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HAPPY PASSENGERS TRAVEL MORE: How to measure and improve Customer Experience by Rail

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HAPPY PASSENGERS TRAVEL MORE: How to measure and improve Customer Experience by Rail.

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1 FOREWORD

Dear Reader,

As Chairman of the UIC Customer Experience Management Platform, it is with great pride that I introduce this comprehensive report called " HAPPY PASSENGERS TRAVEL MORE: How to measure and improve Customer Experience by Rail", a product of rigorous collaboration and a shared vision for the future of rail travel by a selection of UIC members. The representatives of these railways are united by their commitment to shaping the future of rail transport and their dedication to achieving the highest level of customer satisfaction.

Railways have always been more than just a mode of transport; they are a lifeline for millions, connecting people, communities, and economies. Yet, as societal expectations evolve, so too must the rail industry. This report takes you through the intricate weave of modern passenger needs, technological advancements, and strategic frameworks that together define a passenger-centric railway system.

The journey begins with an exploration of the evolving demands of today's passengers—digital-savvy, sustainability-focused, and diverse. It is imperative to understand and anticipate these needs, setting the stage for innovation. From there, the narrative unfolds to highlight the operational pillars that ensure customer satisfaction: reliability, safety, and accessibility. These are dynamic challenges requiring continuous adaptation.

Technology emerges more and more as a powerful enabler, transforming how railways operate and interact with passengers. From AI-driven personalization to IoT-enhanced operations, digital integration offers unparalleled opportunities to streamline journeys and enrich experiences. This report delves into these advancements, illustrating how they can harmonize with the timeless principles of sustainability and inclusivity.

Moreover, the report addresses the critical role of data-driven insights, underscoring the importance of metrics and KPIs in aligning services with passenger expectations. By setting benchmarks through frameworks like UIC's KPIs, railways can measure progress while fostering global consistency.

I invite you to join us on this journey. Become part of the CEMP community! And let yourself be inspired by reading about ambitious projects for the benefit of your passengers, so that the railways can continue to form the backbone of sustainable and innovative mobility in the future.

Yours,

Jörg Ostwald

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2 EXECUTIVE SUMMARY

Transforming Railways through Enhanced Customer Experience

Railways are undergoing a renaissance driven by shifting passenger expectations and rapid technological advancements. This report "HAPPY PASSENGERS TRAVEL MORE: How to measure and improve Customer Experience by Rail" explores a comprehensive roadmap to enhance the railway customer experience (CX), detailing strategies, innovations, and frameworks that align with global mobility goals and passenger-centric values.

This Executive Summary highlights the transformative potential of customer-centric strategies in rail travel. By embracing technological innovation, environmental responsibility, and inclusivity, railways can redefine the passenger experience. and solidify their role as a pillar of modern mobility. The journey to excellence begins with a commitment to understanding and exceeding passenger expectations.

Adapting to Evolving Passenger Expectations

To remain the backbone of future transport, railways must prioritize customer satisfaction. Passengers expect personalized, accessible, and efficient journeys, creating an opportunity for operators to merge operational efficiency with passenger-centric innovation.

Generational preferences highlight the complex and evolving expectations of railway passengers. Younger generations increasingly value sustainable and environmentally conscious practices, reflecting their commitment to combating climate change. In contrast, older demographics emphasize the importance of accessible and diverse services that cater to a broader range of physical and social needs.

Moreover, the pandemic has amplified expectations for hygiene, safety, and contactless service.

These changes highlight the need for railways to adapt to broader societal priorities, balancing environmental stewardship, equitable access, and operational efficiency.

Key Trends Driving Customer Expectations

1. **Digital Convenience.** Passengers now expect seamless access to information and services through digital platforms. From mobile ticketing to real-time train updates, digital integration has become a baseline requirement. Rail operators must invest in user-friendly apps, connected systems, and digital kiosks to meet this expectation.
2. **Personalized Services.** The demand for tailored travel experiences is growing, with passengers seeking options that suit their preferences.
3. **Sustainability Consciousness.** Environmental concerns increasingly influence travel decisions, especially among younger demographics. Railways, as one of the most sustainable transport modes, must strengthen their green credentials through cleaner technologies, carbon-neutral initiatives, and eco-friendly passenger engagement.
4. **Accessibility, Inclusivity and Flexibility.** Ensuring openness for all is essential, particularly for passengers with reduced mobility, elderly travellers and families. Railways must provide barrier-free platforms, tactile navigation aids and inclusive mobile apps, while also offering flexible solutions such as adaptable seating arrangements, on-demand assistance, etc., to meet the diverse and evolving needs of all passengers.
5. **Health and Safety.** Features such as contactless ticketing, enhanced cleaning protocols, and advanced air filtration systems have become vital for maintaining trust and confidence.

Meeting the evolving expectations of passengers directly impacts their satisfaction levels, creating opportunities for rail operators to foster loyalty through tailored strategies.

Customer Satisfaction: The Cornerstone of Railway Success

The ability to meet and exceed passenger expectations determines not only the loyalty of existing users but also the reputation of rail networks in attracting new riders. By aligning operational excellence with modern passenger priorities, railways can ensure long-term growth and resilience.

Customer satisfaction is not merely an outcome but a strategic objective that directly influences ridership, revenue, and public perception. It reflects the effectiveness of operational practices and the emotional connection passengers feel with the service.

There are must drivers to start achieving Customer Satisfaction: Punctuality and Reliability. Comfort and Cleanliness, Ease of Access, Safety and Security and Customer Service.

But this is not enough nowadays: rail operators must adopt proactive strategies that align with passenger priorities:

- **Real-Time Communication.** Providing live updates during service disruptions through apps, SMS, and station announcements minimizes frustration and builds transparency.
- **Personalized Experiences.** Leveraging AI-driven insights allows operators to tailor services to individual preferences, from route recommendations to onboard amenities.
- **Feedback Mechanisms.** Actively soliciting and acting on passenger feedback demonstrates a commitment to continuous improvement and responsiveness.

Building a Railway for All

In continuation of the evolving focus on customer-centric strategies, inclusive service emerges as a fundamental pillar for modern rail systems. By fostering accessibility and equity, operators not only fulfil regulatory obligations but also demonstrate a deep commitment to societal responsibility. An inclusive railway ensures that every passenger, regardless of ability or circumstance, experiences seamless and dignified travel, thereby strengthening public transportation's role in equitable urban mobility.

Inclusive services and barrier-free access benefit not only Persons with Reduced Mobility but also passengers with unique needs, such as those managing prams or strollers, using rollators, or carrying large luggage or bicycles.

Key Features of Inclusive Rail Services:

1. **Barrier-Free Access:** Features like elevators, ramps, and wide entry points ensure that passengers with wheelchairs, strollers, or heavy luggage can navigate stations with ease.
2. **Inclusive Information Systems:** Multimodal information delivery, including audio announcements, visual displays, and tactile guidance, caters to the full spectrum of passenger needs.
3. **Designated Spaces:** Trains now offer dedicated spaces for wheelchairs, service animals, and strollers, along with accessible restrooms, ensuring comfort for all.
4. **Accessible Digital Platforms:** Mobile applications and websites comply with usability standards, offering screen-reader compatibility and simplified interfaces for older or less tech-savvy users.
5. **Empathetic Staff:** Continuous training programs equip staff with the skills to provide personalized support and handle diverse passenger needs effectively.

Streamlining the Passenger Experience

In line with the broader focus on inclusive service and customer satisfaction, simplifying the passenger experience emerges as a key priority for rail operators aiming to meet the expectations of modern travellers. Travel ease directly impacts the perception of rail as a convenient and competitive mode of transport. From the moment a journey is planned to its conclusion, the elimination of friction points creates a positive passenger experience, encouraging greater ridership and supporting the broader goals.

Innovative Practices for Simplified Rail Travel:

1. **Contactless Payment Systems**: This includes innovative solutions like "Be-In/Be-Out" (BIBO) systems, which automatically detect a passenger's entry and exit from the rail network. These systems eliminate the need for physical tickets, streamline access, and provide a seamless, modern, and user-friendly travel experience.
2. **Multimodal Integration**: Unified apps that connect various transport modes allow for seamless door-to-door journey planning. These platforms simplify transfers and encourage the use of public and shared transport options alongside railways. This approach goes beyond first- and last-mile solutions to include comprehensive multimodal offers such as Air-Rail partnerships, enhancing connectivity and expanding travel options.
3. **AI-Driven Personalization**: Artificial intelligence enhances travel by offering personalized journey suggestions, real-time re-routing during disruptions, and updates based on individual preferences.
4. **Enhanced Accommodation** Features: Railways are equipping stations and vehicles with step-free access, tactile navigation aids, and tailored services, ensuring equity in ease of travel.
5. **Advanced Luggage Management**: Automated baggage handling systems, similar to those in airports, are being explored to provide passengers with real-time tracking and streamlined storage solutions, further enhancing convenience.

Key Performance Indicators (KPIs). Measuring Success in Customer Experience

In the pursuit of excellence in rail transport, Key Performance Indicators (KPIs) are indispensable. They act as the compass guiding railway operators toward better performance, improved customer satisfaction, and operational efficiency. Through effective monitoring and analysis, KPIs provide actionable insights that not only highlight areas of strength but also identify weaknesses requiring immediate attention.

Best Practices in KPI Development and Usage:

1. **Strategic Alignment**. KPIs must directly support the strategic goals of the railway operator, whether they focus on expanding services, boosting customer satisfaction.
2. **Stakeholder Collaboration**. Effective KPI frameworks involve input from key stakeholders, including passengers, operational staff, and regulatory bodies.
3. **Dynamic Adaptation**. As market conditions, customer expectations, and regulations evolve, so too must KPIs. Regular reviews and updates maintain their relevance and effectiveness.
4. **Data Visualization and Accessibility**. Modern visualization tools like dashboards and analytics platforms transform KPI data into actionable insights.

The European standard EN 13816 has become a touchstone for ensuring quality in public passenger transport services, offering a structured and comprehensive framework to evaluate and enhance service delivery.

The **UIC's Customer Experience KPIs** Proposal is a pivotal initiative aimed at standardizing the evaluation of passenger satisfaction across international railway networks. The UIC seeks to empower railway operators with actionable metrics that enhance customer experience, operational efficiency, and Safety.

The UIC's KPI proposal sets a structured methodology for capturing both qualitative and quantitative dimensions of rail service delivery. This approach not only streamlines performance monitoring but also ensures alignment with the evolving expectations of modern passengers.

The UIC framework addresses multiple dimensions of customer experience, emphasizing areas critical to the quality of rail services. These KPIs are

categorized to provide a holistic view of performance:

- Operational Performance: Punctuality, Train Availability, Service Disruption Management.
- Customer Satisfaction: Ease of Ticketing, Cleanliness and Maintenance, Customer Care.
- Comfort and Accessibility: Onboard Amenities, Accessibility for passengers with physical, sensory, or cognitive barriers.
- Environmental Sustainability: Energy Efficiency, Carbon Footprint Reduction.
- Safety and Security: Incident Reporting, Passenger Confidence.

Transforming Insights into Action for Superior Rail Services

Monitoring and management strategies are the foundation of delivering reliable, efficient, and customer-centric railway services. By leveraging real-time data, predictive analytics, and fostering cross-functional collaboration, rail operators can address challenges proactively while creating opportunities for sustainable growth and operational excellence.

Core Components of Monitoring Strategies are as follows:

1. **Real-Time Data Collection**: Advanced monitoring technologies, such as IoT sensors and cloud-based systems, provide real-time insights into train performance, passenger flow, and station conditions.
2. **Passenger Feedback Systems**: Mobile apps and kiosks allow passengers to share real-time feedback. Sentiment analysis tools process this information to identify trends and prioritize improvements.
3. **Incident Management Frameworks**: Real-time communication channels, such as alerts and updates, keep stakeholders informed and coordinated.
4. **Mystery Client Programs**: Engaging trained individuals to act as regular passengers provides unbiased and detailed evaluations of services. These programs help identify hidden gaps in the customer experience, such as staff behaviour, cleanliness, or service consistency, that may not be captured through other monitoring methods.

Building Trust and Engagement Through Effective and Seamless Communication

Customer information is more than just an operational necessity in rail transport—it is a pivotal element that shapes passenger perceptions, fosters trust, and builds long-term loyalty. In the digital era, providing timely, accurate, and transparent information has become a key differentiator for rail operators aiming to enhance the customer experience and maintain a competitive edge.

Passenger expectations for information have evolved alongside advancements in technology and communication platforms. Today, rail customers demand real-time, accessible, and personalized updates that cater to their specific travel needs.

Providing seamless communication across all stages of the passenger journey—from pre-trip planning to real-time updates and post-journey interactions—is essential for operational success and customer satisfaction.

- **Pre-Journey Information**: Shaping First Impressions and Setting Expectations. The passenger journey begins long before they board a train. Pre-journey information plays a crucial role in setting expectations and facilitating smooth travel. For many passengers, the ability to access accurate pre-journey information reduces travel anxiety, builds trust, and sets a positive tone for the overall experience.
- **Real-Time Updates**: Ensuring a Stress-Free Journey and Enabling Informed Decisions. The travel phase is where accurate and immediate information is most vital. Passengers rely on dynamic communication to navigate disruptions, delays, or schedule changes effectively, allowing passengers to adjust plans in real time.
- **Post-Journey Engagement: Building Lasting Connections**. Passenger interaction doesn't end

when the journey is complete. Post-journey communication offers opportunities to enhance customer loyalty and gather insights for continuous improvement.

Mechanisms such as post-trip surveys and digital feedback platforms enable passengers to share their experiences, providing operators with valuable data for service improvement.

Emerging technologies are transforming the way rail operators communicate with passengers, providing more sophisticated and efficient methods for delivering information.

Adapting Pricing Strategies to Modern Passenger Needs

Modernizing tariff systems is more than a financial imperative—it's a strategic adaptation to the evolving preferences and expectations of passengers. As societal shifts and technological advancements reshape travel patterns, rail operators must embrace flexible, innovative pricing models to enhance customer satisfaction, and foster integration.

The traditional rigid fare systems, built around fixed schedules and zones, no longer suffice in the face of changing passenger behaviours. Factors such as the rise of remote work, increased leisure travel, and growing environmental consciousness have created a demand for personalized and flexible pricing options.

Post-pandemic travel patterns underscore this shift. Rail operators must innovate to meet these new behaviours, balancing revenue generation with a seamless and equitable customer experience.

- **Dynamic pricing models** are gaining traction in rail transport. Implementing dynamic pricing requires advanced data analytics and transparent communication to foster passenger trust and acceptance. Clear explanations of pricing mechanisms are vital to ensuring passengers perceive the system as fair and advantageous.
- **Subscription tariffs**, inspired by the success of streaming platforms, are tailored for hybrid commuters and frequent leisure travellers. These plans provide predictable costs and convenience, appealing to passengers with diverse needs.

New tariff models present an opportunity to align pricing strategies with sustainability goals. Examples include:

- **Eco-Friendly Discounts**: Incentives for using electric trains or integrating rail travel with bicycles.
- **Green Loyalty Programs**: Rewarding frequent use of sustainable transport modes to encourage long-term eco-conscious travel behaviours.

Encouraging Positive Passenger Behaviours Through Subtle Interventions

Nudging is a subtle yet transformative strategy that enables railway operators to guide customer behaviour effectively. By designing thoughtful interventions grounded in behavioural science, operators can address key challenges such as congestion, and compliance while enhancing the overall passenger experience.

Nudging strategies have emerged as a powerful tool to influence passenger behaviour in the railway industry without resorting to compulsion or enforcement.

The railway sector has adopted nudging strategies in various areas, demonstrating their potential to optimize customer behaviour, for example: Improving Passenger Flow, Encouraging Sustainable Choices, Promoting Off-Peak Travel or Boosting Ticket Compliance.

To craft effective nudges, railway operators must balance psychological principles with operational objectives. Key considerations include Clarity and Simplicity, Personalization or Transparency.

Transforming Railway Services Through AI Innovation

Artificial Intelligence is redefining the boundaries of what is possible in rail customer experience. By enabling personalized service and optimizing operations, AI represents a transformative force for the railway sector.

its successful adoption requires thoughtful planning, ethical implementation, and continuous innovation. In the railway sector, AI is driving a paradigm shift in

customer experience by enabling smarter, more responsive, and efficient services.

The integration of AI in rail services comes with its set of challenges. Data privacy and security are paramount, as AI systems rely heavily on personal and operational data. Ensuring that data is handled transparently and ethically is critical to maintaining passenger trust.

Designing a Calmer, More Enjoyable Passenger Experience

While technological advancements like AI enhance operational efficiency, creating a serene and stress-free travel experience requires a focus on the human aspects of rail travel.

In a fast-paced and stressful world, the creation of Positive Emotions in rail travel have emerged as a vital component of customer experience. More than just transportation, passengers increasingly seek a reprieve from their daily routines—an environment that prioritizes calm and relaxation.

Positive Emotions are not merely a luxury; it's a strategic differentiator that enhances passenger satisfaction and loyalty. Research underscores the link between stress-free travel environments and increased customer satisfaction, making it imperative for operators to embed calmness into their services.

The potential of rail travel extends beyond mere transportation—it can actively support mental well-being, for example: Quiet Zones, Wellness Areas in Stations or Leisure Experiences.

3 INTRODUCTION

3.1 WHAT DO CUSTOMERS WANT?

It is known that reliability is key – punctual, frequent, value for money services. Most recently it was identified that on-board factors including comfort of seating, cleanliness and a fast internet connection, were all in the top 14 of passenger priorities.

Post-pandemic customer has shifted from a daily commute to hybrid working. Again, the factors for a better perception of Customers Experience may be changing.

Future generations are becoming more open-minded and accepting and will expect a tailored and individualised journey allowing them to be connected on the move and able to work effectively. Extracting and utilising data effectively is key to achieving this.

Therefore, this changing customer experience influences the train designs, stations, fares, etc., of the future both for work and leisure.

Source: Voldico

Meeting these evolving customer expectations is essential if rail is to fulfil its strategic potential as outlined in the Rail 2050 Vision.

3.2 THE RAIL 2050 VISION

According to the European Rail Research Advisory Council's (ERRAC) 'Rail 2050 Vision' document, rail transport "already plays a vital role in supporting Europe's society, developing its economy, and protecting its environment.

It has the potential to contribute much more"1.

In its document, ERRAC wanted to draw the attention on the rail sector and its contributions to economic, societal and environmental aspects, and on the challenges and opportunities the sector faces arising from societal changes and other trends. A deep analysis on the unexploited potential is made, and key enablers for delivering the Rail 2050 Vision are listed.

3.3 HOW TO TRANSFORM RAILWAY COMPANIES IN CUSTOMER-CENTRIC ORGANISATIONS

Transforming into a customer-centric organization is an ongoing process that requires commitment, adaptability, and a willingness to continuously improve.

Transforming railway companies into customer-centric organizations requires a comprehensive approach that includes the following steps.

- Understand customer needs: Conduct thorough research to gain a deep understanding of the needs, preferences, and pain points of your customers. Use surveys, focus groups, and data analytics to gather insights into their expectations, challenges, and aspirations when it comes to railway services.
- Develop a customer-centric vision: Define a clear vision and mission statement that places customers at the centre of your organization's goals. This vision should guide your decision-making processes and align the entire company towards delivering exceptional customer experience.

  For instance, companies like NS in the Netherlands have implemented comprehensive customer feedback mechanisms to adjust service delivery in real time, leading to higher passenger satisfaction.

- Empower frontline staff: Equip your frontline staff with the necessary tools, training, and authority to provide excellent customer service. Encourage and empower them to go above and beyond to meet customer needs. Foster a culture that values customer-centricity and encourages employees to take ownership of customer satisfaction.
- Enhance communication channels: Improve communication channels to enable seamless and efficient interactions between customers and the railway company. This can include implementing user-friendly mobile apps, online ticketing systems, and customer service hotlines. Emphasize transparency and responsiveness in all communication.
- Personalize customer experiences: Leverage customer data and technology to personalize interactions and services. Tailor offerings based on individual preferences, travel history, and feedback. Use targeted marketing campaigns to inform customers about relevant offers and promotions.
- Continuously gather and act on customer feedback: Establish mechanisms to gather customer feedback at various touchpoints, such as after travel experiences or through surveys. Actively analyse and act on this feedback to identify areas for improvement and make necessary changes to enhance the overall customer experience.
- Foster a culture of continuous improvement: Encourage innovation and continuous improvement throughout the organization. Regularly review and refine processes, products, and services to better align with customer needs and expectations. Encourage employees to contribute ideas and suggestions for improvement.
- Measure customer-centric metrics: Develop and track key performance indicators (KPIs) that reflect customer-centricity, such as customer satisfaction scores, Net Promoter Score (NPS), and customer retention rates. Use these metrics to assess progress and make data-driven decisions.
- Collaborate with customers: Engage customers in co-creation activities and involve them in the decision-making process. Conduct customer workshops, focus groups, and advisory panels to gather insights and involve them in designing new services or improving existing ones.
- Reward and recognize customer-centric behaviour: Implement recognition and reward programs to acknowledge and incentivize employees who consistently demonstrate customer-centric behaviour. Celebrate success stories and share positive customer feedback across the organization to reinforce the importance of customer satisfaction.

In summary, transforming into a customer-centric organization involves a commitment to continuous improvement, placing customer needs at the heart of decision-making, and fostering a culture of service excellence across all levels of the organization.

3.4 CEMP OBJECTIVES AND PURPOSE

Passengers' satisfaction toward rail transport services will be affected in different ways. They were including expectation, satisfaction, attitude, substitutional mode availability, and accessibility to rail transportation. Passengers always expected that what they received are more than what they had paid.

Thus, pricing will be the most important concern in order to improve the satisfaction of passengers. Besides that, operators can improve the quality of

rail transport services since it contains high potential to attract people to use the train services.

Amsterdam Central transport hub. Source NS International

But what make people feel more satisfied with rail transportation is to add value on all of the services. For example, operators need to provide a good cleanliness no matter inside the railway station or train, availability of security room at station, high speed Wi-Fi available at station and train, etc. Further, features of rail transportation will improve the satisfaction of passenger toward rail transportation.

The CEMP project´s objective is to improve the overall Customer Experience knowledge in the railway sector and thus increasing its attractiveness and profitability with the final objective of fostering a seamless customer experience across railway operators and across different modes of transport answering to the vision of the Railway Sector Vision "Challenge 2050" regarding "Value for money Services".

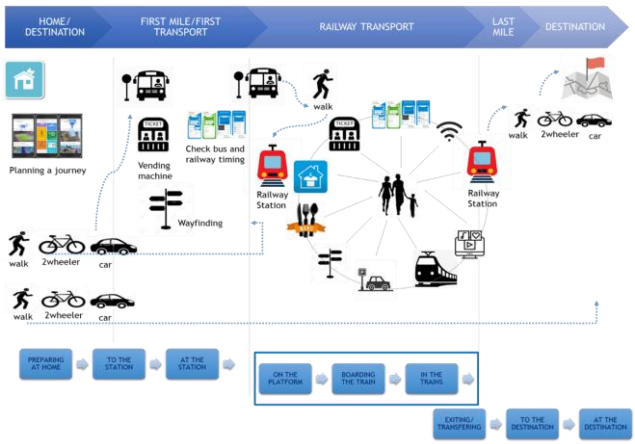
Customer Experience is relevant in the context of railways, and already active in an increasing number of railway companies (SBB, CFL, OBB, NS, SNCB, MAV-START, EUSKOTREN, etc.).

The railway community is collaborating in laying the foundation for tools and measures for customer experience management.

One of the challenges is to have railway companies ready for the near future (competitivity) by:

- Responding to customer needs along the whole journey
- Creating a customer centric culture so all staff go all the way for their customer (internal/external)

An important aspect for an excellent customer care is to develop a customer care culture, which influence the staff in the delivery of good customer service, in order to provide a continuity to the existing company culture, values, etc.



Integral Journey Consideration

In addition to exploiting the typical communication channels like e-mail, hotline calls and written communications, operators establish customer communication channels and ask for feedback from its customers through surveys.

It is very helpful to know the customer's opinion regarding the operating services including but not limited to:

- Customer Services Officer Staff (at stations and on board)
- Other Staff
- Passenger Helpdesk via free-phone, email and in writing
- Lost property
- Website content, functionality and ease of use of information
- Customer service provided by the rail replacement transport service (normally by buses)
- Special events
- Awareness of ticketing / marketing strategy
- Passenger information points

- Security perception

Tradition and modernity are in harmony on the Hungarian Railways

3.5 EMOTIONS IN THE PYRAMID OF CUSTOMER NEEDS

Customer expectations can be described according to the pyramid figure below. In the bases of the pyramid there are the universal needs (main principles) and on the top cultural needs and tailor-based solutions.

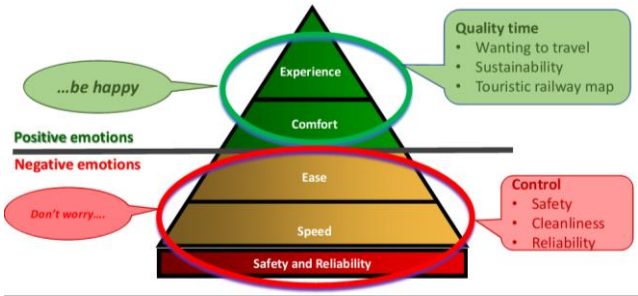
It is needed to understand each specific need to offer the most appropriated service in each case, regarding experience like safety, security, cleanliness, accessibility, wayfinding, ergonomic, entertainment, lighting, etc.

Very high levels of customer satisfaction reflect user contentment with high-quality, reliable and good value services.

The customer's need can be classified into:

- Required – achieve minimum requirements and regulations. Meeting physiological and functional needs. This means reliability, efficiency, security, etc. If not in place, the customer will experiment dissatisfaction.
- Expected – intuitive and customized. It is a kind of promise. This implies an improved service, enhanced experience, etc.
- Valued - Excellence (one step beyond): Excellent hospitality, outstanding design, surprising concepts, etc. Customers' expectations are exceeded.

The pyramid of customer needs illustrates that while foundational requirements like safety and reliability are crucial to prevent negative emotions, addressing higher-level needs such as comfort and experience is essential for fostering positive emotions. By comprehensively addressing each level of the pyramid, railway services can significantly enhance the overall travel experience, leading to higher customer satisfaction and loyalty.



Emotions in the Pyramid of Customer Needs

The figure above provides a layered understanding of how different aspects of railway services fulfill passenger needs and the associated emotional responses.

This pyramid is a hierarchical model that demonstrates how meeting various levels of customer needs can either evoke positive emotions or prevent negative ones, ultimately enhancing the overall travel experience.

- The Foundation: Safety and Reliability

At the base of the pyramid are the fundamental needs of safety and reliability. These are the cornerstones of any effective railway service.

Key attributes at this level include:

- Safety: Ensuring that passengers feel secure throughout their journey.
- Cleanliness: Maintaining a clean environment to promote health and comfort.
- Reliability: Providing consistent and dependable service schedules.
- Meeting these foundational needs is crucial to prevent negative emotions such as fear and anxiety, encapsulated by the phrase "Don't worry...". When these needs are met,

passengers feel a sense of control, which fosters trust in the service.

- The Middle Layers: Speed, Ease, and Comfort

Moving up the pyramid, the next level emphasizes speed. This addresses the need for efficiency and timeliness, which are essential for minimizing frustration and making the journey more convenient.

When trains are punctual and quick, passengers experience ease, reducing the stress associated with travel delays.

Above speed, ease of use becomes paramount. This level focuses on convenience and accessibility, ensuring that passengers can navigate the system effortlessly. Positive emotions such as comfort arise when these needs are adequately met, contributing to a smoother travel experience.

- The subsequent level highlights comfort, focusing on the physical aspects of the journey such as seating, ambiance, and space. Ensuring passenger comfort can transform the travel experience from merely functional to genuinely enjoyable, promoting feelings of relaxation and satisfaction.
- The Pinnacle: Experience

At the apex of the pyramid is the customer's overall experience.

This level encompasses:

- Quality Time: Creating an environment where passengers can make the most of their travel time.
- Sustainability: Implementing eco-friendly practices that appeal to environmentally conscious travelers.
- Touristic Railway Map: Offering additional features such as informative guides and scenic routes that enhance the journey.

Achieving excellence at this level generates the highest positive emotions, such as happiness and pleasure, symbolized by the phrase "...be happy".

Providing a memorable and enriching experience ensures that passengers not only choose to travel by train but also enjoy the journey itself.

3.6 CUSTOMER CENTRIC APPROACH

The priorities of this study are to provide an overview on best practices on Customer Experience on a global scale, including a rail case study based on a real example, as well as making an analysis of future challenges.

Public transport is changing rapidly, and new forms of societal organisation and technologies are emerging, influence and redefine the needs and requirements of the modern customers of the public transport sector.

The fact that the public transport sector has never really had a strong customer orientation has been an impediment to develop a deep understanding of the user of its services.

Trains and buses run in an integrated system across the country. Source: MAV

With the exception of reduced mobility groups, the attempts to understand the emerging needs of most transport customer segments have been rather scarce and fast obsolete.

The mobility of the future will be simple, personal and connected.

Public Transport is on the brink of a new era of "smart mobility" of interconnectivity which is affecting if not disrupting PT operation; social media and networks, mobile/smart phone applications, smart travel information systems, Open Data / Open Service, Big Data, real-time inter-modal journey planning, transport management centres or systems controlling multimodality and complexity, etc., are revolutionizing passenger experience and put the

operators' and authorities' operations to a serious test.

It is time for railways to take a **customer-centric approach**, like airline companies have been doing in recent years. Doing so means using service as a key differentiator; interacting with customers based on their needs and their value to the organization; adopting a fact-based approach to decisions using customer data as a primary source of insight; embracing new channels; and building a customer-focused culture.

Future-ready rail companies, such as JR East in Japan, have begun integrating AI-powered chatbots and predictive maintenance systems to enhance both customer service and operational efficiency.

Building a customer-centric railway means offering passengers memorable and lasting experiences, harnessing customer insight, embracing new channels, and building a customer-focus culture.

To do this, Railway Companies must follow the principles of IDIC:

- Identify customers as unique, addressable individuals.

  By looking at the customer experience through the eyes of the customer, it can be understood the moments of truth that will define a consistent customer experience.

  The view of the interaction must be from end to end, across every single touchpoint, from a variety of instances, including service failure.

- Differentiate by value, behaviour, and needs

  Customers have different needs and values to the company; those needs and value are fluid.

  Fully understanding customers requires a comprehensive segmentation of needs, behaviour, and value.

  Customer needs drive behaviour, which in turn creates value to the railway company.

- Interact more cost-effectively and efficiently

  Customer service is especially important because the service interaction is one of the few opportunities that companies have to personally interact with their customers. Service experiences allow a company to further understand a customer's needs.

  By knowing the "moments of truth" that mean the most to the customer, you can get a better idea of what aspects of service are critical. But the real power is to take advantage of the ability to link these services with specific customer profiles and segments.

- Customize some aspects of the company's behaviour, offerings, or communication

  Customer feedback is especially rich when it is collected immediately after an interaction, when both the memory and the emotion of the incident are fresh. Doing so typically elevates response rates significantly

- Improve cooperation between silos in the organization, creating transversal platforms on each hierarchical level

Silos in the organization. Example. Source: SNCB

- Provide customized services based on distinct customer needs
- Make pricing easier to understand
- Develop an integrated social media strategy
- Avoid the gap between reality on the field and central services
- Foster of autonomy at a local level
- Field staff motivated to improve the customer experience, finding creative solutions within existing limitations
- Collaboration of human resources department
  - Boost customer centricity in onboarding (business game Customer Centricity) &

training for starters, follow up trainings, also for managers

- Recruitment: Job descriptions, Selection (criteria, trainings for job interviewers…)
- Performance management: Link variable salary & customer satisfaction; common objectives: EBITDA, punctuality & work accidents

- Scale up role customer insights that were not being distributed.
  - Set up a structured way to capture the voice of the customer
  - Use these insights to integrate them in crucial projects (e.g. standard designs for stations, website overhaul, redefine transport conditions…)
  - Customer insights distributed throughout the organisation.
- Support motivated staff to find creative solutions within existing limitations
- Boost the cooperation between the departments
- Closing the gap between central and local level
- Identify the customer journey and moments of truth
- Distribute relevant customer satisfaction KPI's
- Create transversal platforms on each hierarchical level.

The vision and goals in Challenge 2050 are all underpinned by the steps taken in the core rail system fields of policy (what needs to be done), technology (developing the tools to enable it to be done) and providing services (what the user perceives and receives when a customer of rail).

These apply across the whole vision, overlap and come together to enhance the overall attractiveness of rail to the customer.

Very high levels of customer satisfaction reflect user contentment with high-quality, reliable and good value services.

Railway company needs to adopt a culture of service excellence to respond to the increasing and ever-changing needs and expectations of customers, while successfully providing them with a positive experience. They have to be the very heart of all the company activities.

This requires **the development of a customer-centric culture** and the provision of high-quality services all along the customer's trip, from the point of origin to the destination.

Passenger Communication. Info Provided to passengers. Source: SCNB

3.7 KEY PERFORMANCE INDICATORS

You Can't Manage What You Can't Measure

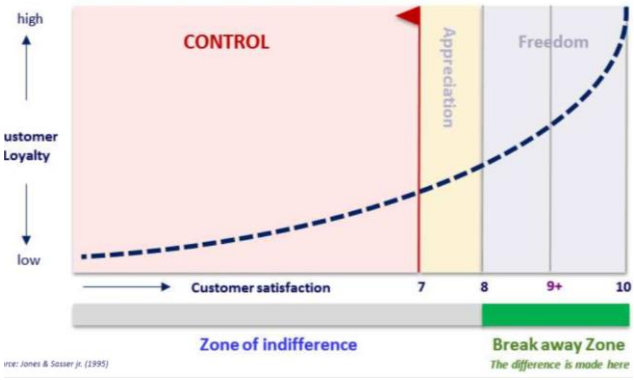
Key Performance Indicators (KPIs) are critical for quantifying customer satisfaction, operational efficiency, and overall service quality. Common KPIs in the rail industry include Net Promoter Scores, on-time performance, and passenger load factors.

It is crucial to deliver a good transport performance persistently and build up a favourable perception in the mind of the passengers.

Therefore, customer who use the service on a regular basis will become more entrenched while encouraging potential new users who have not yet used the service before, so it would increase the demand and revenues.

As long as the favourable perception exists in the mind of passengers, they would tend to tolerate an occasional bout of a sub-standard service. The users

would remain confident regarding the overall performance and would continue using the infrastructure.



Higher scores, more loyalty, more revenue. Source: Jones & Sasser jr. (1995). Mark van Hagen.

Investments in improving customer experience is supposed to increase the number of passengers in trains and consequently to gain more profitable revenues.

On the contrary, if the performance is persistently below expectations, passengers would soon develop an unfavourable feeling and would look for other available alternatives, and it would be hard to encourage new passengers.

Together a drop-in patronage and revenue is expected in the long run.

Once as unfavourable perception is developed, it may be hard to remove it. Even though a good performance is delivered, passengers may perceive this done by chance. Nevertheless, as long as the good performance is maintained, passengers would not be forced to look for other alternatives immediately.

The principles that underpin the performance measurement framework are:

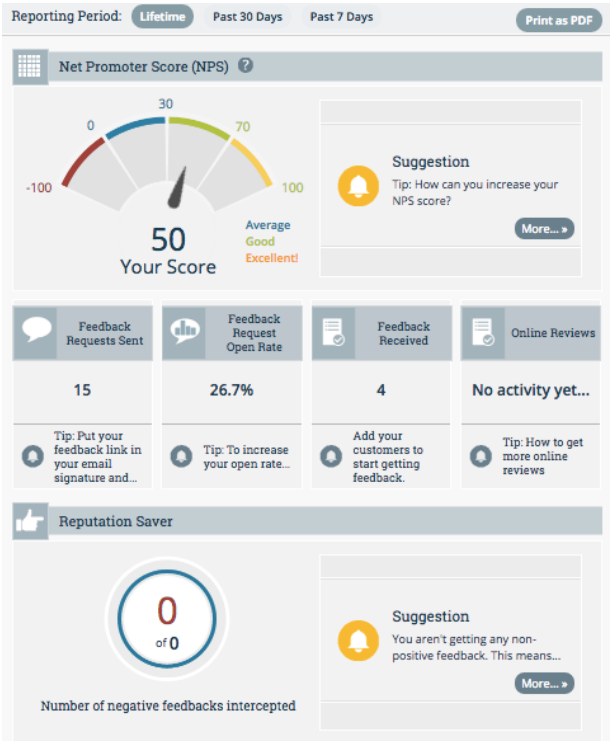
- Measures should be meaningful and relevant to management of key processes and strategic objectives
- Targets and performance review levels should be clearly derived from a balanced consideration of expectations of all stakeholders and philosophy of continuous improvement
- The right people should have measurement information at the right time
- Management information must be assured and controlled to ensure integrity, validity and consistency.

The target levels should be based on an understanding of:

- Customer requirements
- Strategic objectives for excellence
- Current performance
- Past performance trends
- Resource availability
- Planned improvement activities
- Benchmarked world class performance levels

<u>Review of measures and targets</u>

- introduction of new measures or deletion of measures as and when processes are changed
- formal reviews of key processes
- changes resulting from improvement projects and other regular audits
- formal change control to the register of organisational measures.



Example of analytics dashboard

Artificial Intelligence could use advanced algorithms to analyse customer reviews and comments. Using dependency relations, proprietary industry-specific tagging, complex grammar and syntactic rules, cognitive/pragmatic rules, and other resources that analyses reviews and identifies feelings and opinions.

Happy customers are loyal customers, that's why it's so important to be able to measure how your customers feel about railway service.

3.8 CORPORATE SOCIAL RESPONSIBILITY

It does make sense to talk about Corporate Social Responsibility (CSR) when discussing railway customer experience. Corporate Social Responsibility refers to a company's commitment to operating in an ethical and responsible manner, taking into consideration its impact on society, the environment, and various stakeholders beyond its primary profit-making objectives.

Corporate social responsibility. Source: Slovenske Železnice

It is a way to do business in a responsible way, serving customers and benefiting the communities around the stations.

It not only improves the perception of the railway service but can also attract passengers who value responsible and sustainable travel options.

When discussing railway customer experience, integrating CSR principles can have several important implications:

- Environmental Impact: Railways are generally considered a more environmentally friendly mode of transportation compared to road or air travel. Emphasizing CSR within railway operations can highlight the positive impact of choosing trains for travel, contributing to reduced carbon emissions and air pollution. This can enhance the overall customer experience by aligning with environmentally conscious values.
- Accessibility and Inclusivity: CSR efforts can focus on ensuring accessibility for all passengers, including those with disabilities. Investing in accessible infrastructure, providing proper signage, and offering services for passengers with special needs can improve the customer experience for a wider range of individuals.
- Community Engagement: Railways often have a significant impact on local communities. Engaging in CSR initiatives that benefit local communities—such as supporting education, infrastructure improvements, or cultural preservation—can create positive relationships and improve the perception of the railway among both passengers and residents.
- Ethical Business Practices: CSR can extend to ethical business practices, such as fair labour practices for railway employees and suppliers. Treating employees well and ensuring that suppliers adhere to ethical standards can positively influence the overall image of the railway company.

Corporate and social responsibility. Source Southern Railways

- Safety and Security: Prioritizing passenger safety and security is a key aspect of CSR in the context of railways. Implementing and promoting safety measures, emergency response systems, and

communication protocols can enhance passengers' sense of security and well-being.

- Transparent Communication: Openly communicating CSR initiatives and their impacts to passengers can enhance the overall customer experience by providing insight into the values and efforts of the railway company.
- Long-Term Viability: CSR considerations can include long-term sustainability, which aligns with the goals of maintaining high-quality service for passengers over the years. Sustainable practices can contribute to the longevity of the railway service.

For example, Southern Railways focus on making a real difference in three important areas of society: young people, Homelessness and Mental Health & Healthcare.

They develop this this by continuing to build close relationships with community groups and charity organisations, providing support and opportunities to address these issues.

4 CHANGING CUSTOMER NEEDS

4.1 INTRODUCTION

As mentioned in the previous section Introduction, the rail industry's shift toward a customer-centric approach is driven by evolving societal expectations and technological advancements. In this section, it will be explored how the traditional customer needs—such as reliability and safety—are expanding to include modern expectations like digital integration, sustainability, and personalization, reflecting the changing dynamics of customer behaviour.

As we move into the future, the railway industry stands on the cusp of a transformative era. The dynamics of customer expectations are not just evolving; they are accelerating with advancements in technology and shifts in societal norms.

To stay relevant and continue to enhance customer satisfaction, the rail sector must proactively embrace these changes and forecast future trends. This section outlines strategic priorities that will define the next generation of rail travel, focusing on personalization, technology integration, sustainability, and inclusivity.

New Customer Needs.

In the future, railways will increasingly leverage data analytics and AI to offer a highly personalized travel experience. By analysing passenger data, rail companies can predict travel preferences and tailor services to individual needs. This could include customized seating options, personalized entertainment, and even tailored dining choices available through digital platforms during the journey.

4.2 RAIL CUSTOMERS CLASSIC NEEDS

Historically, the foundational needs of rail customers have revolved around a few core aspects of the service experience.

- **Reliability** has always been paramount; passengers expect trains to operate on a precise schedule with minimal delays.
- **Safety** is another non-negotiable aspect, as travellers need to feel secure throughout their journey.
- **Affordability** plays a crucial role, as cost-effectiveness attracts regular commuters and occasional travellers alike.
- Lastly, **comfort**—whether it means having sufficient seating, adequate climate control, or cleanliness—has been a basic expectation of all passengers.

These classical needs form the backbone of rail service delivery, with additional expectations such as **information accessibility** becoming more pronounced over time.

Passengers have long valued clear, accurate, and timely information about schedules, delays, service changes, and ticketing options, preferably available across multiple platforms.

4.3 EVOLVING NEEDS OF MODERN RAIL CUSTOMERS

In recent years, the landscape of customer needs in rail transport has shifted dramatically, mirroring changes in technology, societal expectations, and lifestyle dynamics. **Modern passengers are not just**

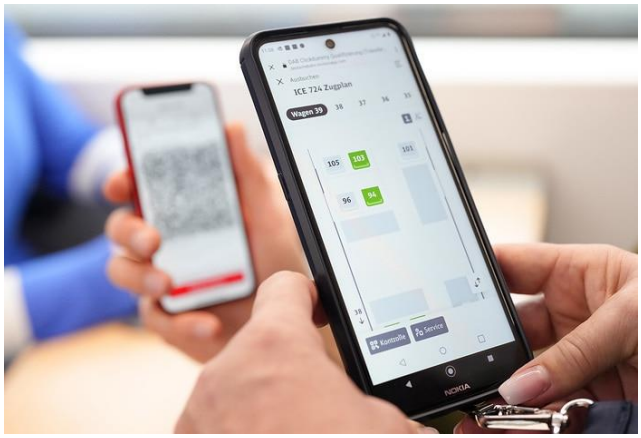
looking for basic service delivery; they seek a holistic experience that aligns with their digital, connected lives. The evolution of these needs can be attributed to several contemporary trends:

- **Digital Integration**: Today's rail customers expect a seamless digital experience. This includes travel recommendations based on user behaviour and preferences, enhancing convenience and accessibility, mobile ticketing options, flexible pricing, real-time updates and digital navigation aids within stations.

  The integration of Wi-Fi services on trains and throughout stations has moved from a luxury to a necessity, enabling passengers to stay connected for work or leisure.

  With the rise of digital platforms, passengers now expect real-time updates at their fingertips through mobile apps, websites, and digital signage. These platforms not only offer convenience but also provide personalized travel recommendations and alerts, ensuring a smoother journey.

  For many customers, uninterrupted connectivity through onboard Wi-Fi has become a necessity rather than a luxury, allowing them to work, browse, or stay in touch during their trip.



Digital on-board service Workstation. Source: DB

- **Personalization**: Modern customers value personalized services that acknowledge their preferences and history with the brand. Loyalty programs, personalized travel recommendations, and customized alerts about preferred routes or travel times are becoming standard expectations.
- **Sustainability**: Environmental consciousness has steered customer preferences towards more sustainable travel options. Passengers increasingly prefer rail services that demonstrate a commitment to sustainability, not only in operations (e.g., energy-efficient trains) but also in practices (e.g., reduced paper use, recycling programs).

  Sustainability is a key driver of customer choices today. Railway companies that embrace energy-efficient technologies—such as regenerative braking systems, solar-powered stations, and eco-friendly materials—can appeal to passengers who prioritize environmental responsibility.

  These practices not only help reduce the carbon footprint of travel but also align with the increasing demand for greener transportation solutions
- **Enhanced Comfort and Amenities**: Beyond the basic comfort of seating, modern rail services are expected to provide enhanced amenities. Quiet zones, enhanced dining options, and even gym facilities or business pods on longer routes are examples of how rail companies are innovating to meet new demands.
- **Security and Privacy**: As data becomes central to the customer experience, concerns about privacy and data security are at the forefront. Customers expect not only physical safety but also the secure handling of their personal and payment data.

  As technology advances, so do the challenges of ensuring the safety and security of passengers. Future rail systems will incorporate more sophisticated surveillance and monitoring technologies, using AI to detect and respond to potential security threats rapidly.

  As the rail industry becomes increasingly reliant on digital services, the need for robust data privacy and security measures grows. Ensuring compliance with regulations like the GDPR is

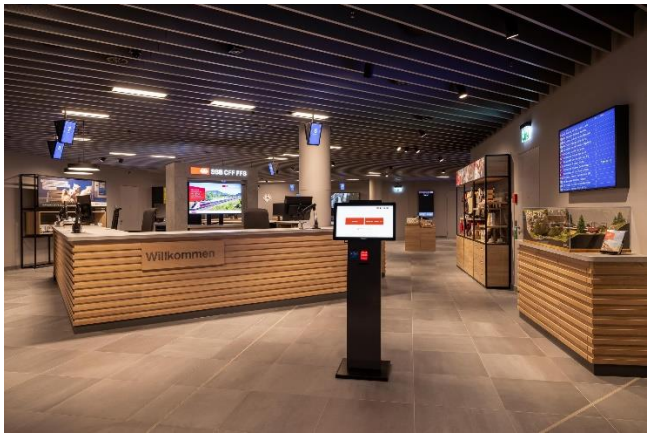
crucial to safeguarding customer information. Rail companies must prioritize transparency in how they collect, store, and use data to build trust and protect passengers from data breaches.

Cybersecurity measures will be strengthened to protect passenger data and secure communication networks within the rail system.

- **Flexibility and Agility**: In an era where travel plans can change rapidly, customers appreciate flexibility in ticket bookings, refunds, and cancellations. Agile customer service that can adapt to individual circumstances, particularly during disruptions, enhances customer trust and loyalty.

  As work-from-home models become more prevalent post-pandemic, customers are seeking greater flexibility in their travel arrangements. Flexible ticket options, such as part-time commuter passes and discounted weekend travel packages, are becoming essential for accommodating hybrid work schedules.

  By offering flexible and dynamic pricing options, railways can cater to a broader range of customer needs and adapt to evolving travel patterns



SBB Travel Centre Zurich Airport (Source: SBB)

- **Experience and Engagement**: The modern rail passenger views travel as an experience rather than a mere necessity. This includes everything from the aesthetic of the train and station design to onboard entertainment and community-building events. Engagement through apps and social media, offering travel tips, rewards, and interactive platforms, also plays into the modern customer's journey.
- **Accessibility**: Enhanced focus on inclusivity has led to a greater need for services that are accessible to all, including those with disabilities, elderly passengers, and non-native language speakers. This involves auditory and visual aids, better physical accessibility within stations and trains, and staff trained to assist a diverse clientele.

4.4 PERSONALIZATION / CUSTOMIZATION

In today's market, personalization is no longer an extra—it's an expectation. Loyalty programs, customized travel alerts, and even seating preferences are examples of how rail companies can cater to individual preferences.

By analysing passenger data, railways can offer tailored recommendations that enhance the overall journey, from ticketing to onboard services. These tailored experiences help build long-term relationships with passengers.

- Customers remember highly positive and frictionless interactions with businesses, and they will continue to seek that experience the next time they think of making a purchase.

  Customers gravitate toward the brands that recognize them as individuals at every step of their journey.

- Personalized customer experience essentially means that you know or remember whom you are interacting with.

It refers to a marketing technique that helps to tailor your communication with each customer, either during direct interactions or individualized messaging.

- Customized experience is all about understanding customer journeys and designing services.

- Products to meet customer's individual requirements.
- Personalized support not only benefits the customers, but if done right, it differentiates you from your competitors.

4.4.1 Importance

- Boost customer retention - It increases the number of repeat customers, revenue, and customer lifetime value (CLV).
- Higher conversion rate - Personalized interaction with customers delights and convinces them to spend more.
- Drives customer loyalty - Keeping the customer first from the initial stages of the client journey, raise their expectations and increase customer loyalty.
- Increase average order value (AOV) - Personalized experience drives impulse purchases.

4.4.2 Main Source for Information

In the realm of customer experience within the railway sector, understanding the pivotal stages of consumer behaviour is crucial for enhancing service delivery and customer satisfaction. A noteworthy aspect of consumer behaviour, as identified in recent research, is the information search and evaluation phase.

This stage is paramount in shaping the decision-making process of consumers, mirroring findings from studies in other industries, such as the mobile phone market, where the internet emerges as the primary source for customers seeking product information, irrespective of whether the purchase is a first-time or repeat one.

Translating these insights into the railway context, it becomes evident that passengers increasingly rely on digital platforms to gather information about rail services. This trend underscores the necessity for railway operators to invest in robust online presence and information dissemination strategies. Providing comprehensive, easily accessible online content about train schedules, ticketing options, service updates, and comparative analyses with other modes of transportation can significantly influence passenger decisions.

Furthermore, the digital strategy should encompass the promotion of features that differentiate rail services from competitors, such as sustainability attributes, comfort, and convenience.

The findings also highlight the impact of demographic factors, such as income, education, and occupation, on the decision-making process, albeit with nuances. For instance, income levels may influence the preference for certain rail services or ticket types. Similarly, education and gender have been shown to affect the propensity to purchase services online, suggesting that railway marketing strategies should consider demographic segmentation to tailor information and promotions effectively.

Moreover, the study's limitation to a single product category and geographic area points towards an opportunity for the railway industry to conduct broader, more diverse research. Expanding the scope of studies to include various rail services and regions could provide more generalizable insights, enabling operators to refine their customer experience strategies further.

A longitudinal approach, examining changes in consumer behaviour over time, could also yield valuable information for long-term planning and service improvement.

In conclusion, the internet's role as the main source of information for consumers highlights the need for

railway operators to prioritize digital engagement and information provision. By focusing on online platforms as a key touchpoint, rail companies can enhance visibility, influence passenger decision-making, and improve overall customer experience.

This strategic focus, coupled with an understanding of demographic influences, will enable the railway sector to meet the evolving needs and expectations of today's digitally savvy passengers.

4.4.3 Ways to Create a Personalized Customer Experience - Examples

- Following practical ways provide a framework that will allow to deliver a personalized customer experience:
  - Segment to build customer profiles
  - Plan an omnichannel customer experience strategy
  - Automate your customer experience
  - Deliver contextual support
  - Develop a self-service experience
  - Listen to customer feedback
  - Allow customers to be a part of the personalization process
  - Personalize every communication
  - Empower employees to create personalized customer experience examples
  - Personalize your email communication

A premium class seat comes with an on-board hot drink. Source: (MAV-START)

- Highly personalized customer experiences, when offered to customers, enable differentiate themselves but also to gain a sustainable competitive advantage.

4.5 FUTURE DIRECTIONS

The evolution of customer needs in the railway sector reflects broader societal shifts towards digital integration, personalized services, and sustainable practices.

Rail companies that anticipate and adapt to these evolving needs, while still maintaining the high standards of reliability, safety, affordability, and comfort, will thrive in the competitive landscape of public transport.

The future of rail travel hinges not only on meeting these expanded customer needs but on embedding them into the very fabric of service design and delivery, ensuring a resilient, attractive, and forward-thinking rail system.

The integration of IoT and smart technologies into railway infrastructure and rolling stock will revolutionize how passengers interact with the railway system. Real-time data will drive dynamic scheduling and route management, reducing delays and optimizing traffic flow.

Cityet Desiro ML. Souce: ÖBB

Augmented reality (AR) could transform passenger navigation within stations, providing intuitive directions and information, enhancing the

passenger's ability to move efficiently and comfortably through large or complex stations.

The future of railway customer experience is a dynamic, exciting frontier that promises to redefine the parameters of public transportation. By embracing innovation and fostering a culture of continuous improvement, the rail industry can ensure that it not only meets but anticipates the needs of its customers, paving the way for a more connected and sustainable world. As we continue to navigate these changes, our focus will remain steadfast on delivering excellence and inclusivity in every journey, making every rail experience safe, enjoyable, and tailored to the needs of the modern traveller.

5 CUSTOMER SATISFACTION

5.1 INTRODUCTION

In today's rapidly evolving rail industry, customer satisfaction is not only about meeting expectations but also about anticipating and adapting to new customer demands.

As discussed in previous Section 3, passengers now seek flexibility, technological convenience, and personalized experiences.

This section will explore how addressing these emerging needs can significantly enhance customer satisfaction levels, leading to improved customer loyalty, reputation, and overall service quality.

As highlighted in the previous section, customers today expect much more than timely services and functional facilities. They prioritize seamless connectivity, real-time information, digital tools, and tailored experiences that fit their lifestyle.

The challenge for rail operators is to ensure that their satisfaction metrics are aligned with these evolving priorities, moving beyond traditional measures to include digital engagement, environmental sustainability, and personalized services.

ICE 4 in the Höxter district (Source: DB)

5.2 PASSENGER SATISFACTION

5.2.1 Level of Service Quality

There are several factors that will affect the passenger satisfaction towards rail transport service. Passenger satisfaction can be measured by carrying out surveys and analyse the result. In this assignment, secondary data will be analysed in order to study the passenger satisfaction towards the rail transport service.

5.2.2 Passenger Satisfaction towards Rail Transportation Service

Customer satisfaction towards rail transport service is determined by several factors. These factors are related with the passenger expectation towards rail transport service.

- The important factors that determine the passenger satisfaction are the availability of the rail transport, quality of the rail transport service and affordability in terms of the fares of the rail transport service (Geetika, 2010). The satisfaction of the passenger towards the rail transport service definitely will be high if they are affordable for the fares, the availability of the rail is high, and the quality of the service is good.
- Secondly, the next factors are employee behaviours in rail transport field. Employees that are involved in this field are such as the ticket seller, porters and the crews that are working at the rail terminal.

  The behaviours of the staff at the terminal will affect passengers' satisfaction as if the crews are friendly and knowledgeable, they will be able to help the passenger whenever that face problem at the terminal.

  Friendly staffs' behaviours will make the passenger feel that they are being respected and willing to use rail transport service again for the next time.
- Thirdly, the information system is also one of the determinants that will affect passenger satisfaction. Information systems related to the announcement about the arriving time or delay of the train at the railway station.

  Passengers' satisfaction towards the information can be evaluated in terms of the accuracy of the information system such as whether the announcement will be made at the suitable and accurate time or not.

The frequency of the announcements made will also affect the customer satisfaction towards the rail transport service.

- Next, passengers' satisfaction level towards rail transport service can also be evaluated through the level of their satisfaction towards the basic facilities that have been provided such as the waiting area, lighting, cleanliness and comfortability of the terminal.

  This is the fourth factor that will affect passengers' satisfaction towards rail transport service. The reason why this is one of the important factors is because waiting time of the passenger at terminals is sometimes very long and depends on the area of the terminal location, hence, they will be required for a comfortable and clean waiting area in order to make passengers satisfied with the service provided.

Customer service staff interaction

- The fifth determinant on passengers' satisfaction towards rail transport service is safety and security. Generally, this factor includes the safety of customers when taking the rail transport, the safety of the passenger at the waiting area, the security of the parking area so that passengers feel secure for the 'park and ride' service, the security of taking care of the passengers' luggage. Good safety and security will definitely draw a high level of passengers' satisfaction towards the rail transport service.

5.2.3 Satisfaction Drivers Based on New Customer Needs

Beyond general and important satisfaction metrics like punctuality, cleanliness, and safety, this section introduces satisfaction drivers to reflect evolving customer demands.

- Digital Engagement: Passengers now expect smooth digital interaction, from booking tickets to receiving real-time updates via mobile apps.
- Personalization: Tailored travel experiences, from personalized seating preferences to curated onboard services, are emerging as key factors in customer satisfaction.
- Sustainability: Customers are increasingly prioritizing rail services that align with their values, particularly concerning environmental responsibility. Rail operators should measure and promote their sustainability efforts to improve satisfaction.
- Accessibility and Inclusiveness: With passengers expecting more inclusive travel experiences, satisfaction will be determined by how well services cater to individuals with different needs, including those with disabilities.

5.2.4 Measuring Customer Satisfaction

Measuring customer satisfaction is an essential component of understanding and improving the overall passenger experience. It provides valuable insights into how services are perceived by customers and helps rail operators identify areas for improvement.

Traditionally, this has been done through surveys and feedback forms, but modern technology offers a range of new methods to capture customer sentiment in real-time.

Customer satisfaction measures often rely on post-journey surveys or feedback forms. These methods capture passengers' impressions of the punctuality, cleanliness, and safety of the service. However, they have limitations in capturing real-time reactions or in understanding the nuanced, evolving preferences of passengers.

5.2.4.1 Current Methods

- Surveys and Feedback Forms: Currently, rail operators have used post-journey surveys or feedback forms to gather information about the passenger experience.

  Passengers are asked to rate aspects such as punctuality, cleanliness, safety, and comfort. These metrics provide a general view of satisfaction but are limited by their retrospective nature.
- Focus Groups and Interviews: Another current method is organizing focus groups or conducting interviews with passengers to get in-depth feedback about their journey experience.

  This allows operators to gather more qualitative insights into customer needs and perceptions.

5.2.4.2 New Methods of Measuring Customer Satisfaction

In addition to current surveys and feedback forms, in today's digital age, rail operators have access to advanced tools and technologies that allow for more dynamic and real-time measurement of customer satisfaction.

Methods such as:

- Real-Time Feedback Collection: Mobile apps can prompt passengers to rate their experience immediately after a journey, providing real-time insights into customer satisfaction.
- AI-Driven Sentiment Analysis: By analysing customer interactions on social media or other digital platforms, AI tools can assess passenger sentiment and highlight areas for improvement.
- Big Data and Predictive Analytics: Leveraging large-scale data can help rail operators predict future satisfaction levels by analysing patterns from past journeys, passenger behaviour, and service disruptions.

5.2.4.3 Customer Satisfaction Evaluation

Customer satisfaction on rail transport service can be evaluated through 4 factors which are related with the observable service dimensions:

- Convenience of the rail transport service that consists of connectivity to other modes of transport, ticketing and reservation service, regularity of the rail schedule available, information updating at the terminal regards the train schedule and arrival time and the capabilities to prevent or solve the accidents or necessity.
- The second factor is related with the service comfortability of the seats, space available at the seat, the equipment of the vehicle, comfortability of the air conditioning and the cleanliness of the vehicle (Pin-Fenn Chou, 2014).

  The comfort of the seating and cleanliness of the vehicle can be measured using tools such as Customer Satisfaction Score (CSAT), which asks passengers to rate specific aspects of their journey, providing an immediate snapshot of customer perception.

The third factor quality of the staff at the terminal that included the behaviour of the employee, the attitude of the employee, the knowledge that the staff have related to rail transport service and the presence of the staff in rail transport service field.

- The fourth factor is related to the trustworthiness of the rail transport service that evaluate whether the train has arrived and depart on-time, the safety of the rail driving, the exactness on ticketing and reservation management and the faultlessness regards the schedule of the train.

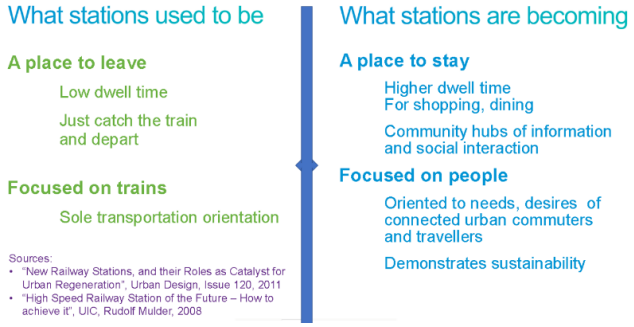
The comfort of the seating and cleanliness of the vehicle can be measured using tools such as Customer Satisfaction Score (CSAT), which asks passengers to rate specific aspects of their journey, providing an immediate snapshot of customer perception.

5.2.4.4 Case Study: service quality of rail transport service in India

The service quality of rail transport service in India has failed to meet the expectation of the passenger (M. Devi Prasad, 2010). This research has been carried out by evaluating on few determinants which are the attitude of the staff that are serving for rail transport service, the understanding level of the rail transport company on the needs of the passenger, the reliability of the rail transport service, the responsiveness of the rail transport service in helping the passengers that are facing problems, perceptible dimensions that included the facilities provided in the train, the level of the comfortability of the train, the connectivity of the rail transport in terms of the frequency and accessibility and the level of convenience that the rail transport brought to the passenger.

5.3 MAKING STATIONS ENVIRONMENT MORE PLEASANT

Top of “a place to stay”, a station become more and more a destination on itself.



5.3.1 Emotions are the Key

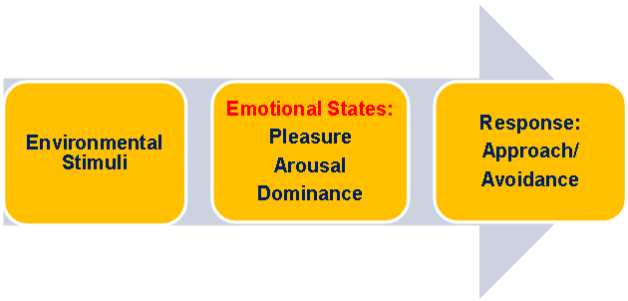
As previously mentioned in the Pyramid of Customer Needs (Section 3.5), emotions such as comfort, safety, and enjoyment are fundamental in shaping passenger behaviour. By consciously designing station environments to evoke these positive emotions, operators can enhance the overall experience, improving customer satisfaction and loyalty.

People’s behaviour is influenced by numerous stimuli in the environment, often unconsciously. Over 95% of environmental stimuli such as sound, temperature, colour and smell are experienced unconsciously, although they can significantly influence our emotions and therefore our behaviour.

Recent studies have shown that environmental stimuli such as music, scent, and colour can significantly enhance the station experience for passengers. Experimental findings, consistent with reversal theory, suggest that during peak hours, minimal stimuli should be used, while additional stimuli can be beneficial during off-peak times. Passengers often congregate near the central section of the platform, close to stairs or elevators.

To encourage a more even distribution of passengers, pleasant stimuli can be placed further down the platform to attract those who are receptive to such stimuli. However, it is crucial to consider passengers' moods, as not everyone appreciates extra stimuli, and they should have the option to avoid them.

The stimuli in the environment can lead to two types of behaviour: approach or avoidance.



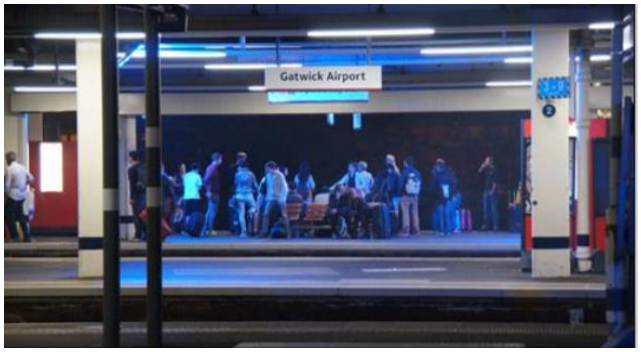
Stimulus-Organism-Response model. Source: Mark van Hagen

Negative emotions lead to avoidance behaviour Positive emotions lead to approach behaviour.

- Avoidance behaviour is all the negative behaviour provoked by the environment, i.e. wanting to leave, not wanting to explore, lack of connection with the place and no desire to return.
- Approach behaviour is all the positive behaviour provoked by the environment, such as wanting to stay, setting out to explore the environment, feeling connected to the place, desire to spend money and to return.

  Approach behaviour can be stimulated by consciously chosen design and deliberate addition of the right (intangible) stimuli to the environment. Think, for a moment, about colours, sounds and smells you might experience during a journey.

Lighting is a key support for emotion and feelings. Some studies show that blue-lighting-emitting- diode (LED) lamps on railway platforms and at railway crossings helped in reducing suicide rates in train stations.



Blue LED lamps at Gatwick Airport station (UK)

5.3.2 The Waiting Experience

Usually, waiting is considered a lost time. Several researchers have reached the conclusion that the waiting (subjective) experience is a good interpreter of customer satisfaction and how influential the waiting environment is on the time perception.

Time plays a centric role in the service process, as trains depart at a certain known time, and passengers have to be aware of time.

By making the waiting environment more pleasant, passengers will find waiting more enjoyable, not realize he/she is waiting. Then the duration of the wait will seem shorter, and therefore, the experience at the station will improve.

The idea is to make waiting experience more comfortable with extras like live performances, music and events (for example, giving the possibility to watch the football matches and to show the results on the screens).

It has to be noted that music is subjective: music can be considered as a distraction by some, but as noise by others.

Comfortability could be improved for example by creating workspaces, free water refill points and using architecture and design to create a cosy atmosphere (warm colours, natural materials in the waiting rooms).

Reactive and dynamic lights are essential, both for warm colours when the temperature is low and cold colours when the temperature is high during summertime.

Normally, occasional passengers at stations spend more time and are open to new experiences than those who use the same service on a regular basis. The latter are accustomed to rail service and are more concerned with an efficient service process.

It is accepted that time awareness is greater with functional services than with “pleasure” services. Since most customers of functional services are focused on efficiency, customers will give importance to feel a sense of control over time (clocks, real-time information) and space (overview). A positive environment and waiting experience are

created when the environment is reassuring and not overly stimulating.

In contrast, in a hedonic service, efficiency is less important to most customers; as enjoyment is paramount, the sense of control over time and space is secondary. In this case, a positive environmental and waiting experience is created when the environment is stimulating and distracting.

Waiting could be a nice experience. Danish rest waiting room (DSB)

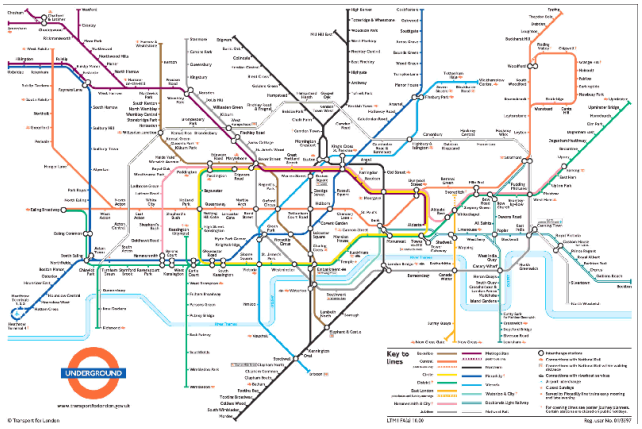
Modern stations can incorporate a range of purpose-driven waiting zones, such as quiet workspaces with charging stations for business travellers or comfortable lounge areas for families and tourists. These tailored environments ensure that all types of passengers have a space that suits their needs, making the waiting experience more pleasant.

Travelling by train might be functional but it can also be a pleasant experience. However, due to the scheduled departure, the time itself can never be completely abandoned and therefore remains a focus of attention for passengers.

5.3.3 Enhancing Wayfinding to Boost Customer Confidence

Effective wayfinding is integral to providing a high-quality customer experience in public transportation. The clarity with which passengers can navigate stations, understand schedules, and find their routes directly impacts their confidence and satisfaction. Without clear, intuitive wayfinding systems, potential riders may feel overwhelmed or confused, dissuading them from using public transport regularly.

Drawing from the pioneering work of Harry Beck with the London Underground map, the principle of simplification and clarity in design should be a standard across all elements of public transport wayfinding.



Harry Beck´s London Underground map

Beck's innovative line-and-dot approach not only made complex underground networks comprehensible but also set a design standard that has been emulated worldwide. This approach underlines the need for straightforward, universally recognizable symbols and signs that can guide passengers effortlessly through their journeys.

A unified set of designs and symbols for wayfinding in public transport systems can significantly enhance user experience. By standardizing these elements, riders traveling in different cities or countries would encounter a familiar system, reducing the learning curve and making public transport more accessible. This standardization could include universally understood symbols for different types of transport, key destinations, ticket offices, and accessibility options.

According to the UIC International Railway Solution IRS 10181 User Information in Railway Stations, are receiving increasing numbers of passengers with various profiles.

IRS 10181 Main Entrance Typology Recommendation

Wayfinding should take account of their needs. a classification for passengers could be as follows:

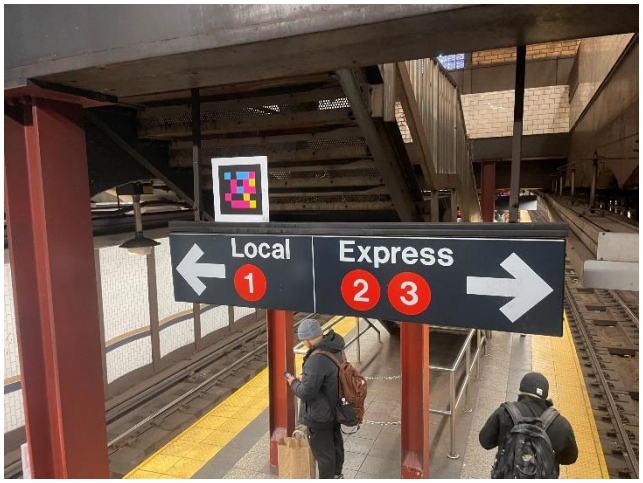
1. Foreign traveller / Tourist
2. Business traveller
3. Occasional traveller
4. Regular traveller / commuter
5. Family
6. Traveller with stroller
7. Traveller with luggage
8. Elderly people
9. Wheelchair user
10. Visually impaired people
11. Hearing-impaired people

Must (commuters) and lust (leisure) passengers respond differently to environmental stimuli, often in combination with the degree of density.

Special routes should be considered, depending on the station's accessibility. Facilities should be adapted to different kinds of disabilities (audible signs, tactile paths, etc.).

Incorporating digital solutions, such as real-time wayfinding apps or interactive kiosks, can further enhance passengers' sense of control and security in busy or unfamiliar stations. These technologies can improve the overall customer experience by making the station environment more intuitive and easier to navigate.

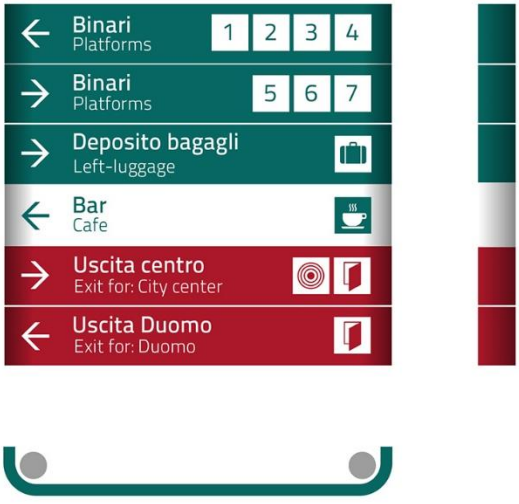
For instance, QR codes placed at stations can link passengers to route maps, ticket purchasing options, and schedules on their smartphones, integrating physical and digital navigation aids.



Colourful QR Codes Installed to Help People With Low Vision or Little English Navigate the Subway System

Recognizing the diversity of public transport users, especially in international or tourist-heavy cities, multilingual support in wayfinding materials is essential. This includes signs, announcements, and digital resources available in multiple languages, and employing pictograms that transcend language barriers.

Providing language support not only assists non-native speakers and international tourists but also reinforces the inclusivity of the public transport system.



Trenitalia- Railway Identity and wayfinding Restyling

To ensure that wayfinding systems truly meet the needs of all users, transit authorities should engage in regular testing and solicitation of passenger

feedback. This can be achieved through user surveys, focus groups, and inviting passengers to participate in wayfinding trials. Feedback can provide invaluable insights into user challenges and preferences, guiding iterative improvements in the wayfinding design.

5.3.4 Type of Passengers and Station Environment

As discussed in Section 5.8, regular commuters and occasional travellers have different needs and preferences. While commuters prioritize efficiency and convenience, occasional travellers seek enjoyment and exploration.

Adapting station environments to meet these varying needs—by providing quiet zones for commuters and more stimulating, engaging environments for occasional passengers—can enhance overall customer satisfaction

During peak hours, more Must passengers travel, and platforms are more crowded.

During off-peak hours, platforms are less crowded and there can be found a more balanced mix of "must" and lust passengers.

Therefore, measures to improve the waiting experience on the platform can logically be adapted to the needs of the passengers.

Lust passengers feel better on a quiet platform with stimulating or fast-paced, dim lighting and warm colours, and prefer screens offering distractions, such as informative (rail-related, for example) programmes.

Must passengers find greater pleasure when they feel they are in control of their stay, i.e. not only that they can orient themselves, feel assured and have a grip on the time but also be distracted as little as possible by environmental stimuli.

Must passengers therefore favour cool colours, low lighting, relaxed/slow music and serious screen content such as news and current affairs.

Negative stimuli should be removed or neutralised before adding positive stimuli.

Adding the right environmental stimuli at the right time can increase the positive rating of the platform.

- Visual impressions: Negative visual stimuli, such as vandalism, graffiti, dirt and an unattractive view, should be avoided as much as possible.
- Colours: The negative grey colour of the platform could be broken here and there by adding colour or coloured light.
- Sound: Unwanted ambient sounds, such as noisy machines, traffic or other sources, should be avoided and replaced by music to soften the wait.

5.3.5 Station Environment

Passengers who pay attention to time find the wait more tedious and longer. On average, in commuter or regional train services train passengers spend several minutes in a station, and 60% of which are spent waiting on the platform.

Some studies have concluded that the evaluation of the wait (short/long, pleasant/late) seems to determine satisfaction with the wait more than the estimated time. Studies also elucidate the influence of the environment on the experience of waiting.

As with time, attention to the environment also plays a role, so that passengers do perceive the environment, albeit partly unconsciously.

The presence of other people provides further stimuli. Therefore, when platforms are busy, the number of stimuli in the environment should be minimised, but when they are quiet, stimuli can be added.

In both busy and quiet periods, the right balance of stimuli in the form of coloured light, music and infotainment can induce positive and affective reactions. As passengers do not seem to be receptive to additional stimuli on a busy platform, soft music, cool colours and a low level of lighting provide greater pleasure, better assessment of the platform and increased approach behaviour.

In contrast, passengers in quieter environments are receptive to stimuli and appreciate stimulating music, warm colours and low lighting.

ÖBB Lounge Service

Innovative station designs such as the ÖBB Lounge Services and artwork integration at European stations have demonstrated that even small enhancements can significantly improve the waiting experience. For example, the addition of nature-inspired artwork or calming background music can influence emotions and reduce the perceived waiting time.

Congruent visual stimuli provide optimal processing fluency, i.e. passengers on a congested platform need congruent visual input. In the case of infotainment, this means a fast screen change on a busy platform and a slower one on a quiet platform.

It is essential to measure how passengers respond to environmental enhancements through KPIs such as customer satisfaction scores and Net Promoter Scores. Gathering this data will enable operators to assess the impact of changes in station environments and continuously improve the customer experience.

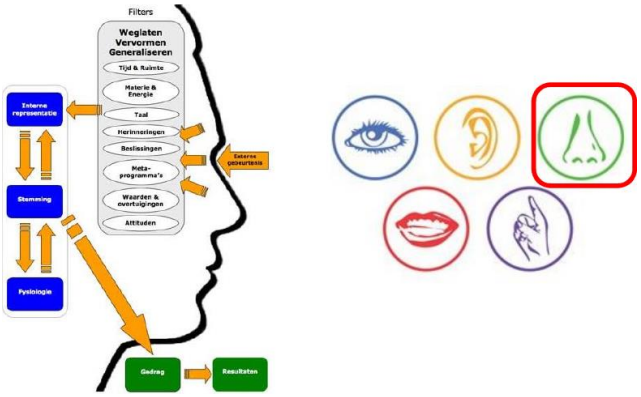
5.4 AROMA ON BOARD AND AT STATIONS

Incorporating scents into rail travel represents a pioneering approach to enhancing the customer experience by tapping into the subtle but powerful sense of smell. This strategy is grounded in the idea that olfactory cues can significantly influence perceptions of cleanliness and overall satisfaction with the travel environment.

Pilot studies have demonstrated a favourable link between the introduction of pleasant aromas and an improvement in passenger comfort levels, suggesting that scents could play a crucial role in passenger satisfaction.

The strategic use of aromas and perfumes aboard trains and at stations is a promising frontier in enhancing the passenger experience through sensory engagement. It necessitates careful consideration of numerous factors, including individual scent preferences, health considerations, brand alignment, and operational feasibility.

This endeavour, while challenging, holds the potential to redefine travel comfort and set new standards in passenger satisfaction within the rail industry.



Scent is one of the five senses. Source: NS

5.4.1 Research and Implementation of Scents

Extensive research is vital in selecting the appropriate scents that can create a positive, memorable experience without being intrusive or overpowering. Initial investigations involve identifying natural and synthetic aromas that evoke freshness and cleanliness. For instance, a light citrus scent is often associated with cleanliness and can invigorate the atmosphere aboard trains and within stations. In contrast, lavender, known for its calming properties, might be used in evening services to help passengers unwind during their commute.

The process also includes detailed pilot studies where various scents are tested in controlled environments to assess their impact on the perceived cleanliness and freshness of the train interiors. Feedback is meticulously gathered to ensure the scents are not

only enjoyable but also do not cause discomfort to those with sensitivities or allergies.

In conjunction with other sensory elements such as ambient lighting and sound, the strategic use of aromas can create a holistic sensory experience, enhancing overall passenger satisfaction.

5.4.2 Challenges in Scent Implementation

One of the primary challenges is the individual variability in scent perception and tolerance. What is pleasant and subtle to one passenger might be overwhelming or unpleasant to another.

This necessitates a balanced approach in scent intensity and character. Furthermore, the potential for scent-induced allergies or irritations requires careful selection and testing of the scents, emphasizing hypoallergenic properties.

Given the prevalence of respiratory conditions such as asthma and allergies, any scent chosen must be hypoallergenic and certified by health authorities. Rail operators should consider integrating air purification systems alongside scent distribution to ensure air quality remains uncompromised.

5.4.3 Brand Identity and Scent

Another innovative aspect is the strategic alignment of scents with the company's brand identity. By creating a unique olfactory signature, the rail service can enhance brand recognition and customer loyalty.

For example, a rail company operating in coastal areas might choose oceanic scents to resonate with the geographical identity of their service routes, thereby reinforcing brand imagery and creating a stronger emotional connection with passengers.

Just as visual and auditory elements contribute to a strong brand presence, a consistent olfactory signature can serve as a subtle yet powerful reinforcement of brand identity. This can foster a stronger emotional connection with passengers, enhancing both loyalty and recall.

5.4.4 Operational Considerations

From an operational standpoint, consistent scent distribution is challenging yet crucial. The systems used for dispersing scents must be capable of delivering a uniform fragrance experience across all trains and stations without frequent maintenance or refills.

The technology must also be adaptable to different train layouts and station designs to ensure comprehensive coverage.

Recent advances in scent-diffusion technologies, including automated systems used in retail environments and airports, allow for uniform distribution of fragrances with minimal disruption. Partnering with specialized companies in this field could ensure smooth operational integration.

5.4.5 Examples and Global Insights

Internationally, there are precedents for the strategic use of scent. For instance, major airlines have long used signature scents to enhance passengers' sense of comfort and to distinguish their brand.

- Must-travellers judge that windows are cleaner in the condition with smell (+0.4 points).
- Men give a higher average rating on the theme Clean in the condition with smell (+0.4 points).
- Travellers in the 25 to 49 years category rate the train as fresher in the condition with smell (+0.5 points)

NS Scent Research. Source: NS

Similarly, retail spaces often use subtle scents to encourage customers to linger longer and enhance their shopping experience. These practices underline the potential for rail services to adopt similar strategies to enhance the travel experience.

5.4.6 Future Directions and Research

Looking ahead, ongoing research will focus on refining the scent selection process, taking into account seasonal variations and the evolving preferences of passengers. The psychological effects of specific olfactory notes will continue to be a significant area of study, with potential expansions into using scents to positively influence mood and well-being—drawing on principles from aromatherapy to create a more relaxing travel experience.

Innovative ideas are also being explored, such as customizable scent zones which would allow passengers to choose the ambient scent in their immediate environment or combining scents with other sensory elements like ambient lighting and sound to create fully immersive travel environments.

5.5 SUBSTITUTIONAL MODE AVAILABILITY

Substitutional mode availability is one important determinant of passengers' satisfaction toward rail transport.

The word substitution has different meanings in different academic areas. Generally, substitution can be defined as one thing to replace another thing. The more exact meaning can actually be found from the online dictionary Merriam-webster where "substitution as the act, process, or result of substituting one thing for another".

Besides, in the field of logistics, mode normally uses together with transport. In basic, there are five common transport modes that include rail, road, water, air and pipelines.

So, by combining the word substitution and mode together, it forms the substitutional mode, which means that the use of one mode of transport is replaced by another mode of transport.

There may be some reasons why passengers could need to substitute railway transport for other modes like road and air mode of transport. Thus, how does the determinant of substitution mode availability affect passengers to choose railway transport rather than other modes of transport?

"Passengers are able to substitute KTM Commuter trip for other modes on almost all days of the week" (Ummi Aqilah Khalid, 2014). To explain that KTM Commuter train is one of the railway public transports in Malaysia. Railway transport is playing a very significant role to those passengers who are frequently to take public transport as one of his or her transportation to work, school, public spaces, and so on.

KTM Commuter. Kuala Lumpur Malaysia

This is because public transport, which passengers use frequently, is often too rushed to arrive on time. Road congestion is a very common problem in any city. No matter whether you drive your own vehicle or travel by bus, you will usually have no way of getting there when faced with heavy congestion on the road.

But with rail transport, passengers can avoid traffic jams. That is why there are many rail transport vehicles in developed countries. These vehicles include high-speed trains, bullet trains, monorails, and so on. Therefore, passengers are more likely to replace road transport services with rail transport services due to their satisfaction with rail transport services.

To fully capitalize on substitutional mode availability, rail operators must ensure that real-time information on connecting services is easily

accessible via mobile apps and station displays. Partnerships with local bus services or ride-sharing platforms can further enhance the seamless integration of these modes.

Integrating substitutional modes not only improves the passenger experience but also supports broader environmental goals by reducing carbon emissions. Encouraging the use of clean transportation modes such as buses, cycling, or electric vehicles aligns with the rail sector's sustainability initiatives.

Many railway networks have successfully integrated substitutional modes, such as the Park & Ride facilities in cities like London and Paris, where passengers can leave their cars and easily transfer to trains. Additionally, last-mile solutions like bike-sharing services in cities like Amsterdam provide a seamless transition from train stations to final destinations.

5.5.1 Ticket Price and Its Impact on Rail Passenger Satisfaction

In the realm of railway transportation, customer satisfaction is deeply influenced by a variety of factors, where cost and travel time are paramount, as highlighted by Jeremy Mattson's research (2010). Mattson asserts that these elements are critical in shaping mode choice, followed by other considerations such as service frequency, comfort, habitual usage, availability of information, and access and egress points. Additional influences include socioeconomic factors among various other variables.

By ensuring passengers have reliable substitutional modes during disruptions, rail operators can minimize inconvenience and improve satisfaction. Surveys conducted by rail operators like SNCF have shown that passengers are more likely to remain loyal to rail services when alternative modes are easily accessible during unforeseen delays.

In the context of rail transport, the cost typically refers to the fare or ticket price, which fundamentally represents the amount a passenger must pay to utilize the service. It's commonly understood that ticket prices generally escalate with the length of the journey, though this can vary significantly depending on the type of train service opted for.

For instance, in Malaysia, the ETS KTM train—an express service—is priced higher than the KTM Komuter, a more local and frequent service, for the same route. This discrepancy can be attributed to differences in service offerings such as speed, comfort, and amenities, all of which are influenced by the train's engine power, design, weight, and capacity.

ETS KTM train in Malaysia

The mechanism by which ticket prices affect passenger satisfaction is straightforward yet impactful. Cihat Polat (Factor-factor of Demand for Public Transport Services in Urban Areas, 2012) emphasizes that fare adjustments are among the most direct and influential factors affecting public transport patronage. An increase in ticket prices tends to inversely affect customer satisfaction; as fares rise, the cost of travel becomes a significant burden, leading to diminished satisfaction. This reduction in contentment can lead passengers to reconsider their mode of transport, potentially opting for alternatives that offer more competitive pricing.

Elevated ticket prices directly translate to increased daily expenditures for commuters, influencing their overall satisfaction and loyalty to rail services. The higher costs may drive passengers to seek other forms of transportation that provide similar services at lower prices. Consequently, this shift can result in a decreased demand for rail transport, underscoring the delicate balance between fare pricing and customer satisfaction.

Ultimately, managing fare prices in a way that aligns with customer expectations and market conditions is crucial for maintaining and enhancing the appeal of rail transportation. It is imperative for rail operators to continuously assess and strategically manage fare structures to ensure they remain attractive to passengers while sustaining operational viability. By doing so, railways can retain a competitive edge in the broader public transportation network, fostering sustained patronage amidst a diverse array of transportation options.

5.5.2 Travel Time

Travel time is a critical determinant of passenger satisfaction in rail transport. It significantly impacts the attractiveness and efficiency of rail services, influencing passengers' decisions to choose rail over other transportation modes. Unlike the cost of travel, which can vary based on multiple factors, travel time is often perceived as a non-negotiable aspect of the travel experience, emphasizing its importance to passengers.

In rail transportation, the goal is always to minimize travel time, thereby maximizing efficiency and effectiveness. This not only enhances passenger satisfaction but also positions rail as a competitive option in the transportation landscape. Efficient rail services ensure that passengers spend the least amount of time in transit, aligning with evolving demands for quick and effective transportation solutions.

According to Kofi Adu-Boahen's insights from 2014, travel time is pivotal in shaping passengers' transportation choices. The principle is straightforward: the shorter the travel time, the greater the passenger satisfaction. However, this relationship is intricately linked with the cost, as shorter travel times often result in higher fares. This interplay between time and cost must be carefully managed to strike a balance that appeals to passengers while maintaining operational sustainability.

Del Peterson's research further underscores this point, emphasizing that both time and cost are crucial factors considered by passengers when selecting their mode of transport. The challenge for rail operators is to offer services that not only minimize travel time but also provide value for money, ensuring that the higher costs associated with faster services are justified by the benefits they deliver.

Travel time in rail transport is composed of several elements: walk time to and from stations, wait time at the station, in-vehicle time, and the duration of any necessary interchanges. Each component affects the overall travel experience and, consequently, passenger satisfaction. Mark Wardman's study highlights the significance of these individual components, particularly how they contribute to the perceived duration of travel.

Adding complexity, Cihat Polat's research delves into how these time components integrate with service factors like fare prices, service frequency, speed, and the number of transfers required. His findings suggest that an optimal balance of these factors can significantly enhance passenger experiences, potentially increasing rail patronage.

SBB station clock at Zurich main station. Source: SBB

To achieve high levels of passenger satisfaction, it is imperative for rail operators to continuously seek improvements in service efficiency. This involves reducing not just the in-vehicle time but also minimizing waiting times, streamlining interchanges, and enhancing access to and from stations. Effective management of these factors can transform rail transport into a more attractive and competitive choice, fostering greater customer loyalty and expanding the user base.

In conclusion, travel time is a fundamental aspect of the rail customer experience. Efficient management of all travel time components is essential to meeting passenger expectations and enhancing the overall attractiveness of rail transport. This focus not only improves customer satisfaction but also strengthens rail's competitive position against other modes of transportation.

5.6 COMPETITION FOR ENHANCING CUSTOMER SATISFACTION

The evidence from around the world is clear: competition in the railway sector is a key driver of customer satisfaction, service improvement, and sustainable travel.

By adopting policies that encourage competition, countries can ensure their railway systems meet the evolving needs of passengers, offering a reliable, affordable, and enjoyable travel experience.

As the global railway industry moves forward, fostering competition will be essential in making rail travel the backbone of modern transportation networks.

The impact of competition can be measured through KPIs such as customer satisfaction surveys, which track improvements in punctuality, cleanliness, and overall service quality. Operators in competitive markets tend to score higher on these measures due to the constant drive for improvement.

5.6.1 The Global Challenge: Enhancing Railway Customer Experience

Railways worldwide have faced their share of challenges, from operational disruptions to evolving passenger expectations. These issues highlight a critical need for improvement and innovation in the railway sector.

As passenger numbers gradually rebound post-global disruptions, railway operators face the dual challenge of recovering lost revenue and adapting to changing commuter behaviours. The quest to retain and grow customer bases has never been more pressing.

5.6.2 The Role of Competition: Lessons from Global Success Stories

The transformative power of competition in the railway industry is evident from a global perspective. Diverse models of railway operation, from state-owned enterprises to private competitors, have demonstrated that competition can significantly enhance service quality, affordability, and passenger satisfaction.

For instance, the introduction of multiple operators on a single route can lead to a variety of benefits for passengers, including reduced ticket prices, improved service quality, and increased frequency of trains. This variety allows passengers to choose services that best match their preferences, whether prioritizing cost, speed, or amenities.

While competition has spurred innovation and reduced costs, it can also lead to challenges. For example, competition can result in service fragmentation, where passengers experience

inconsistency in service levels depending on the operator.

5.6.3 Case Studies of Competition-Driven Success

Several countries have witnessed the positive impact of introducing competition into their railway systems.

- In Spain, the entry of new operators on high-speed routes led to a significant reduction in ticket prices and an increase in passenger numbers, demonstrating competition's role in making rail travel more attractive compared to other modes of transportation.
- Similarly, in Italy, the competition between Trenitalia and private operator Italo on the Rome-Milan route has doubled passenger numbers and reduced prices, showcasing how competition can shift travel habits from road and air to rail, with added environmental benefits.

5.6.4 A Path to a Competitive Ecosystem

While the benefits of competition are clear, establishing a competitive railway environment requires overcoming significant barriers.

These include regulatory hurdles, the need for substantial investment in infrastructure, and ensuring fair access to tracks for new entrants. Effective regulation and policymaking are crucial to fostering a healthy competitive landscape that benefits both operators and passengers alike.

To foster a truly competitive environment, regulators must ensure equal access to railway infrastructure, create clear policies on service quality standards, and incentivize new entrants to innovate without compromising safety or customer service.

5.6.5 Innovation, Sustainability, and Customer Focus

The future of rail lies in embracing competition as a catalyst for innovation and improvement. By learning from global examples, railway systems can leverage competition to not only enhance customer satisfaction but also promote sustainability and efficiency.

Investments in modern infrastructure, digital technologies, and customer service can transform railways into the preferred choice for travellers, contributing to economic growth and environmental sustainability.

As competition encourages operators to differentiate themselves, many have turned to sustainable innovations such as introducing energy-efficient trains and developing digital ticketing platforms, which further enhances the overall customer experience.

5.7 WIFI ON BOARD, YES OR NOT?

Incorporating Wi-Fi on board trains is becoming increasingly vital for enhancing the customer experience, particularly as we navigate the evolving landscape of digital connectivity.

Free on-board internet is available on most MAV-START suburban and long-distance trains

This necessity is even more pronounced on long-distance journeys, where passengers frequently use laptops and other devices, making both cellular and Wi-Fi connectivity essential. However, the integration of these technologies aboard trains is not without its challenges and considerations.

Wi-Fi availability and speed can be measured through customer satisfaction surveys and included as a key performance indicator (KPI). Operators can use these insights to improve service quality.

5.7.1 Connectivity Challenges and Solutions

- In an era where connectivity is crucial for both work and leisure, passengers increasingly expect reliable Wi-Fi as part of their travel experience. Studies show that over 60% of passengers consider Wi-Fi availability when choosing a mode of transport, especially on long-distance routes.
- Cellular Connectivity Limitations: The penetration of cellular signals, especially advanced networks like 5G, into train carriages poses a significant technical challenge. The metal structures of carriages can impede signal strength, affecting the reliability of cellular connections inside trains.
- Future Data Demand: Operators must not underestimate the projected increase in data usage among passengers. Future connectivity solutions should account for both uplink and downlink data flows and consider latency issues. It's estimated that trains may require bandwidths ranging from 1 to 5 Gbps in the medium term, necessitating a hybrid approach that combines cellular and Wi-Fi technologies.

5.7.2 Enhancing Wi-Fi Service Quality

- User-Friendly Wi-Fi Access: Ensuring that on-train Wi-Fi is straightforward to connect to is paramount. This means avoiding complicated captive portals, intrusive monetization tactics such as advertisements or data capture, and ensuring the infrastructure supports regular technological upgrades. Furthermore, maintaining an open internet environment by not blocking any applications, including VPNs and streaming services, aligns with Net Neutrality principles.
- Infrastructure and Federation: Encouraging a seamless transition between on-train Wi-Fi and station networks, and eventually extending this connectivity to encompass smart city infrastructures, is essential for a consistent user experience. This approach also includes facilitating access for Mobile Network Operators (MNOs) or neutral hosts to develop trackside infrastructure to enhance connectivity.
- Modular On-Train Gateways: Adopting modular gateways on trains that can dynamically switch between public 5G, trackside wireless, and satellite connections in remote areas is crucial. These systems should be designed for easy upgrades without necessitating train service interruptions.
- Signal Enhancement Strategies: Improving on-train signal reception through upgraded repeaters and considering technological solutions like window etching can significantly boost outdoor-to-indoor signal performance.
- Operators like DB in Germany and MAV-START in Hungary have successfully implemented modular Wi-Fi systems that can switch between different technologies, ensuring continuous connectivity even in remote areas.

5.7.3 Market Insights and Passenger Preferences

Recent studies, such as the one conducted by Evo-rail, underline the importance of high-quality Wi-Fi connectivity in influencing passenger travel preferences. A significant portion of Spanish travellers indicated a higher likelihood of choosing train travel if robust Wi-Fi connections were available.

This preference is notably pronounced among younger demographics, emphasizing the role of digital connectivity in shaping future travel choices.

The geographical variation in preferences also highlights the universal appeal of improved Internet access, with notable demand across different regions of Spain.

Such insights underscore the broader applicability of these findings, suggesting that rail operators worldwide should prioritize the deployment of high-quality, reliable Wi-Fi services to meet evolving passenger expectations and enhance the overall travel experience.

Regular commuters tend to prioritize reliable, high-speed connectivity for productivity, while occasional travellers often seek consistent Wi-Fi for entertainment purposes. Catering to both needs can greatly enhance overall customer satisfaction, as highlighted in Section 5.8 (Different Perceptions Between Commuters and Occasional Travelers).

5.7.4 Conclusion

The integration of high-quality Wi-Fi services on trains is not merely a value-added service but a critical component of the evolving rail travel experience.

By addressing the technical challenges of connectivity, adopting passenger-friendly service policies, and leveraging insights into market demand and preferences, rail operators can significantly enhance customer satisfaction and competitive advantage in the digital age.

5.8 DIFFERENT PERCEPTIONS BETWEEN REGULAR COMMUTERS AND OCCASIONAL TRAVELLERS

Railways serve as a vital mode of transportation, connecting people and places across vast distances. Within the vast array of railway passengers, two distinct groups emerge: regular commuters and occasional travellers. Regular commuters rely on railways for their daily transportation needs, while occasional travellers utilize trains less frequently, usually for specific purposes.

For example, commuters prioritize efficient station layouts that allow them to move quickly through the space, while occasional travellers may appreciate more leisure-oriented amenities, such as comfortable seating and clear signage. Infrastructure should be flexible enough to accommodate both profiles, as highlighted in Section 5.3 on making stations more pleasant.

This section aims to explore the different perceptions held by these two groups, shedding light on their distinct experiences, needs, and expectations while traveling by train.

5.8.1 Regular Commuters

Regular commuters, often referred to as daily rail users or must travellers, form a substantial portion of railway passengers.

These individuals rely on trains as a means of transportation to and from work, school, or other daily commitments. Commuters develop a strong familiarity with train schedules, routes, and fellow passengers, resulting in a unique perception of the railway system.

Regular commuters tend to have a long-term relationship with rail services, and their satisfaction is often based on cumulative experiences. As such, collecting regular feedback through surveys or satisfaction metrics can help operators address recurring pain points like delays or overcrowding.

Trains are more and more popular as a substitute for car commuters

5.8.1.1 Efficiency and reliability

For regular commuters, efficiency and reliability are of paramount importance. They have a keen understanding of train timings and expect punctuality.

Delays or disruptions in the train service can significantly impact their daily routine and work schedules, leading to frustration. Consequently, regular commuters value a well-maintained railway infrastructure and reliable service that adheres to schedules.

5.8.1.2 Comfort and amenities

Due to the repetitive nature of their journeys, regular commuters often seek comfort during their travel.

They appreciate amenities such as comfortable seating, ample legroom, and access to electrical outlets or Wi-Fi for work or entertainment. Additionally, they may value cleanliness and a calm environment to ensure a smooth and productive journey.

WI-FI on board (Source: DB)

5.8.1.3 Communal atmosphere

Regular commuters become familiar with fellow passengers who often travel on the same routes. This shared experience fosters a sense of community and camaraderie among commuters, with informal interactions becoming a part of their daily routine.

The social aspect of commuting contributes to a unique perception of the railway, emphasizing the importance of a friendly and safe environment.

5.8.2 Occasional traveller

Occasional travellers or lust travellers, on the other hand, have different motivations and expectations when it comes to railway journeys. They embark on train trips less frequently, often for leisure, vacations, or special occasions. Their perception of the railway system is shaped by these occasional and diverse experiences.

For occasional travellers, offering flexible ticketing options, such as day passes or family packages, as well as promoting scenic or thematic train routes, can enhance their travel experience. These offerings align with the flexibility and novelty sought by this group, as discussed in Section 5.5 on Substitutional Mode Availability.

5.8.2.1 Adventure and exploration

For occasional travellers, train journeys are often associated with adventure and exploration. They might look forward to discovering new places, enjoying picturesque landscapes, or experiencing the thrill of a train ride. The journey itself holds significance, and occasional travellers are more likely to embrace the journey as part of their overall travel experience.

DB Regio on tour in Werdenfelser Land (Source: DB)

5.8.2.2 Flexibility and convenience

Occasional travellers may prioritize flexibility and convenience in their train travel. They might prefer flexible ticket options, allowing them to choose between different travel times and classes.

Moreover, convenient amenities like onboard dining, comfortable seating, and luggage storage options contribute to a positive perception of the railway system for occasional travellers.

5.8.2.3 Novelty and experiential value

Unlike regular commuters, occasional travellers may perceive train journeys as novel and exciting. The ability to explore new routes, take scenic routes, or even travel on historic or luxury trains adds a unique experiential value to their perception of rail travel.

They may appreciate the ambiance, aesthetics, and charm of trains, viewing them as more than just a mode of transportation.

MAV operates several nostalgy trains every year (Source: MAV)

5.8.3 Conclusions

Railways accommodate a diverse range of passengers, each with their unique needs and expectations. Regular commuters and occasional travellers hold different perceptions of the railway system, shaped by their frequency of travel, purposes, and priorities. Understanding these distinct perspectives is crucial for railway authorities to cater to the varying requirements of both groups effectively. By considering the perspectives of regular commuters and occasional travellers, railways can strive to provide a seamless and satisfying experience to all passengers,

Regarding the above which specific measures need to be taken to improve customer experience for both groups of travellers

To improve the customer experience for both regular commuters and occasional travellers, several specific measures can be taken. Here are some key steps that railway authorities can consider:

5.8.3.1 Regular Commuters

- Punctuality and Reliability: Implement strict adherence to train schedules, minimize delays, and provide real-time updates in case of disruptions.
- Comfort and Amenities: Upgrade seating arrangements, provide ergonomic seating, sufficient legroom, charging points, and onboard Wi-Fi for productivity and entertainment during the journey.
- Cleanliness and Maintenance: Ensure regular cleaning of trains, maintain proper hygiene standards, and promptly address any maintenance issues or malfunctions.
- Dedicated Commuter Services: Introduce dedicated carriages or compartments for regular commuters to enhance their comfort and facilitate a more focused working environment.
- Loyalty Programs: Offer loyalty programs or incentives to recognize and reward regular commuters for their consistent usage of the railway system.

5.8.3.2 Occasional travellers

- Enhanced Amenities: Upgrade onboard amenities, including comfortable seating, clean restrooms, catering services, and luggage storage facilities to ensure a convenient and pleasant journey.

MAV-START operates dining and bistro cars on several InterCity/EuroCity lines

- Flexible Ticketing Options: Provide flexible ticketing options that allow travellers to choose from a variety of fare classes, travel times, and routes to suit their preferences and schedules.
- Information and Assistance: Improve signage, display clear information about destinations, transfers, and amenities at stations and onboard trains. Provide readily available assistance to guide occasional travellers and address their queries.
- Scenic Routes and Experiences: Promote scenic routes, heritage trains, and thematic

experiences to cater to the adventurous spirit of occasional travellers, highlighting the unique features and attractions along the way.

Several railway lines serve tourist needs, including to Lake Balaton. Source: MAV-START

- Travel Packages and Collaborations: Collaborate with local tourism agencies to create attractive travel packages and partnerships that combine train travel with other tourist activities, encouraging occasional travellers to explore new destinations.

5.8.3.3 Common Measures

- Safety and Security: Ensure stringent safety measures, well-trained staff, and visible security presence to instil confidence in both regular commuters and occasional travellers.
- Customer Feedback Mechanisms: Establish effective channels for collecting customer feedback, such as online surveys, suggestion boxes, or dedicated customer service helplines, to address concerns and make improvements based on passenger input.
- Rail operators should implement distinct customer feedback mechanisms for regular commuters and occasional travellers to better understand their satisfaction levels. Regular surveys and focus groups for both groups can help track service satisfaction and adapt offerings accordingly.
- Staff Training: Train railway staff to be courteous, helpful, and knowledgeable about the railway system, routes, services, and passenger assistance.
- Digital Solutions: Invest in mobile applications that offer real-time updates, personalized trip recommendations, and digital ticketing options can improve the overall experience for both regular commuters and occasional travellers. These tools can help commuters save time and provide occasional travellers with easy access to information about their journey.
- Infrastructure Development: Continuously invest in improving railway infrastructure, including station facilities, platforms, accessibility features, and connectivity, to enhance the overall travel experience for all passengers.

By implementing these measures, railway authorities can cater to the specific needs and expectations of both regular commuters and occasional travellers, ultimately enhancing the overall customer experience and encouraging more people to choose rail as their preferred mode of transportation.

5.9 COMMUTERS VERSUS TOURISTS PASSENGERS

Understanding the distinct needs of commuter and tourist passengers is crucial for enhancing the customer experience by rail. Each passenger profile has unique requirements and expectations, influencing various aspects of rail service, from ticketing systems to station amenities. Addressing these differences effectively can lead to improved satisfaction and efficiency for all users.

Commuters typically engage in routine, daily travel for work or school, prioritizing efficiency and reliability. In contrast, tourist passengers often travel for leisure or exploration, seeking comfort, flexibility, and a memorable experience.

5.9.1 Classification

According to the UIC International Railway Solution IRS 10181 User Information in Railway Stations, Stations are receiving increasing numbers of passengers with various profiles.

A classification for passengers could be as follows:

1. Foreign traveller / Tourist
2. Business traveller
3. Occasional traveller
4. Regular traveller / commuter
5. Family
6. Traveller with stroller
7. Traveller with luggage
8. Elderly people
9. Wheelchair user
10. Visually impaired people
11. Hearing-impaired people

5.9.2 Different Needs

- Commuter (Must) customers
  - Arrive to station minutes in advance to schedule
  - Usually go straight to platform
  - Limited use of the station commodities
  - Will carry a backpack or handbag
  - Move "quickly" around the station
  - Probably not intensive users of ticketing machines
- Tourist (Occasional) customers
  - Arrive to station with time in advance
  - Usually walk by the station prior to the platform
  - Use of the station commodities
  - Luggage
  - Need use of ticketing machines
  - Need assistance.

Rail operators can differentiate services by offering commuters priority boarding, season tickets, and parking facilities, while tourists may enjoy package deals, sightseeing tours, and promotional discounts on group travel.

Over a million cyclists chose the railways in Hungary last year

5.9.3 Key Aspects to be considered

- Passenger Perception
  - **Commuters:** Focus on punctuality, reliability, and efficiency. They value a predictable and smooth travel experience, with minimal delays and disruptions.
  - **Tourists:** Prioritize comfort, ease of navigation, and the overall travel experience. They appreciate friendly customer service, clean facilities, and informative resources that enhance their journey.
- Ticketing and validation system.
  - **Commuters**: Typically prefer quick, seamless ticketing solutions such as monthly or annual passes, contactless payment options, and easy-to-use mobile apps for purchasing and validating tickets. Their focus is on minimizing time spent in queues and simplifying their daily travel routine.
  - **Tourists**: Require flexible ticketing options, including single-journey tickets, day passes, and multi-day tourist passes. They benefit from multilingual ticketing machines, clear instructions, and the ability to purchase tickets in advance or upon arrival.
- Accessibility assistance services
  - **Commuters**: Need efficient and accessible routes to ensure a swift transition from their homes to workplaces. This includes well-

maintained pathways, reliable elevators and escalators, and easy access to parking facilities for bicycles and cars.

- **Tourists**: Require comprehensive accessibility features, including clear signage in multiple languages, tourist information centres, and assistance services for those unfamiliar with the local language or transit system. Accessibility to major tourist attractions from stations is also critical.

- Luggage
  - **Commuters:** Generally, travel light, often only carrying a briefcase or a small bag. They require minimal luggage space but appreciate overhead racks or designated areas for personal items.
  - **Tourists:** Often travel with larger suitcases and multiple bags, necessitating ample luggage storage solutions both on the trains and within stations. This includes luggage racks, dedicated storage compartments, and porter services.
- Use of Infrastructures
  - **Commuters:** Benefit from infrastructure that supports high-frequency, reliable services, such as dedicated commuter lanes and priority boarding during peak hours. Efficient, well-lit, and safe pathways between different modes of transport (e.g., buses, trams) are essential.
  - **Tourists:** Seek infrastructure that enhances their travel experience, including scenic routes, comfortable waiting areas, and easy access to amenities such as restrooms and dining facilities. Tourist-friendly features like information kiosks, Wi-Fi, and charging stations are highly valued.
- Rolling Stock
  - **Commuters:** Prefer trains designed for efficiency and high capacity, with features such as ample standing room, easy-to-clean surfaces, and frequent service intervals to reduce wait times.
  - **Tourists:** Appreciate trains with comfortable seating, panoramic windows, and amenities such as food and beverage services. Information displays and announcements in multiple languages enhance their travel experience.
- Station Services for Passengers
  - **Commuters:** Require streamlined services that facilitate quick passage through stations, such as express ticket machines, automated gates, and minimal disruption during peak hours. Additional conveniences like coffee stands and newsagents cater to their routine needs.
  - **Tourists:** Value comprehensive station services including tourist information desks, baggage storage, local guides, and maps. Access to transportation hubs, hotels, and major attractions from the station is also crucial.
- Metrics
  - **Operators** can track satisfaction levels for both groups through tailored KPIs such as reliability for commuters and service quality for tourists.
  - **Regular surveys** can help monitor evolving expectations and guide future improvements.
- Digital tolls
  - Mobile applications that provide real-time updates, personalized journey recommendations, and sightseeing guides can greatly enhance the travel experience for tourists.
  - For commuters, real-time tracking and automated ticketing systems ensure efficient, hassle-free travel.

5.10 STRATEGIES FOR ELEVATING RAIL CUSTOMER SATISFACTION

Based on the analysis above, the most sensitive factors that can directly affect passengers'

satisfaction toward rail transport services are price, time and (mental /physical) effort.

Time is the most valuable resource people have and must passengers are focussed on the travel process and focus on ***time well saved***. Lust travellers on the other hand are focussed on the experience and the environment and have their focus ***on time well spent*** while travelling by rail (Van Hagen & Van Oort, 2019).

Travellers on the platform (Source: DB)

The following strategies have been categorized to help prioritize implementation:

- Short-Term Wins: Empowering frontline staff and enhancing communication channels.
- Medium-Term: Gathering feedback and personalizing customer experiences.
- Long-Term: Fostering a culture of continuous improvement and embedding customer-centric KPIs across the organization.

Other aspects to be considered are as follows:

- Value for money is the thing that passengers most concern. When they pay for an amount, they will have some expectation for the service that same or even more then the value that they had paid. Facilities at train terminals must be improved such as efficiency of staff at counter, cleanliness of terminal and others.
- Adding Value through Amenities: Incorporating amenities such as on-board entertainment, complimentary refreshments, and high-speed Wi-Fi can significantly enhance the passenger experience, making rail transport an attractive option.
- Another critical factor affecting passengers' satisfaction toward rail transport services is the speed and punctuality of train services. This factor is about the required journey time of one train to move from one location to another. People will compare the time from departure to destination with different modes of transportation. Reducing journey times and ensuring punctuality are essential for meeting passenger expectations. Efficient services that respect timetables contribute to higher satisfaction levels.
- Integrating sustainability into customer satisfaction strategies—such as using green energy sources and promoting eco-friendly rail travel—can not only improve the environmental impact but also attract customers who prioritize sustainable transport.

To ensure the effectiveness of these strategies, rail operators should integrate KPIs such as Net Promoter Scores (NPS) and customer retention rates into their ongoing performance monitoring systems.

As the conclusion, passengers' satisfaction toward rail transport services will be affected in different ways. They were including expectation, satisfaction, attitude, substitutional mode availability, and accessibility to rail transportation.

Passengers always expect that what they received are more than what they had paid. Thus, pricing will be the most important concern in order to improve the satisfaction of passengers.

Besides that, operators can improve the quality of rail transport services since it contains high potential to attract people to use the train services.

But what make people feel more satisfied with rail transportation is to add value on all of the services. For example, operators need to provide a good cleanliness no matter inside the railway station or train, availability of security room at station, high speed Wi-Fi available at station and train, etc. Further, features of rail transportation will improve the satisfaction of passenger toward rail transportation.

5.11 ENHANCING CX THROUGH ENVIRONMENTAL STEWARDSHIP: THE IRYO CASE STUDY

The rail industry has a crucial role to play in accelerating the modal shift and reducing greenhouse gas (GHG) emissions while enhancing the passenger experience.

It is the railway industry role to improve passengers' safety and comfort while improving sustainability.

In an innovative move blending customer engagement with environmental conservation, Iryo, a Spanish private high-speed rail operator, has embarked on a pioneering project to create a "smart forest" with the support of its passengers.

This initiative represents a significant step forward in enhancing customer experience, demonstrating how companies can integrate sustainability into their business models to address the growing ecological concerns of today's consumers.

Iryo's collaboration with ReTree, a company specializing in combining reforestation with digital technology, marks the inception of a smart forest designed to offset carbon emissions. This venture allows passengers to actively participate in environmental preservation by opting to pay a small supplement when purchasing their tickets.

The initial phase of the project will see the planting of 125 trees funded by Iryo, symbolizing the company's commitment to ecological sustainability.

What sets this initiative apart is the use of digitalization to enhance the customer experience. Passengers who contribute to the smart forest's growth can track the progress of their contributions in real time, witnessing the forest's development from any digital device. This level of transparency and engagement not only fosters a deeper connection between the customer and the company but also promotes a sense of ownership and pride among passengers in their collective environmental efforts.

The location for the reforestation effort was chosen through social media, emphasizing the participatory nature of the project. Potential sites included major Spanish cities such as Madrid, Barcelona, Zaragoza, or Valencia, underscoring the initiative's national impact.

By leveraging the carbon sequestration capabilities of trees, Iryo's smart forest serves as a significant carbon sink, contributing to cleaner air and combating climate change.

This initiative aligns with Iryo's broader sustainability goals. The company boasts a fleet of trains that are among the quietest and most sustainable in the industry, made from 95% recycled materials and powered entirely by renewable energy. Such commitments reinforce Iryo's role as a sustainable enterprise, resonating with the growing environmental awareness among business and leisure travellers alike.

Recent trends indicate a slow but steady return of "pro" travellers to train services, with a notable emphasis on the ecological impact of travel choices. According to SNCF, 62% of business travellers report that their companies now place greater emphasis on the environmental aspects of travel, with 70%

expressing a preference for trains over other modes of transport. This shift, albeit gradual, highlights a broader societal move towards more sustainable travel options in the wake of the COVID-19 pandemic and its impact on travel behaviours.

Iryo's smart forest initiative not only enhances the customer experience by engaging passengers in meaningful environmental action but also positions the company as a leader in sustainable transport. By integrating digital innovation with ecological stewardship, Iryo sets a new standard for the rail industry, offering insights into how businesses can adapt to meet the evolving expectations of today's environmentally conscious consumers.

5.12 INTEGRATING RAIL AND CYCLING FOR SUSTAINABLE MOBILITY

5.12.1 Overview

In the evolving landscape of urban mobility, the integration of multimodal transportation options is pivotal for fostering sustainable and efficient travel. Recognizing the synergy between rail transport and cycling, innovative strategies are being deployed to create a seamless and environmentally friendly customer experience.

The integration of rail transport and cycling represents a forward-thinking approach to addressing evolving urban mobility challenges. By providing secure and convenient bicycle parking facilities at railway stations, and fostering collaborations between rail operators, cycling networks, and municipalities, the door is opened to a more sustainable, efficient, and pleasant travel experience.

This multimodal strategy not only meets the evolving needs of today's commuters but also contributes to the broader goals of reducing urban congestion and minimizing environmental impact.

This approach emphasizes the elimination of the "door-to-door" barrier, acknowledging that travellers are not confined to a single mode of transportation but rather benefit from a cohesive network that includes both rail and cycling.

By integrating cycling and rail services, operators can significantly reduce urban congestion and promote eco-friendly travel options. The environmental benefits, such as reduced carbon emissions, align with global sustainability goals, while the promotion of cycling encourages healthier lifestyles among passengers.

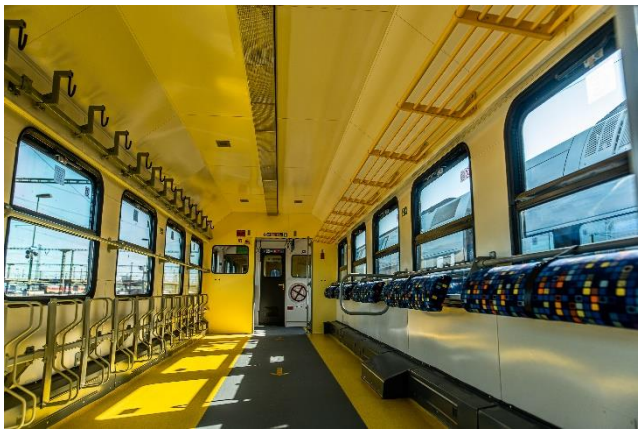
5.12.2 Implementation Strategies

To enhance the multimodal customer experience, key initiatives focus on providing secure bicycle parking facilities at railway stations. These facilities are designed to encourage the combination of rail travel with cycling, catering to the needs of commuters for both the first and last mile of their journey. The initiatives are characterized by:

- Secure Bicycle Parking: Installation of modular, demountable, and station-integrated bicycle parking facilities that offer protection against weather conditions, theft, and vandalism. These

parking spaces include lockable areas and feature electronic opening and access control systems to ensure that only registered users can access the facilities.

- Collaborative Efforts: Partnerships with cycling networks and municipalities to advance sustainable mobility strategies at train stations, aiming to promote the integration of clean transport modes – rail and bicycles.
- Mobile apps that provide real-time updates on bike parking availability and integrated ticketing solutions can further enhance the seamless transition between cycling and rail travel. This convenience boosts overall passenger satisfaction and ensures that users can efficiently plan their journeys.
- Providing secure bike parking at stations and promoting rail-cycling connectivity can directly impact customer satisfaction, particularly for environmentally conscious passengers. By incorporating satisfaction metrics, rail operators can track the effectiveness of these initiatives.



Converted cars for bicycle transport. Source: MAV-START

5.12.3 Case Studies

- Nationwide Deployment in Belgium: Following Belgium's example, secure and user-friendly bicycle parking facilities are being introduced across multiple railway stations. This national rollout is part of a broader strategy to integrate cycling with rail travel, addressing the first and last mile challenge and promoting an eco-friendly mode of transportation.
- Madrid Chamartín Clara Campoamor Station: A pilot project successfully implemented secure bicycle parking in a 59 m2 space within the station. This initiative has paved the way for further installations, highlighting the potential to enhance the commuter experience and encourage the use of bicycles for connecting journeys to and from the station.

Madrid Chamartín Clara Campoamor Station ***secure bicycle parking***

- The Dutch Model: The Netherlands has long been a pioneer in integrating cycling with public transport. Numerous railway stations across the country feature extensive bicycle parking facilities, bike rental services, and dedicated lanes connecting stations with urban and suburban areas. This model exemplifies the benefits of a cohesive approach to multimodal transport, significantly enhancing accessibility and convenience for all travellers.

  In the Netherlands, the extensive integration of cycling with rail services has led to a significant increase in cycling adoption, with over 40% of passengers utilizing bicycles for the first and 15% of the passengers for the last mile of their journey. This multimodal approach has improved customer satisfaction by providing convenient, sustainable, and efficient transport options.

6 INCLUSIVE SERVICE

6.1 INTRODUCTION

In today's rapidly evolving society, the need for inclusive transportation systems is more critical than ever. Railways, as a backbone of public transport, play a significant role in shaping the daily experiences of millions of commuters. The "Inclusive Rail" initiative recognizes the importance of integrating accessibility, gender sensitivity, and diversity into the fabric of rail services to ensure that every passenger, regardless of their physical abilities, gender identity, or background, feels welcomed, respected, and adequately served.

Inclusivity in rail services means providing equal access and ensuring a comfortable, safe, and respectful experience for all passengers, regardless of their physical abilities, gender identity, or socio-economic background. This initiative spans efforts to remove physical barriers, address safety concerns, and promote cultural sensitivity.

As discussed in previous sections, enhancing customer satisfaction and environmental sustainability are core goals of modern rail services. Inclusivity intersects with these areas, ensuring that improvements in customer service and sustainability benefit all passenger groups, including those who may face barriers to access.

This section delves into how the rail industry can address these pivotal aspects, enhancing customer experience through targeted strategies that cater to the unique needs of diverse passenger groups.

- By prioritizing accessibility, we aim to dismantle the physical barriers that challenge individuals with disabilities.
- Addressing gender involves not only ensuring safety and respect for all genders but also tailoring services to meet the varied expectations and needs of each gender.
- Emphasizing diversity includes acknowledging and catering to the cultural, socioeconomic, and age-related differences that influence passenger expectations and satisfaction.

Through a comprehensive approach that combines policy, design, and service enhancements, "Inclusive Rail" seeks to foster an environment where rail transport is not only a means of moving from one place to another but also a symbol of social progress and equality.

This initiative not only enhances the user experience but also solidifies rail transport's role as a leader in sustainable and socially responsible public services.

To ensure continuous improvement, rail operators should actively seek feedback from passengers with reduced mobility, using surveys and focus groups to gather insights into areas for enhancement.

6.2 BROADENING RAIL ACCESS FOR MOBILITY CHALLENGES

Improving accessibility in public transportation is critical for enhancing the mobility of passengers with reduced mobility (PRM) and ensuring their full participation in societal activities.

This encompasses meeting their diverse communication needs and social integration, thereby expanding their opportunities.

However, the challenge often lies in the gap between the adoption of regulations aimed at improving transport accessibility and their practical application. This gap highlights an inconsistency in the development and enhancement of accessible transport infrastructure and services, making transportation still out of reach for many within the PRM community.

Examples of accessibility enhancements include automated boarding ramps for wheelchair users, tactile paths for visually impaired passengers, and audio guidance systems in stations to ensure that passengers with reduced mobility can navigate easily.

A study has shed light on this issue by conducting a comprehensive survey focused on the perceptions of PRM regarding the quality of service in rail transport. Utilizing the Full Consistency Method and Rough Power Heronian aggregator, this research evaluated service criteria based on the EN 13816 standard,

specifically adapted for PRM. This approach notably bypasses the socio-economic profiles of decision-makers, acknowledging the financial constraints typically faced by PRM, such as low incomes or pensions.

The research identified Accessibility, Availability, and Security as the three paramount criteria from the perspective of PRM. Accessibility emerged as the crucial area for intervention, with specific emphasis on environmental adaptations like the implementation of adequately sloped ramps, ensuring free access to all media, and enhancing the accessibility of ticket sales points and station entry/exit facilities.

The need for precision in the scheduling of public transport and providing sufficient seating in rail vehicles were highlighted under Availability. Meanwhile, Security was associated with the stability and safety of the vehicles.

Other significant criteria included Time, emphasizing the importance of providing travel time information during disruptions; Customer Care, stressing on assistance for PRM in connecting services and maintaining vehicle stability; and Information, highlighting the need for universal movement guidelines and reliable service updates.

Comfort and Environmental Impact criteria received similar importance from PRM as from passengers without disabilities, suggesting universal design benefits all users.

This methodology offers a robust framework for decision-makers at local and regional levels, aiding in enhancing services for PRM.

This research paves the way for future investigations that could further refine the criteria based on different environments (regional, urban, or rural) and specific types of disabilities. Such detailed analysis could reveal new insights into the specific needs for equipment, services, or features within the rail passenger system, offering a tailored approach to enhancing PRM accessibility across various transportation modes.

By improving accessibility, rail systems not only comply with regulations but also contribute to the sustainability of transport networks by encouraging wider usage among all passenger demographics, including PRM passengers. This aligns with the sector's environmental and social responsibility objectives.

Case studies such as the London Underground's Step-Free Access Program demonstrate the tangible benefits of making accessibility improvements, increasing both passenger satisfaction and ridership among PRM groups.

London Underground step-free program,

Operators should ensure that all stations and trains are equipped with accessible features, such as tactile paths for visually impaired passengers, hearing loops, and ramps or elevators for passengers with mobility challenges. Additionally, dedicated seating areas and clear signage in multiple languages or with pictograms can further enhance inclusivity.

6.3 FOSTERING DIVERSITY

Diversity in the railway sector encompasses a wide range of passenger needs, from individuals with cognitive and intellectual disabilities to those from

different cultural backgrounds, age groups, and socioeconomic strata. Ensuring that rail services cater to all these groups promotes a more inclusive and equitable passenger experience.

In the rail transport sector, a groundbreaking initiative is underway to improve cognitive accessibility for all users, particularly benefiting those with intellectual disabilities or comprehension challenges. This effort is not only about creating a more navigable and user-friendly environment but also about fostering inclusivity and promoting the autonomy of every individual who traverses our networks.

One of the most innovative and heartwarming projects in this domain is a program designed to specifically address the needs of passengers requiring cognitive support. This program, though unique in its naming in specific implementations, universally aims to enhance the travel experience for individuals facing intellectual disabilities or orientation and comprehension difficulties. It represents a leap toward a more sustainable and inclusive transportation model.

The initiative encompasses a comprehensive suite of measures to improve cognitive accessibility across the rail network. These measures include the development and dissemination of user guides in easy-to-read formats, video tutorials that offer clear and straightforward instructions complemented by sign language and subtitles, and targeted campaigns to elevate the visibility and integration of individuals with intellectual disabilities.

A core component of this accessibility program is the direct engagement with users through specialized training sessions conducted by rail professionals. These sessions, which have already benefited hundreds of participants, aim to demystify the use of the rail network, providing practical knowledge both in and out of the classroom setting.

Volunteer-driven activities further enrich this initiative. Volunteers accompany individuals with intellectual disabilities on tours of rail museums or through the network itself, offering a hands-on opportunity to familiarize with station and train elements in a supportive environment. These special visits are not only educational but also serve as inclusive leisure activities, reinforcing the trainings on autonomy and safe travel.

The personalized training aspect of the program is particularly impactful. Over several months, participants receive one-on-one guidance during their rail journeys, learning to navigate the system with confidence, seek assistance when needed, and travel independently without fear. The success of these trainings is a testament to the program’s effectiveness in empowering individuals to become self-reliant commuters.

The inspiration behind such initiatives often comes from real-life stories that underscore the profound difference accessibility enhancements can make in individuals’ lives. For instance, the story of a young, courageous woman seeking to learn independent travel within the rail network illustrates the program's vital role not just for the individuals directly involved but also for their families, providing peace of mind and a sense of security.

In summary, the rail industry's commitment to improving cognitive accessibility is paving the way for a more inclusive transportation system. By addressing the specific needs of passengers with intellectual disabilities or comprehension challenges, these initiatives are not only enhancing the user experience

but also promoting greater autonomy and participation in society.

This forward-thinking approach underscores the sector's dedication to creating a transport environment where everyone, regardless of their cognitive abilities, can navigate with ease and confidence.

6.4 SIGN LANGUAGE TRANSLATION IN RAIL TRANSPORT

In addition to improving accessibility, the use of sign language translation enhances the overall travel experience for deaf and hard-of-hearing passengers. This initiative promotes independence and confidence, while also contributing to increased customer satisfaction

The integration of sign language translation technology in rail transport aims to enhance accessibility for deaf and hard-of-hearing passengers.

This innovative approach involves using digital platforms to translate passenger information into sign language, ensuring that critical travel information is accessible to all, regardless of hearing ability. The technology typically involves the use of QR codes and web-based platforms to provide real-time updates and information in sign language.

Deaf and hard-of-hearing passengers often face difficulties accessing information, especially during service disruptions, as such information is frequently shared via audio announcements.

Mobile applications offering real-time updates on accessibility features and providing sign language support or subtitles for important announcements can further enhance inclusivity for passengers with hearing impairments.

6.4.1 Benefits

- Enhanced Accessibility: Provides vital travel information to deaf and hard-of-hearing passengers who may struggle with audio announcements.
- Inclusivity: Ensures that all passengers, regardless of hearing ability, have access to the same information.
- Multi-Modal Communication: Combines text, audio, and sign language to cater to diverse passenger needs, including those with noise sensitivity or those using noise-cancelling headphones.
- Global Reach: Potential to support multiple languages and communication methods, broadening the technology's applicability in international contexts.

6.4.2 Implementation

- QR Codes: Placed at various points in the station to direct users to a web page.
- In addition to QR codes, other implementation methods can include smart kiosks and interactive displays at stations, which offer sign language translation for passengers seeking real-time travel updates. These technologies can be integrated into existing digital infrastructure, further enhancing accessibility.
- Web Platform: Provides information about station facilities, live departure updates, and service disruption notifications in sign language.
- Integration with Other Technologies: Future potential to combine with other accessibility tools to offer comprehensive travel navigation and information.

6.4.3 Case Study: London Overground's Sign Language Translation Pilot

Rail operators in countries such as Japan and the UK have implemented real-time sign language translation services on station displays and mobile apps, ensuring a seamless travel experience for passengers with hearing impairments.

London Overground, a suburban rail service operated by Transport for London, has piloted a sign language translation system to improve accessibility for deaf and hard-of-hearing passengers. The pilot involved the use of the Luna platform, developed by Go Media and powered by Signapse technology, to translate

digital passenger information into British Sign Language (BSL).

London Overground's Sign Language Translation Pilot

The London Overground pilot represents a significant step towards inclusive rail transport, demonstrating how technology can be leveraged to meet the diverse needs of passengers.

By making critical travel information accessible through sign language, London Overground is setting a precedent for other transport operators to follow, ensuring that all passengers have equal access to essential travel information.

Pilot Details:

- Technology: QR to be used to direct passengers to a web page containing information about station facilities, live departures, and service disruption notifications in BSL.
- Text and Audio Options: These are available for users who are not necessarily deaf but might benefit from alternative forms of information due to noise sensitivity or the use of noise-cancelling headphones.

Future Prospects:

The successful implementation of this technology could lead to its broader adoption, combining various accessibility solutions to provide end-to-end travel navigation and information in multiple languages, enhancing the travel experience for passengers with disabilities.

6.5 CUSTOMER EXPERIENCE AND GENDER ISSUES

The relationship between customer experience and gender issues in rail service is that both aspects affect the satisfaction, safety and accessibility of rail passengers and employees.

Gender issues in rail customer experience have gained significant attention due to the unique needs and travel patterns of women passengers. Women often have different travel behaviours compared to men, such as more frequent trips for errands and caregiving alongside their work commutes.

Rail service providers should aim to create a more inclusive and diverse environment that meets the needs and preferences of different genders, as well as other dimensions of diversity such as age, ethnicity, disability and sexual orientation.

6.5.1 Key Findings from UITP's Gender Best Practices Study

A study conducted by the UITP, commissioned by the European Investment Bank, benchmarked gender practices in the public transport industry globally.

Source: UITP

The study identified several critical areas that require attention to enhance gender inclusivity in public transport systems:

- Sex-Disaggregated Data: Collecting and analysing sex-disaggregated passenger data is essential for understanding and addressing the distinct travel

needs of women. However, over half of the surveyed public transport operators do not collect such data, citing technical difficulties or concerns about making distinctions based on gender or race.

- Gender-Sensitive Design and Planning: Public transport planning often fails to accommodate the unique travel patterns of women. Most respondents do not consider gender perspectives in route planning or scheduling. This gap can limit women's access to transport options, thereby affecting their employment opportunities and work-life balance.
- Safety and Security: Security concerns are universal, but women often face specific risks that need targeted measures. Although many operators have implemented CCTV and panic buttons, there is a lack of explicit focus on gender-sensitive security practices during operations.
- Facilities for Women: The availability of gender-sensitive amenities, such as space for buggies and baby-changing facilities, is limited. These facilities are crucial for ensuring comfort and convenience for women passengers, especially those traveling with children.
- Workforce Diversity: Women are underrepresented in the public transport workforce, particularly in driving and maintenance roles. Barriers include cultural stereotypes, inflexible work schedules, and a lack of diversity in leadership positions. Promoting gender diversity in the workforce requires targeted recruitment, mentorship programs, and inclusive policies.

6.5.2 Gender Issues Mitigation

Some measures that can be taken to mitigate gender issues in public transport are:

- Increasing the representation of women and other underrepresented groups in the rail workforce, especially in leadership and technical roles, by providing more opportunities for recruitment, training, mentoring and career development.
- Addressing any forms of discrimination, harassment or bias that may occur in the rail sector, such as by implementing policies, codes of conduct, reporting mechanisms and awareness campaigns.
- To foster a more inclusive environment, operators should consider gender-sensitive designs in stations and trains, such as well-lit waiting areas, women-only sections, and emergency call buttons in case of harassment.

Customer experience by rail: gender issues

- Rail operators can further enhance gender-sensitive design by introducing dedicated spaces, such as women-only carriages or parenting rooms, which provide a safer and more comfortable travel experience for women, especially those traveling with children. These initiatives have proven successful in countries such as Japan and India, where women's safety during travel is a key concern.
- Designing and delivering rail services that are responsive to the different travel patterns, needs and expectations of different genders, such as by providing more flexible ticketing options,

adequate security measures, accessible facilities and information, and gender-sensitive design.

Source: UITP

- Engaging with customers and employees from diverse backgrounds and perspectives to understand their experiences, feedback and suggestions for improvement, such as by conducting surveys, focus groups, consultations and co-creation sessions.
- From a rail service point of view, the relationship between customer experience and gender issues is significant. Gender issues can impact the customer experience, as different genders may have unique needs, concerns, and expectations when using rail services.
- Increasing the representation of women in leadership and operational roles within the rail industry is essential for creating a more gender-sensitive working and traveling environment. Programs that promote recruitment, mentorship, and career advancement for women can drive meaningful change in the workforce.

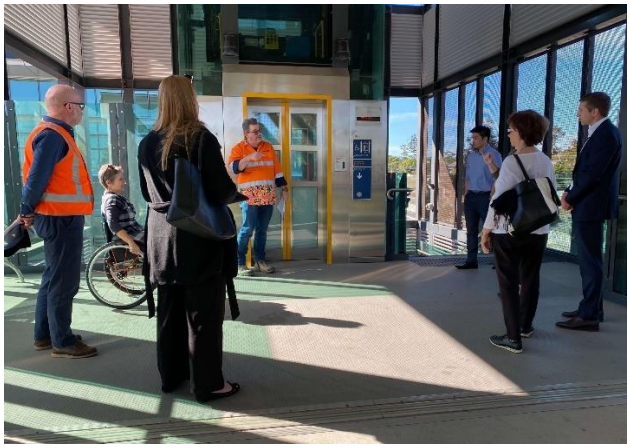
6.5.3 Customer Experience Improvements related to Gender Issues

To improve the customer experience, several measures can be taken:

- Safety and security: Ensuring safety and security for all passengers, regardless of gender, is crucial. This includes implementing measures to prevent harassment, violence, or any form of discrimination on trains and at stations. Clear reporting procedures and staff training on handling such incidents should be in place.
- Inclusive facilities: Providing gender-inclusive facilities such as restrooms and changing areas can enhance the customer experience. Having clean, accessible, and well-maintained facilities that cater to the needs of all genders can contribute to a more inclusive environment.
- Awareness and sensitivity training: Train staff should undergo training to develop awareness and sensitivity towards gender-related issues. This training can help them understand the diverse needs and concerns of passengers and provide appropriate support and assistance.
- Communication and information: Ensuring that communication and information provided to passengers are gender-inclusive is essential. This includes using gender-neutral language in announcements, signage, and written materials. Additionally, providing information about available resources, support services, and reporting mechanisms for gender-related concerns can be beneficial.
- Diversity and representation: Promoting gender diversity within the rail service workforce can contribute to a better understanding of diverse customer needs. Encouraging a diverse workforce, including employees of different genders in customer-facing roles, can help create a more inclusive and empathetic environment.
- Feedback mechanisms: Establishing channels for passengers to provide feedback, including gender-specific concerns or suggestions, is important. Actively listening to passenger feedback and taking appropriate actions to address concerns or improve services can enhance the overall customer experience.

- Collaboration with gender-focused organizations: Collaborating with gender-focused organizations or experts can provide valuable insights and guidance on creating a more inclusive and gender-sensitive rail service. Partnering with these organizations can help identify areas for improvement and implement effective measures.
- Implementing real-time safety measures such as CCTV cameras, panic buttons, and mobile safety apps can empower passengers to report incidents quickly.
- Station lighting and the presence of staff during operating hours are crucial in ensuring that women feel safe, especially during off-peak hours.
- Addressing gender issues must also take into account the needs of women with disabilities and those from diverse cultural backgrounds, as their travel experiences may intersect with additional challenges. By incorporating a holistic approach, rail operators can ensure that gender-sensitive solutions also support broader inclusivity goals.

By implementing these measures, rail services can create an environment that is inclusive, safe, and respectful for all passengers, regardless of gender, thereby improving the overall customer experience.



Cross-River Rail. Accessibility (Australia)

6.5.4 Case Studies from Gender Best Practices

By integrating these gender-sensitive practices, public transport systems can significantly enhance the overall customer experience, ensuring safety, accessibility, and convenience for all passengers.

The case studies provide valuable insights into effective strategies for addressing gender issues in rail customer experience.

6.5.4.1 Case Study 1: London Overground, UK

London Overground has implemented several initiatives to address gender issues and enhance the customer experience for women passengers:

- Signage and Information Accessibility: London Overground uses clear and accessible signage to provide information to all passengers, including those with hearing impairments. This approach ensures that women, especially those traveling with children or carrying bags, can easily navigate the transport system.
- Safety Measures: London Overground has enhanced safety measures, including well-lit stations, CCTV coverage, and the presence of staff during operating hours. These measures help create a secure environment for women, reducing the risk of harassment and assault.

6.5.4.2 Case Study 2: Transport for London (TfL), UK

Transport for London has been proactive in implementing gender-sensitive practices across its network:

- Consultations and Focus Groups: TfL conducts regular consultations and focus groups with women passengers to understand their travel needs and concerns. This feedback informs the design and planning of services to ensure they are more inclusive and accessible.
- Staff Training: TfL provides training for staff on gender sensitivity and customer service, ensuring that employees can effectively support women passengers and address any issues they may face.

6.5.4.3 Case Study 3: Ferrocarrils de la Generalitat de Catalunya (FGC), Spain

FGC has taken proactive steps to address gender issues in public transport through various initiatives:

- Focus Groups and Gender Audits: FGC regularly engages with focus groups to understand the needs of female users and redesign spaces accordingly. A gender audit initiative revealed insights into women's perceptions of the service, leading to redesigned spaces to enhance safety and comfort.
- Reducing the Gender Pay Gap: Despite salary discrimination being illegal in Spain, FGC recognized the persistent gender pay gap. The company implemented quotas and promotion policies favouring the underrepresented gender, which has effectively reduced the pay gap over the years.

6.5.4.4 Case Study 3: SNCF, France

As part of its corporate social responsibility requirements, SNCF has adopted a responsible procurement strategy including an ethical procurement charter based on anti-discrimination principles and zero-tolerance policies against harassment.

6.5.4.5 Case Study 4: Indian Railways, India

In India, the government has introduced women-only coaches in suburban trains, while Germany has implemented dedicated carriages for female passengers. These initiatives have helped reduce incidents of harassment and improved the overall travel experience for women.

6.6 ENGAGING YOUTH TRAVELERS: UNDERSTANDING PREFERENCES AND MARKETING STRATEGIES

In today's rapidly evolving digital world, the expectations and behaviours of youth generations regarding transportation are shifting dramatically. Rail operators are increasingly recognizing the importance of adapting their services to meet the unique needs and preferences of younger passengers, who prioritize convenience, sustainability, and connectivity.

Enhancing the rail customer experience for youth generations requires a multifaceted approach, blending technology, personalization, and sustainability to align with their values and lifestyle.

By understanding and addressing the specific needs and preferences of youth generations, rail operators can create a customer experience that not only meets their expectations but also positions rail travel as a preferred mode of transportation for environmentally conscious, tech-savvy, and experience-driven young travellers.

6.6.1 Leveraging Technology for Seamless Travel

Younger passengers are digital natives, accustomed to managing various aspects of their lives through smartphones and apps.

Rail companies can capitalize on this by offering a seamless digital experience, from trip planning and ticket booking to real-time travel updates and onboard entertainment. Implementing user-friendly mobile apps that integrate ticketing, live train tracking, and customer service can significantly enhance the convenience of rail travel.

Features such as mobile ticketing and QR code-based access eliminate the need for physical tickets, aligning with the preference for digital solutions.

6.6.2 Personalization and Experience

Youth generations value personalized experiences that reflect their individual preferences. Rail operators can utilize data analytics to offer customized travel suggestions, loyalty rewards, and targeted promotions based on previous travel patterns.

Onboard, personalization can extend to adjustable seating arrangements, personalized entertainment options, and catering services that offer a variety of dietary choices, including vegan and vegetarian options.

6.6.3 Promoting Sustainability

Environmental concerns are paramount for younger generations, who are more likely to choose eco-

friendly modes of transportation. Rail companies can attract this demographic by highlighting the sustainability of rail travel compared to other modes of transportation.

Initiatives such as carbon offset programs, investments in renewable energy sources for train operations, and efforts to reduce waste onboard resonate with environmentally conscious passengers. Transparency about sustainability efforts and achievements can further enhance the appeal of rail travel.

6.6.4 Enhancing Connectivity

Staying connected is crucial for young travellers, whether it's for leisure, work, or study during their journey. Offering reliable, high-speed Wi-Fi onboard, along with power outlets and USB charging ports at every seat, ensures that passengers can use their devices without interruption.

Social spaces on trains can also encourage interaction among passengers, catering to the desire for social connectivity and networking opportunities.

6.6.5 Incorporating Educational and Social Initiatives

Rail operators can engage with youth passengers by incorporating educational and social initiatives into the travel experience. Programs such as train-based workshops, cultural exchange trips, and partnerships with educational institutions for study-related travel can enrich the rail journey, making it more than just a means to an end.

6.6.6 Case Studies: Innovations in Youth-Centric Rail Services

- Europe's Night Trains for Youth Travel: Several European rail operators have reintroduced night train services, targeting young travellers with amenities like Wi-Fi, lounge areas, and affordable sleeper options.

Sleeper Cabin. Source: ÖBB

These trains cater to the backpacker culture, offering a cost-effective and environmentally friendly way to explore multiple destinations.

- Japan's Rail Pass for Youth: Japan Railways offers a youth rail pass, providing unlimited travel across its extensive network at a discounted rate for young travellers. This initiative encourages exploration and cultural exchange among domestic and international youth.
- Social Media Engagement: Rail operators like Amtrak in the United States actively engage with younger audiences through social media platforms, using content that highlights the adventure, convenience, and sustainability of rail travel. Social media campaigns and influencers play a significant role in shaping perceptions and choices around rail travel.

6.6.7 Overview

In the realm of rail transport, effectively engaging with the youth market goes beyond current marketing tactics. It involves creating a seamless, integrated customer experience that resonates with

the values, preferences, and digital habits of younger generations.

Integrating youth marketing with customer experience in rail transport requires a holistic approach that addresses the digital, environmental, and social preferences of younger generations. By focusing on these core areas, rail operators can create a compelling, attractive proposition for young travellers, ensuring that rail remains a top choice for sustainable, enjoyable, and connected travel.

This comprehensive approach combines innovative youth marketing strategies with enhancements in customer experience to meet and exceed the expectations of Millennials and Generation Z.

6.6.8 Strategy and Implementation

6.6.8.1 Digital First Approach

- Seamless Digital Experience: Ensure that every touchpoint, from ticket booking to customer service, is optimized for mobile devices, recognizing that younger passengers prefer managing their travel digitally.
- Engagement through social media: Utilize platforms favoured by the youth, such as Instagram, TikTok, and YouTube, to create engaging, shareable content that highlights the joys and conveniences of rail travel. Incorporating AR filters, interactive stories, and live Q&A sessions can further enrich this experience.

6.6.8.2 Sustainability as a Core Message

- Communicate Eco-Friendly Practices: Embed the rail's environmental benefits in marketing messages, emphasizing its role in reducing carbon footprints. Sharing stories of sustainable initiatives, like using renewable energy sources or eco-friendly onboard amenities, can enhance brand loyalty among eco-conscious youth.
- Active Participation in Sustainability: Encourage and facilitate passenger involvement in environmental efforts, such as tree planting initiatives linked to ticket purchases or promoting zero-waste travel challenges.

Wind turbine operated by ÖBB Infra. Source: ÖBB

6.6.8.3 Personalization and Customization

- Data-Driven Personalization: Leverage analytics to deliver personalized travel recommendations, promotional offers, and content, making each interaction feel tailor-made and relevant.
- Experiential Packages: Design travel packages that cater to the diverse interests of younger travellers, from music festivals and cultural events to adventure sports and eco-tourism. Partnerships with event organizers, accommodations, and local attractions can offer comprehensive, experience-focused travel solutions.

6.6.8.4 Empowering Connectivity and Community

- Onboard Connectivity: Provide robust Wi-Fi and charging facilities onboard, ensuring that young passengers can stay connected, work, or enjoy digital entertainment throughout their journey.

- Fostering a Sense of Community: Create communal spaces on trains or at stations where young travellers can socialize, work collaboratively, or participate in onboard events and workshops, enhancing the social aspect of travel.
- Engaging with social media influencers and encouraging user-generated content can amplify the visibility of rail services among younger audiences, turning passengers into brand advocates who share their experiences on platforms like Instagram and TikTok.

6.6.8.5 Case Studies Highlighting Success

- Interactive Campaigns with Real-Time Engagement:

A rail company launched a social media challenge encouraging young travellers to share their train journey experiences through creative content. Winners received free rail passes, amplifying engagement and showcasing real customer experiences across platforms.

- Sustainability Ambassadors Program:

Another operator initiated a program where young environmental influencers travelled across the network, documenting how rail travel contributes to sustainable tourism. The content was shared across social media, highlighting the operator's commitment to eco-friendly practices.

- Collaborative Content Creation Workshops:

Recognizing the value of user-generated content, a rail service hosted onboard content creation workshops, teaching young passengers how to capture and share their travel experiences. This not only enhanced the travel experience but also generated authentic content that resonated with a wider youth audience.

- Rail operators like Amtrak in the United States and Transport for London have successfully engaged younger travellers through targeted marketing and fare strategies, offering discounted passes for students and youth, along with social media campaigns that highlight the adventure and convenience of rail travel.

7 ELEVATING RAIL TRAVEL EASE

7.1 ENHANCING THE PASSENGER JOURNEY

Accessibility is a multifaceted aspect of rail transportation that directly influences passenger satisfaction. By addressing parking availability, enhancing connectivity with other public transport modes, optimizing the location of rail facilities, and ensuring facilities are inclusive and comprehensive, rail operators can significantly improve the travel experience.

Integrating passenger feedback into continuous service improvement, especially concerning accessibility, will be key to achieving and sustaining high levels of passenger satisfaction in the rail sector.

Accessibility encompasses the ease with which travellers can access rail services, including stations, terminals, and other related facilities. High accessibility is essential, as it directly impacts the convenience and overall travel experience of passengers.

There are four important factors on affecting passengers' satisfaction toward rail transport service with accessibility to rail transportation according to the study of Mintesnot G. Woldeamanuel "Factors affecting travellers' satisfaction with accessibility to public transportation".

According to this study, parking problems, residence location, connectivity of different public transport routes, and walking distance are those important factors on affecting passengers' satisfaction toward rail transport service with accessibility to rail transportation.

7.1.1 Parking Availability

Available of car park spaces is one important factor in affecting passengers' satisfaction toward rail transport service with accessibility to rail transportation. Available of parking spaces in railway station are more convenient for those riders whose working areas lack of car spaces.

So, by providing more parking spaces in railway stations, riders can save on their time and energy instead of spending the time and energy on looking for parking spaces especially in the urban area that is lacked parking spaces.

As a result, the more available of car park spaces in railway station, passengers who are often facing parking problems are more being satisfied, especially in suburban and rural areas, to have a better access to the station.

The P+R car parks have a high occupancy rate every day. Source: MAV-START

In Japan, large commuter stations like those in Tokyo offer extensive P+R facilities that allow for smooth transitions between private vehicles and rail services. Similarly, the United States' BART system in San Francisco has pioneered large-scale P+R facilities that cater to the growing commuter base.

7.1.2 Proximity to Residential Areas

The distance between passengers' residences and railway stations plays a pivotal role in accessibility.

There is a close relationship between residence location and the railway station. The closer the residence location to one railway station, passengers who are from the residence area will be more convenient to take the rail transportation. Hence, the mobility to rail transportation for them is very low. Thus, the closer the residence location to one railway station, the lower the mobility for rail transportation, at the same time, the satisfaction of passengers from the residence area are more being satisfied.

7.1.3 Connectivity with Public Transport

The connectivity between different public transport routes is one of the important factors in affecting riders' satisfaction toward rail transport service with accessibility to rail transportation. In general, there are different types of public transportation, such as bus, train, taxi and so on. Mostly not all the passengers are able to reach their prospective destination directly by only taking the rail transportation. So that the connectivity between different modes of public transport is important in order to make passengers more convenient to reach their final destination. Therefore, the higher the connectivity of different public transport routes, the higher the passengers' satisfaction with accessibility to rail transportation.

Incorporating real-time data into mobile applications, allowing passengers to seamlessly plan their journey across multiple modes of transport, is crucial for improving connectivity. Rail operators can collaborate with city transport authorities to ensure accurate data sharing.

7.1.4 Walking Distance

The walking distance from other transport modes to railway stations, and within the station to platforms, affects passenger convenience.

For example, a passenger only needs to walk around 5 minutes to reach to railway station after he or she gets down from the bus. Besides, walking distance is also counted of walking time between the railway station and the passengers' home, office and other places.

Shorter walking distances are associated with higher satisfaction as they make the transfer between modes easier and more comfortable.

7.2 CASE STUDIES

7.2.1 The London Underground's Step-Free Access Program

The London Underground has been systematically increasing the number of step-free stations, providing elevators and ramps to ensure that everyone, including those with mobility impairments, parents with strollers, and the elderly, can access the Underground network with ease.

This initiative significantly enhances accessibility and passenger satisfaction.

7.2.2 Tokyo's Rail Network Integration

Tokyo's integration of its rail network with other public transportation modes is a prime example of enhancing accessibility. The city's comprehensive signage in multiple languages, proximity of rail stations to residential and commercial areas, and the seamless transfer between lines exemplify effective connectivity.

7.2.3 Sydney Rail System

The Sydney Rail System has successfully integrated multi-modal transport options, with rail stations closely linked to bus and ferry services, enhancing accessibility and providing a model for cities aiming to improve public transport integration.

7.2.4 Park and Ride (P+R) Facilities in European Cities

Several European cities have successfully implemented P+R facilities, offering commuters convenient parking options at the outskirts of cities with efficient rail connections to city centres.

This strategy addresses parking issues and encourages the use of public transport, thereby improving accessibility and satisfaction.

7.3 PASSENGER MOVEMENT COUNTING

7.3.1 Importance

Counting passenger movements on a train is crucial from a customer experience perspective for several reasons. This process involves tracking the number of passengers boarding, alighting, and moving within the train, providing valuable data that can enhance service delivery and passenger satisfaction in multiple ways.

Accurate passenger counting allows operators to make real-time adjustments to train services, optimizing capacity and preventing overcrowding,

which directly contributes to improved passenger comfort and overall satisfaction.

- Capacity management

Understanding passenger movements helps in managing seating capacity and standing space, ensuring that trains are neither overcrowded nor underutilized. This enhances comfort and convenience for passengers.

- Service Frequency and Scheduling

Passenger count data can inform the scheduling of trains, optimizing frequency to match demand. During peak times, additional services can be deployed to prevent overcrowding, while off-peak services can be adjusted to conserve resources.

- Safety and Security

Knowing the number of passengers on board is essential in emergencies for evacuation and rescue operations.

Overcrowded trains can pose safety risks. Monitoring passenger movements allows for proactive measures to control crowd sizes and maintain safety.

- Enhanced Passenger Comfort

By preventing overcrowding and managing train capacities effectively, rail operators can ensure a more comfortable and enjoyable journey for passengers.

- Targeted Service Improvements

Focused Investments: Data on passenger movements can highlight areas requiring service improvements or additional amenities, such as more frequent services on busy routes or enhanced facilities on trains with high passenger volumes.

- Resource Allocation

Efficient Use of Resources: Understanding passenger flow patterns helps allocate resources more efficiently, such as positioning staff where they are needed most to assist passengers or manage crowds.

- Data-Driven Decisions

Strategic Planning: Long-term planning benefits from passenger movement data, aiding in decisions regarding fleet expansion, station upgrades, and the development of new routes or services.

- Personalized Services

Customized Experiences: Aggregated passenger movement data can also support the development of personalized services and promotions, targeting frequent routes or identifying underserved segments.

7.3.2 Technologies

In the evolving landscape of rail transport, accurately counting the number of passengers moving within a train has become an essential aspect of service management, directly influencing operational efficiency, safety, and passenger satisfaction. To achieve this, a variety of sophisticated technologies are deployed, each with its unique approach to monitoring passenger flow.

- One such innovative solution involves the use of sensors that gauge the weight of passengers as they traverse designated areas within the train. These sensors, strategically placed at entry and exit points or within the carriage itself, offer a discreet yet effective means of estimating passenger load. By measuring the collective weight, they provide an indirect count of individuals onboard, adjusting for variables like luggage which might skew the data, especially on routes to and from airports.
- Furthermore, the integration of cameras throughout the train marks another leap forward in passenger monitoring technology. Equipped with advanced facial recognition software, these cameras do more than just record; they analyze

the visuals to identify and count passengers. This method not only aids in quantifying the number of occupants in a carriage but also enhances security by monitoring passenger movement and behaviour.

- Ticketing systems also play a pivotal role in this technological ecosystem. The moment a ticket is purchased, it initiates a data trail that continues as passengers scan their tickets upon entering and exiting the train. This digital footprint allows for precise tracking of passenger movements, contributing valuable insights into usage patterns and carriage occupancy.
- Diving deeper into the technological arsenal, motion sensors emerge as a key tool for detecting passenger activity. Positioned in strategic locales throughout the train, these sensors capture movement, sending signals to a centralized computer system that logs the presence of passengers. This method is particularly effective in high-traffic areas, ensuring accurate counts and identifying peak times for travel.
- Complementing the suite of technologies are thermal imaging systems. Unlike their counterparts, thermal cameras focus on the heat signatures emitted by passengers, offering a unique perspective on occupancy. This technology excels in differentiating between inanimate objects and humans, providing reliable counts even in densely packed carriages where current methods might falter.

Each of these technologies—weight sensors, cameras with facial recognition, ticketing systems, motion sensors, and thermal imaging—contributes to a comprehensive understanding of passenger flow within trains. By harnessing the strengths of these diverse methods, rail operators can ensure not just the comfort and safety of their passengers but also optimize service delivery and operational efficiency.

The future of passenger counting in rail transport, therefore, lies in the integration and intelligent application of these technologies, paving the way for a more connected, efficient, and passenger-centric travel experience.

7.3.3 Case studies

In the quest to accurately count and understand passenger movements within the rail transport ecosystem, various operators across Europe have embarked on innovative case studies, each employing unique methodologies to tackle this complex challenge.

These case studies not only shed light on the practical aspects of passenger counting but also reveal the broader implications for service optimization and customer satisfaction.

These case studies illustrate a collective endeavour towards more accurate, efficient, and user-friendly methods of counting passengers in rail transport. From leveraging the physical attributes of trains to integrating cutting-edge digital technologies, each approach contributes to a deeper understanding of passenger behaviour. This, in turn, enables operators

to tailor services more closely to customer needs, enhance safety, and optimize operational efficiency.

7.3.3.1 SNCB's innovative use of train braking systems

At the heart of SNCB's approach is an ingenious utilization of the train's braking system data outlining how the Desiro train units were equipped to calculate braking power based on the onboard weight, indirectly estimating passenger numbers at each stop.

This method, refined by Siemens (Desiro´s manufacturer), adapts for additional weight variables, such as luggage on airport-bound trains, showcasing a blend of precision and adaptability in passenger counting.

7.3.3.2 CFL's passengers counting, satisfaction surveys and user centric approach

In Luxembourg, the current methodology for passengers counting leans mainly towards manual counting. The CFL are also in the process of setting up automatic passengers counting. This passengers' counting allows CFL to better understand the mobility behaviours.

In complement of this, CFL conduct satisfaction conducted every year. They also develop a user centric approach on their project, and they involve their customers in cocreation workshops. It is highlighted the labour-intensive yet insightful nature of these surveys, allowing for a granular understanding of passenger flow and expectations regarding the service.

7.3.3.3 SBB's multi-faceted passenger counting strategy

Switzerland's SBB presents a multi-layered strategy, balancing between automatic door sensor counts in regional services and manual counts in long-distance operations. SBB deployed beacon technology for tracking passenger check-ins and check-outs via mobile phones, alongside the use of customer measurement systems at major stations to monitor station entries and exits.

SBB's approach reflects a nuanced understanding of technology's role in enhancing passenger counting accuracy and the challenges of public perception regarding data privacy.

7.3.3.4 The Netherlands' NS and credit card check-ins

Highlighting a move towards convenience and modernity, NS has implemented a check-in/check-out system using credit cards. This innovation offers tourists and occasional users an easy-to-use option for accessing rail services, although it currently does not support discounted fares during off-peak hours, indicating a balance between accessibility and pricing strategies.

7.3.3.5 Future directions and ai applications

Artificial Intelligence (AI) will revolutionize passenger counting and flow management. The future use of AI in analyzing timetable searches and controlling passenger flows, shows a future where technology not only simplifies counting but also anticipates and manages passenger movements with unprecedented precision.

7.4 ENHANCING THE BOARDING EXPERIENCE

Enhancing the boarding experience requires a multifaceted approach that integrates operational efficiency, customer feedback, advanced technology, and robust security measures. By addressing these key aspects, railway services can ensure a seamless and enjoyable boarding process, ultimately improving passenger satisfaction and safety.

7.4.1 Key Points

- Operational Efficiency

The necessity for streamlined boarding processes to reduce wait times and alleviate congestion during peak hours is of the upmost importance. Optimizing gate arrangements and improving signage to direct passenger flow more effectively were suggested to minimize bottlenecks and enhance overall efficiency.

Examples:

- Redesign gate layouts to reduce bottlenecks and ensure smoother passenger flow.
- Enhance visibility and clarity of directional signage throughout the station.
- Introduce dedicated lanes for different types of passengers (e.g., regular, priority, families, and individuals with disabilities).

➢ Customer Feedback

Gathering and analyzing customer feedback is crucial for identifying pain points in the current boarding experience. This feedback is essential for informing targeted improvements, ensuring that changes align with passenger needs and preferences.

➢ Technology Integration

The adoption of advanced technology solutions is essential to facilitate smoother boarding. Potential uses of mobile app functionalities need to be considered, such as allowing passengers to navigate the station and access real-time information about their boarding gates and train status.

- Develop a comprehensive mobile app that provides real-time updates on train schedules, boarding gate information, and platform changes.
- Install automated ticket gates to speed up the boarding process.
- Implement smart queue management systems to manage passenger flow during peak times.

➢ Security Concerns

Maintaining a secure boarding environment is a priority, especially with the introduction of new technologies. Enhanced security measures are necessary to ensure passenger safety without compromising the efficiency of the boarding process.

- Upgrade surveillance systems to monitor passenger flow and detect potential security threats.

➢ Efficient Boarding Processes

It is important an efficient boarding process for improving customer experience and safety. There is a need for standard procedures and advanced technology to minimize accidents and ensure punctuality. Seamless boarding has to include especially passengers with bicycles or luggage.

- Ensure platform heights are consistent with train door levels to facilitate easier boarding.
- Provide dedicated assistance for passengers with bicycles, luggage, or disabilities.

➢ Passenger Safety

The group addressed the challenge of passengers attempting to board trains at the last moment, which can lead to safety hazards.

Potential solutions can include using clear visual and audio signals to indicate when it is no longer safe to board. Educating passengers about these signals is essential to improve overall safety and efficiency.

- Use clear visual and audio signals to indicate when it is no longer safe to board.
- Conduct education campaigns to inform passengers about boarding signals and safety practices.

The Shinkansen system in Japan utilizes clear markings on platforms, coupled with automated boarding gates, to ensure efficient passenger flow during peak hours. Similarly, Dutch Railways (NS) have optimized boarding processes by using dedicated lanes for passengers with bicycles or special needs, speeding up the boarding process.

7.5 ROLLING STOCK

7.5.1 Classes

In the UK there are several train operating companies (TOCs) removing their first-class service due to factors such as a lack of take-up, costs savings and trying to increase train capacity.

The majority of passengers would rather prefer a reliable, clean and uncongested train rather than a higher level of luxury – obtained at a premium. To date, most of the changes have been on non-intercity routes, but some of the new entrants to the open access market have not included first-class as an option.

Travelling in sleeper cars is part of the relaxation. Source: MAV-START

Numerous Mobility-as-a-Service (MaaS) initiatives are focusing on making the journey as streamlined and informed as possible, including the ultimate aim of transparent and easy to understand tickets (and in some cases, ticketless travel).

Technology will play a massive role in ensuring the passenger experience is optimised and travelling on trains and buses will become more cost effective and reliable.

Eventually, this will be led by customer behaviour and demand; this has already changed since the pandemic.

- Some customers may enjoy a little 'luxury' and so there is still some need to differentiate on certain routes, probably the longer ones.
- It is necessary to be ready and react to the changing environments and make rail sustainable, thinking differently about current terms, whilst providing an opportunity for customers who may wish to 'treat' themselves.

7.5.2 Train Interiors

Train interiors are not only integral to safety and an operator's image but are also crucial to customer experience. Operators aim to create a comfortable and welcoming ambience which offers comfortable seating, ample legroom, and evolving amenities, considering factors such as lighting, temperature control, privacy, and the importance of on-board technology to provide a connected journey.

Train interior design is evolving to meet changing passenger needs and preferences, with options ranging from luxury to budget-friendly.

Train Interior. Info to Passengers. Source: SNCB

Passenger comfort can be significantly improved by focusing on ergonomic seating designs, adjustable lighting, and sound insulation. Operators such as the ÖBB Nightjet have set new standards for comfort, offering privacy and evolving amenities for overnight travellers.

There is a growing emphasis on making cabins accessible for all, prioritizing inclusivity in the rail industry.

Aesthetic cleanliness and a sense of well-being are also significant factors in customer satisfaction and encourage repeated use.

Sustainability is also a factor, with eco-friendly materials and energy-saving systems being incorporated. A well-designed interior can help enhance the overall journey, as well as attract and retain customers. Sustainable practices in material sourcing, such as the use of biobased materials, are becoming increasingly important in rail interior design.

Future innovations may include modular seat structures with recycled fabrics, and systems that

allow passengers to have a more personalized and comfortable journey.

7.5.2.1 Nightjet of the new generation: a new era in night-time travel

ÖBB – the Austrian Federal Railways – is the biggest company advocating for climate protection in Austria, and the Nightjet has now become synonymous with sustainable travel within Europe. For customers, it is not only the network with lots of attractive destinations in Europe that counts, but also modern and comfortable trains. ÖBB have looked closely at the needs and wishes of today's passengers and designed the interior of the new rolling stock accordingly.

ÖBB Nightjet train

Austrian Federal Railways' Nightjet service exemplifies innovative design with more privacy and comfort options, setting new benchmarks for overnight travel.

7.5.2.2 Is the era of uncomfortable train seats coming to an end?

A good-looking train seat is not necessarily a comfortable seat and explains how the new operator will ensure the ambience and comfort of its train interiors is a major priority in what they hope will be an outstanding interior layout for passengers.

7.5.2.3 Case Study: French SNCF

The stiffness of the seats on recent trains is often criticised, in contrast to the "softness" of the old Corail trains. The SNCF promises that the future TGV M will be more comfortable.

On a TER train you can sit for a few tens of minutes, but on a TGV through France you can sit for several hours. So the comfort of the seats is very important? and the passengers' verdict is as good as their expectations! As trains modernise, the nostalgic "c'était mieux avant" (it was better before) comes to the fore. And we are reminded of the softness of the wide seats of the Corail (short for "comfort on rails") trains, which came into service in the late 1970s and are about to disappear in France.

Although the new trains benefit from the highest safety standards and the most advanced technology, they seem to be lacking in the eyes of a large proportion of passengers: their seats. SNCF can pack its bags with its TGVs, there's nothing like the comfort of the "old" Corail trains, where you have a huge, cushy seat," reads one Twitter message. Or: "The new TGV 2nd class seats are as comfortable as Ryanair's".

Fireproof materials, mass of the trains? Very restrictive rules

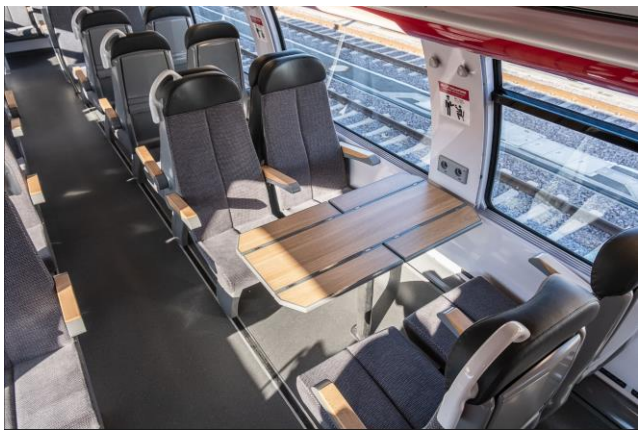
How to explain such a regression? The answer lies in European standards. Fireproofing, anti-damage, train weight, hygiene? They are becoming stricter every year. For example, "fire regulations require the use of generally solid fireproof materials. The challenge is to find the technology capable of meeting these standards while offering passengers the best possible comfort," say Isabelle Le Saux, Design Director at SNCF Voyageurs, and Florence Rousseau, TGV M Marketing Director.

Another important aspect is that the seats must be as light as possible. A two-seater in an Ouigo weighs 38 kg. On a TGV Océane, it weighs 43 kg in second class and 80 kg in first class (because of its reversibility

system). Saving weight has an environmental impact: the lighter the train, the less energy it consumes to operate. In addition, this hunting of the extra kilos should make it possible to comply with the standard imposing a maximum axle load of 17 tonnes. This means that a TGV carriage must not exceed 34 tonnes. Its predecessors, the Corail cars, can carry twice as much weight (68 tonnes).

Although passengers may not necessarily realise it, the ergonomics of the latest seats are designed to prevent back pain. The seats of the TGV Océane, in service since 2017, have been designed for the first time in collaboration with an osteopathic school. However, passengers often find them too "stiff" and "hard". "Indeed, this overly scientific approach has been criticised by some customers," admits SNCF Voyageurs. In other words, the design of these seats forces passengers to adopt an upright posture, not necessarily in line with their actual use.

Should we expect improvements in the TGV of the future? The new TGV M trains that will enter service from 2024 should make up for the comfort lost in recent years. The SNCF promises the return of a "less firm seat with a spring effect". Thanks to the use of a mesh fabric, the seats will follow the shape of the body, creating a hammock effect," explains Isabelle Le Saux and Florence Rousseau.



To improve this patented technology, the seats were recently tested by 75 volunteers in real travel conditions. For two hours, they were invited to use them in the position that suited them best and filmed to detect any discomfort.

The company wants to reassure passengers on another point: although future trains will have 20% more capacity (734 seats instead of about 600), it will not be at the expense of comfort. "The power cars have been reduced by 4 metres and each carriage by 1-metre. This makes it possible to add an extra carriage, i.e. around 20% more seats with the same legroom", summarises SNCF Voyageurs. And on other trains, such as the TER? It all depends on the regions, which decide on their configuration. Some choose 2-2 rows, while others opt for 2-3 rows, which obviously leave less space.

7.5.3 Quiet Cars

The quiet car initiatives underscore the rail industry's commitment to adapting to passenger preferences and enhancing the travel experience. By providing spaces where noise is significantly reduced, railways are not only catering to the needs of those who wish to work or relax in silence but are also setting new standards for passenger comfort and service quality.

As the feedback from these initiatives continues to be positive, it is likely that more railway operators will consider incorporating quiet zones into their service offerings, thereby making peaceful travel an accessible option for all passengers.

Railway operators globally are increasingly experimenting with "Quiet Zones" or "Quiet Cars" on trains, offering passengers a sanctuary from the hustle and bustle of daily commute. This innovative approach aims to provide a peaceful environment where noise is minimized, and tranquillity is paramount, catering to the needs of travellers

seeking a quiet space to work, read, or rest during their journey.

One notable experiment in this domain was conducted in Belgium, where certain train segments were designated as quiet zones. These areas strictly prohibited phone conversations and required all mobile devices to be switched to silent mode, ensuring that the quietude of the environment was maintained. The initiative was targeted at assessing passenger reception to such a noise-free travel option on some of the busiest rail routes, including cities like Ghent, Brussels, and Liege.

The feedback from passengers was overwhelmingly positive. Many appreciated the opportunity to work undisturbed or enjoy a moment of silence, highlighting the challenge of finding quiet spaces in today's fast-paced world.

The success of this trial highlighted the potential of quiet zones to not only enhance the passenger experience but also to encourage more frequent use of rail services.

Following Belgium's example, other countries have explored similar concepts. For instance, certain railway operators in China, the United States and the United Kingdom have introduced quiet cars, enforcing rules against loud conversations, phone calls, and ensuring electronic devices are used with headphones or on silent mode. These efforts reflect a growing recognition of the value of quiet travel environments in improving overall customer satisfaction.

Quiet Car NS Railways. (Source: NS)

Implementing Quiet Cars requires a multifaceted approach, combining clear policy communication, physical modifications, and passenger cooperation.

- Policy Design and Communication
  - Clear Guidelines
  - Awareness Campaigns
- Physical Modifications and Signage:
  - Dedicated Carriages
  - Soundproofing Measures.
- Passenger Cooperation and Enforcement
  - Staff Training
  - Passenger Self-Regulation.

7.5.4 Rolling stock Design

According to the Study Development of an Innovative Train Using Evidence Based Design (Mark van Hagen, Netherlands Railways et al.), contrary to popular belief, the design of trains is rather more important for passengers than running trains on time, from the customer experience perspective.

The report adds that knowing that investment in the look and feel of a train is relatively cheap, compared to the functional aspects of a train, and investments carried out for running trains on time, it is far easier to improve customer experience at lower costs by paying careful attention to the design of the train.

Rail operators in Japan and Germany have integrated sustainable design elements into their rolling stock, such as the use of eco-friendly materials and energy-saving technologies. For instance, JR East's E235 series incorporates regenerative braking systems to reduce energy consumption.

Rolling stock design should also incorporate universal design principles to ensure accessibility for passengers with disabilities, as discussed in Section 6.2 Features such as low-floor trains, wide doors, and dedicated wheelchair spaces are essential for creating an inclusive travel environment.

Many operators, including Eurostar and Thalys, have optimized their rolling stock with dedicated luggage storage compartments that minimize clutter and provide security for passengers' belongings.

Adequate luggage space is essential for preventing congestion in aisles and ensuring a comfortable journey for all passengers

7.6 LUGGAGE HANDLING

Improving luggage handling requires a combination of technological advancements, efficient feedback mechanisms, and addressing operational challenges.

By implementing these specific measures, railway services can significantly enhance the luggage handling experience, ensuring efficiency, security, and passenger satisfaction.

Addressing these areas is crucial for enhancing the overall passenger experience and ensuring the efficient and secure handling of luggage.

Raised seating concept". Source: ÖBB

Luggage handling is a critical component of the overall customer experience in railway services. Alongside bicycles, it requires meticulous planning and integration across various elements of railway operations, including stations, rolling stock, and the services provided by the railway company.

Ensuring efficient and convenient luggage handling can significantly enhance passenger satisfaction and streamline operations.

7.6.1 Improvements

By addressing the following aspects described in the paragraphs below, railway services can significantly improve the luggage handling experience, ultimately enhancing overall customer satisfaction and convenience.

These measures ensure that passengers have a seamless and enjoyable journey, with their luggage safely and efficiently managed throughout their travel.

7.6.1.1 Overhead Racks and Information Systems

In commuter trains, overhead racks are typically designed for smaller items, such as cabin luggage. However, for long-distance journeys, trains are equipped with additional luggage racks that offer multiple storage levels to accommodate larger bags.

Some modern trains are adopting the "raised seating concept," which allows for more convenient storage without requiring passengers to lift their luggage overhead.

Providing clear information onboard regarding luggage reservations and occupancy detection helps passengers know in advance where to store their luggage and check availability.

Overhead racks

7.6.1.2 Enhancing Station Facilities

Stations should be equipped with secure lockers that offer additional security features for temporary luggage storage.

Integrating luggage tagging systems and offering automated storage lockers at major stations can improve the security and convenience of luggage handling, ensuring passengers have peace of mind throughout their journey.

This service is particularly useful for passengers who have a layover or need to explore the city without their luggage. Providing luggage carts can assist

passengers in moving larger items through the station with ease.

In Japan, luggage services at Shinkansen stations allow passengers to drop off large bags for direct delivery to their destination, reducing congestion on trains. Similarly, in Europe, operators like Renfe and SNCF have introduced luggage-forwarding systems for passengers traveling long distances.

7.6.1.3 Accessibility Features

To ensure easy access for all passengers, stations should include lifts and inclined moving walks. These features are crucial for those with heavy or bulky luggage, making their transit through the station more comfortable and barrier-free.

7.6.1.4 Train Configuration and Capacity

Trains need to have adequate baggage racks to handle the luggage needs of passengers. Depending on the type of service (commuter or regional), some trains feature multifunctional zones designed for standing room, bicycles, strollers, and luggage. These zones offer flexible space usage, adapting to the needs of different passenger groups.

ICE L - stepless entry (Source DB

7.6.1.5 Addressing Luggage Restrictions and Prohibited Items

To ensure safety and convenience, most railway operators impose restrictions on the size and number of luggage pieces. Passengers may be required to pay additional fees based on the size and quantity of their luggage.

Specific items are typically prohibited for safety reasons, including:

- Articles exceeding one meter in any dimension.
- Motorcycles, mopeds, motor scooters, and motorized cycles (excluding e-scooters).
- Livestock such as pigs, sheep, and goats.
- Any animal or item likely to cause inconvenience due to its size or behaviour.
- Sharp objects, edged weapons, firearms, corrosive substances, inflammable substances, radioactive materials, and explosives.

7.6.2 Enhancing Customer Experience

7.6.2.1 Generous Storage Racks

Providing ample storage space is essential, as some trains have special coaches designated for luggage. Ensuring a good level of storage space accommodates varying customer needs and enhances the travel experience.

Rack for larger luggage

7.6.2.2 Luggage Visibility

Passengers feel more secure when they can see their luggage. Offering storage options within a reasonable distance from seating areas ensures that passengers can keep an eye on their belongings, enhancing their sense of security.

While most trains do not have dedicated staff to assist with luggage, implementing a reservation system that allows passengers to pre-book space for bulky items can significantly improve their experience.

Implementing adaptable storage solutions that can be optimized for different routes and seasons helps meet varying customer needs. This flexibility ensures

that the railway service can handle different luggage demands efficiently.

7.6.2.3 Innovative Security Solutions

To further enhance security, some railway companies are exploring the use of lockable racks to secure passengers' luggage during the journey. This innovation ensures that passengers can travel with peace of mind, knowing their belongings are safe.

7.6.3 Key Points

- Managing Flow and Security

It is important to manage the flow and security of luggage, especially during peak travel times.

It is proposed to enhance the security protocols and streamline luggage handling processes to manage large volumes efficiently.

  - Increase staffing and use automated systems to manage luggage flow during peak times

- Electric Wheelchairs and Heavier Items

Handling of Electric Wheelchairs and Heavier Items, that are becoming bigger and heavier.

A possible solution is retrofitting existing systems and provide training for staff on handling heavier and more cumbersome items. SNCB's response to this challenge serves as a model for implementing effective solutions.

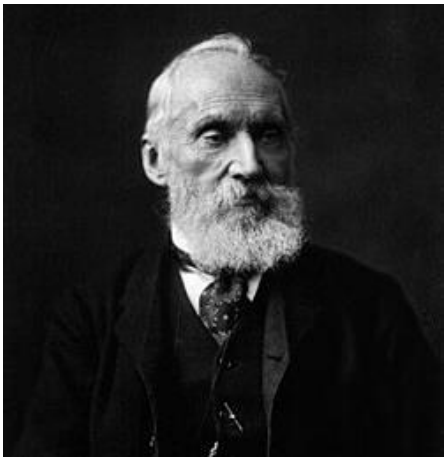
  - Develop specialized handling procedures for oversized and heavy luggage items.

- Looking ahead to anticipate changes in terms of the product to be carried, for example, in terms of micro-mobility.

8 KEY PERFORMANCE INDICATORS (KPIS)

8.1 IMPORTANCE OF KPIS

The importance of Key Performance Indicators (KPIs) in any organization or system cannot be overstated, and the wisdom of William Thomson Kelvin, Lord Kelvin (1824-1907) encapsulates this perfectly. His assertion that what is not defined cannot be measured, and what cannot be measured cannot be improved, speaks to the foundational role of KPIs in progress and quality assurance.



William Thomson Kelvin, Lord Kelvin (1824-1907)

To put it simply, KPIs are critical because they convert abstract concepts into concrete, measurable goals. They give clarity by defining what success looks like and how it can be quantitatively tracked over time. Without such definitions, one cannot begin to measure progress or lack thereof.

Measurement is the next essential step. It enables organizations to understand their current performance in relation to their goals. By setting and tracking KPIs, organizations can gather insights into which processes are working and which are not, creating opportunities for informed decision-making.

The ability to measure performance is intrinsically linked to the ability to improve it. Improvement is an ongoing process, not a one-time goal. By continuously measuring their performance against set KPIs, organizations can engage in a cycle of constant refinement and enhancement. They can see the impact of changes and make adjustments as needed, driving continuous improvement.

Conversely, Lord Kelvin warns that what is not improved invariably deteriorates. This is a call to vigilance. In a rapidly evolving world, standing still equates to moving backwards as new technologies, processes, and strategies emerge. Continuous improvement through KPIs is not just a pathway to excellence but also a hedge against obsolescence and decline.

In summary, KPIs are vital tools for defining, measuring, and improving the performance of an organization. They enable organizations to turn strategic objectives into concrete results, fostering a culture of continuous improvement and ensuring that they remain competitive and effective.

8.2 INTRODUCTION

All industries can learn from other sectors. However, understanding your customer and the drivers for overall customer experience for your product is paramount in designing the optimal on-board experience.

Knowing customers is essential; for example, airlines know all their customers. In rail, there are a lot of customers whose details are unknown, and it is difficult to obtain feedback or communicate with them.

Engaging with stakeholders—ranging from passengers to regulatory bodies—is crucial for successful KPI management. Communication strategies should ensure that stakeholders are not only aware of the measures being implemented but also have opportunities to provide input. This collaborative approach helps in aligning service improvements with passenger expectations and regulatory requirements.

Ensuring that staff are well-trained and equipped to meet the challenges of evolving rail operations is critical. Ongoing training programs in customer service, technology use, and safety protocols are essential to empower employees and ensure they are capable of delivering high-quality service consistent with passenger expectations.

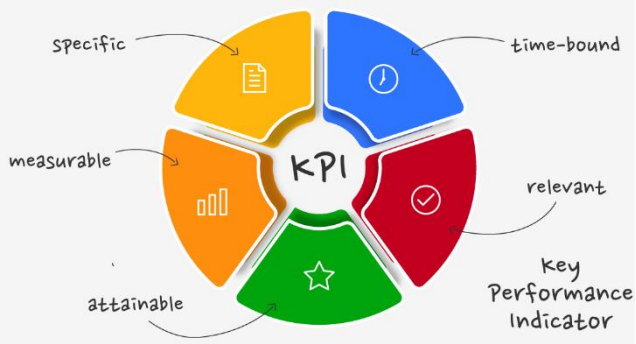
By adopting these monitoring and management strategies, rail operators can ensure a high level of service delivery that meets the dynamic needs of their passengers, thereby enhancing overall customer satisfaction and loyalty in the competitive public transportation landscape. This structured approach to KPI management not only facilitates operational excellence but also supports strategic growth and sustainability in the rail sector.

Technology plays a critical role in measuring KPIs more accurately and in real-time. Advanced data analytics platforms allow operators to track customer sentiment through surveys, social media, and direct feedback while also measuring operational efficiency with minimal manual input.

8.3 DEFINITION AND OBJECTIVES

KPIs provide targets for teams to shoot for, milestones to gauge progress, and insights that help people across the organization make better decisions.

- Quantifiable measure of performance over time for a specific objective.
- KPIs to be connected with a key business objective
- KPIs revision on a consistent basis: progress and effectiveness
- KPIs to be shared with staff and stakeholders
- Monitoring and improving these indicators is key to ensuring a positive customer experience and fostering customer loyalty.
- Each of these KPIs requires a combination of quantitative and qualitative measurement techniques to provide a complete understanding of the customer experience and areas of potential service improvement.



8.4 KPIS AIRPORT EXAMPLES

8.4.1 Safety

- Safety
- Fatality
- Reportable Dangerous Occurrence
- Reportable Occupational Illness / Disease
- Reportable Serious Injury
- Near Miss
- First Aid Injury
- Equipment Property Damage
- Lost Time Injury
- Medical Treatment Case
- Restricted Workday Case
- Number of Reported Issues
- Bird Strike
- Operational Delay
- Cancelled Operation
- Customer complaints
- Percentage of Flights Delayed > 15 minutes
- Average Minutes Delay
- Percentage of Flights Delayed Due to Technical / Commercial reasons

8.4.2 Environmental

- Spills / Releases / Discharges to Land
- Spills / Releases / Discharges to Water, including Groundwater
- Releases / Discharges to Atmosphere
- Vegetation Removal / Harm
- Harm to Animal Species

- Damage to Cultural Site
- Environmental Noise / Vibration
- Other

8.4.3 Financial

- Operating Margin
- Revenues
- Expenses
- Revenue Per Available Seat

8.4.4 Flights Operations

- Number of Flights
- Number of PAX
- Average Turnaround Time
- Number Lost Baggage Incident

8.5 AIRLINE OPERATIONS

- Departure Punctuality: percentage of flights that depart on-time at the planned origin airport concerning all operated flights
- Regularity: percentage of operated flights concerning planned flights i. e. how many flights an airline cancels.
- Delay Reasons: somehow related to punctuality KPIs, the KPI provides a more specific analysis of operational issues. Alternative: Some airlines monitor the average delay minutes per flight or average delay minutes a passenger experience.
- Seat Load Factor: percentage of checked-in passengers in relation to an aircraft's available seats.
- Arrival Punctuality: percentage of flights that arrive on-time at the planned destination airport concerning all operated flights. Typically, the definition of on-time contains a 15 minute time window in both directions: ahead and behind schedule.
- Misconnex Quota: percentage of connecting passengers who miss their onward flight related to the complete number of connecting passengers.

8.6 HOSPITALITY

"Customers or guests are always right". This is the fundamental principle adopted by hoteliers under contemporary marketing. So it is necessary for hotel marketers to fulfil customers' expectations which not only make customers' satisfied but also enhances the market share.

Following KPI´s are commonly use in hospitality business:

- **Total Available Rooms**: number of rooms which are readily there to be booked in the hotel.
- **Average Daily Rate or ADR**: average rate at which each room at the hotel was sold on a given day.
- **Revenue per Available Room or RevPAR**: reflects how much a hotel can charge for its rooms and how successful it is at selling the inventory which is available.
- **Occupancy Rate**: percentage of rooms which are occupied for a particular period of time.
- **Online reviews**: can break or make your reputation; prompt replies show the customers that you care.
- **Average Length of Stay or ALOS**: calculated by dividing the occupied rooms by a number of bookings.
- **Market Penetration Index or MPI**: Is calculated by dividing your hotel's occupancy by the hotel market's occupancy and then multiplying the figure by 100.

8.7 RAILWAYS INFRASTRUCTURE MANAGER

The Platform of Railway Infrastructure Managers in Europe (PRIME) plays a pivotal role in shaping the landscape of rail transport by prioritizing customer experience and operational efficiency through its Key Performance Indicators (KPI) structure.

The PRIME KPI structure is meticulously designed to encapsulate the multifaceted nature of railway infrastructure management and address the diverse needs of its stakeholders and customers.

The PRIME KPI structure provides a comprehensive framework that not only measures the performance of railway infrastructure managers but also guides them in prioritizing initiatives that enhance the customer experience and meet stakeholder expectations.

By adopting this structured approach, railway managers can better align their operations with the evolving needs of passengers and other stakeholders, ensuring a resilient and future-ready railway system.

This structure is divided into five distinct dimensions, each focusing on critical areas of railway management:

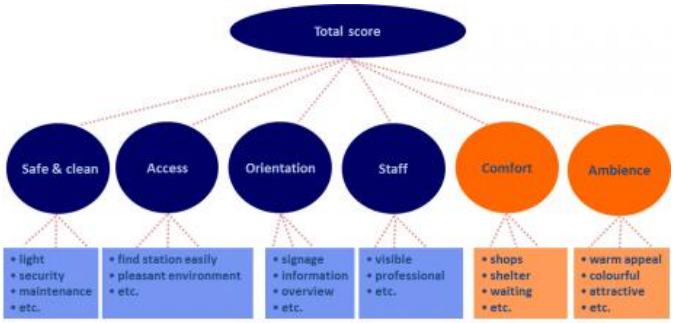
- **Safety and Security**: This dimension ensures that safety remains the cornerstone of railway operations. It involves continuous monitoring and enhancement of safety measures, emergency response protocols, and security systems to protect passengers, staff, and assets. By prioritizing safety, PRIME helps to build trust and confidence among passengers and ensures compliance with national and international safety regulations.
- **Service Quality**: Focused on delivering high-quality, reliable, and punctual service, this dimension measures the effectiveness of timetable adherence, the frequency of services, and the cleanliness and maintenance of trains and stations. Enhancing service quality directly impacts customer satisfaction and loyalty, making it a critical component of the KPI structure.
- **Financial Performance**: This dimension assesses the economic aspects of railway management, including cost efficiency, revenue generation, and investment in infrastructure. By optimizing financial performance, PRIME aims to ensure sustainable growth and the continuous improvement of rail services without compromising on quality or safety.
- **Environmental Impact**: Reflecting the growing importance of sustainability in transport, this dimension evaluates the environmental footprint of railway operations. It includes measures to reduce energy consumption, emissions, and waste, and to promote eco-friendly practices across all aspects of railway infrastructure. This not only aligns with global environmental goals but also enhances the public's perception of the railway sector as a leader in sustainable transport.
- **Customer Satisfaction**: Perhaps the most directly impactful dimension, this focuses on understanding and improving the end-user experience. It involves regular surveys and feedback mechanisms to gauge passenger satisfaction with various aspects of the service, such as comfort, convenience, information availability, and overall travel experience. Insights gained from customer feedback are pivotal in driving enhancements across all other dimensions.

Each of these dimensions is interconnected, with improvements in one area often leading to positive outcomes in others. For instance, enhancing safety and service quality boosts customer satisfaction, while better financial performance allows for more

investments in sustainable technologies, further improving environmental impacts and service quality.

The **Station Experience Monitor** (SEM) is a tool designed to evaluate passengers' experiences at train stations. Used in countries such as the Netherlands and the United Kingdom, as well as at various demonstration sites of the NODES project, its goal is to guide interchange designers and operational managers in creating more pleasant and valuable environments for users.

SEM is a valuable tool for identifying interchange performance in relation to customer experience, providing deep insights into travellers' needs and preferences.



Station Experience Monitor. Source: NS Railways

The figure from the Station Experience Monitor (SEM) aligns with the "Pyramid of Public Transport Customer Needs," inspired by Maslow's Hierarchy of Needs. This model organizes passenger needs hierarchically, from the most basic to the most advanced:

- **Functional Needs (Base of the Pyramid):** include essential elements such as cleanliness, safety, and accessibility at the station. If these needs are not met, the customer experience will be unsatisfactory, as they form the foundation of the service.
- **Comfort and Ambience Needs (Middle Levels):** focus on creating a comfortable and welcoming environment for passengers, enhancing their waiting and transit experience.
- **Emotional and Social Needs (Top of the Pyramid):** represent higher-order aspects of the experience, such as a sense of social connection, enjoyment, and inspiration.

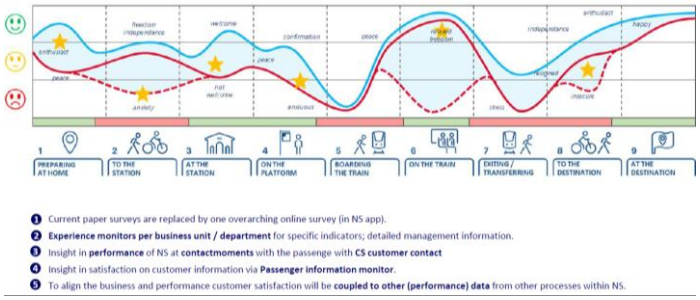
The figure shows that all needs must be addressed. However, the most positive and memorable customer experiences occur when emotional and social needs are fulfilled.

8.8 RAILWAY UNDERTAKING

- Railway performance in terms of Quality of Service can be measured based on eight KPIs in the framework. Each KPI is evaluated with one or more Key Measures derived from operations.
  - Accommodation: rolling stock's maximum capacity to carry in terms of available passenger seats and standing room
  - Passenger Space Kilometer
  - Journey time: total practical consumed time for trains to complete their trips, without connections
  - Connectivity: passenger or cargo interchange time between any two services at a given interchange
  - Punctuality: total delays of trains running in the area, and at designated stations
  - Resilience: based on the traditional timetable stability and robustness and recoverability
  - Passenger comfort:
  - percentage loading/ crowding of trains
  - smoothness of the train driving (jerks no.)
  - Energy: consumed both by running rolling stock and infrastructure such as stations, signalling systems, etc.
  - Resource usage: track usage, rolling stock usage and crew usage.
- Railway companies are leveraging innovative KPIs to align customer satisfaction with operational excellence. These KPIs reflect a blend of real-time feedback mechanisms, post-journey analysis, and targeted assessments. Here's a detailed narrative for each KPI:

- **Customer Journey Satisfaction Score**. Railway operators now measure customer satisfaction holistically by evaluating the entire journey, from ticket purchase to arrival at the destination. This KPI provides an overall verdict on the passenger experience, capturing insights after the journey through online surveys integrated into railway apps.
- **Train Experience Monitor (Real-Time Feedback)**. The Train Experience Monitor captures feedback in real-time while passengers are on board. Through in-train surveys conducted via tablets or paper, this KPI evaluates core services like train maintenance, cleanliness, and staff behaviour.
- **Passenger Information Satisfaction**. This KPI measures how passengers perceive the quality and accessibility of real-time updates and information provided during their journey. By monitoring the effectiveness of announcements, digital displays, and mobile notifications, railway companies can ensure that passengers feel informed and in control, even during unexpected disruptions.
- **Customer Service Contact Performance**. This KPI tracks passenger feedback on responsiveness, problem resolution, and the professionalism of customer service representatives. This metric helps identify areas where customer service can be refined, ensuring that passengers feel valued and supported throughout their journey.
- **Seasonal Trends and Segment-Specific Satisfaction**. This KPI analyzes patterns in customer feedback to understand how satisfaction differs across segments, such as frequent commuters versus occasional travelers.
- **Ad Hoc Initiative Impact.** This KPI measures the immediate impact of the efforts on customer satisfaction, allowing companies to assess their effectiveness in real-time.
- **Integrated Data Performance Alignment**. This KPI reflects the integration of satisfaction metrics with performance indicators like punctuality, cleanliness, and reliability.

These KPIs collectively represent a modern, data-driven approach to improving railway services. By focusing on real-time feedback, comprehensive journey evaluations, and targeted assessments, railway operators ensure that passenger needs remain at the forefront of their operations. Let me know if you'd like this tailored further for a specific audience!



Customer Satisfaction Transjourney. Measurement Framework. Source: NS

9 EN 13816 PUBLIC PASSENGER TRANSPORT SERVICE QUALITY

9.1 INTRODUCTION

The EN 13816 standard, titled "Transportation - Logistics and Services - Public passenger transport - Service quality definition, targeting and measurement," is a significant document for the public transportation sector. Developed by the European Committee for Standardization (CEN), it offers a framework to assess and improve the quality of service in passenger transport across various modes. This standard exemplifies a commitment to a unified European approach to service quality.

This standard emerged with the purpose of tackling the complexities of quality in public passenger transport services. It draws upon the French standard NF EN 13816 and, upon its adoption by CEN, became mandatory for member states to implement without modification.

Through rigorous quality control measures, including customer satisfaction surveys and continuous monitoring, EN 13816 promotes an adaptive and responsive public transport service capable of meeting and exceeding the evolving needs of its customers. It advocates for an integrated quality approach, blending customer expectations with service delivery to provide an optimal transportation experience.

9.2 OBJECTIVES OF EN 13816

The main goal of EN 13816 is to enhance the quality of service. It aims to:

- Identify user needs and expectations.
- Adapt available resources accordingly.
- Deliver added satisfaction to customers.
- Provide a measurement benchmark across different service operators.

The standard is characterized by a strong focus on customer care. It acknowledges the human factor as the principal element of the service product, defining??By applying these standards and principles, public transportation services can greatly enhance the customer experience, which in turn can lead to higher usage rates and customer satisfaction. the product as the customer's perception of service quality. Employee satisfaction is considered reflective of customer satisfaction, emphasizing the simultaneous production and consumption of service. The demand for public transportation services is often seasonal and unpredictable, adding to the complexity of service quality management.

A key focus is on customer service, which involves making travel easier and more enjoyable, typically through human presence.

Comfort elements are introduced to make travel relaxing and pleasant, while safety measures protect against crime and accidents and manage emergency situations.

There is a push towards integrating technology, such as real-time information systems and navigation aids, to enhance customer experience and satisfaction.

EN 13816 emphasizes a customer-centric approach, with considerations for a service culture, improving service touchpoints, adopting service performance, and enhancing service structure.

9.3 QUALITY MANAGEMENT CYCLE

EN 13816 defines service quality from two perspectives: the customers (both current and potential) and the service providers (including the Administration). It recognizes four visions of quality:

- Expected quality
- Targeted/offered quality
- Produced/delivered quality

- Perceived quality

This cycle helps in understanding and narrowing the gap between what is expected by the customer and what is delivered by the service provider.

The standard defines eight service quality areas, organized according to the customer experience pyramid expectations:

Service Quality Area	Subareas
8. Environmental Impact	- Reduction of emissions and pollutants - Energy efficiency - Sustainable practices and materials - Noise reduction
7. Comfort	- Seating availability and comfort - Ambient conditions (temperature, lighting, noise) - Cleanliness - Onboard facilities (Wi-Fi, restrooms)
6. Customer Service	- Customer support and interaction - Handling of complaints and feedback - Staff courtesy and competence - Availability of customer service points
5. Information	- Pre-travel information - On-trip information - Post-travel information - Real-time updates - Clarity and accuracy of information
4. Time	- Travel time - Timeliness (punctuality) - Reliability (consistency) - Connections and transfer times
3. Offered Service	**- Availability of services** **- Network coverage** **- Frequency of service** **- Hours of operation**
2. Accessibility	- Physical accessibility - Financial accessibility - Access to customer service and information - Universal design for all passengers, including those with reduced mobility
1. Safety	- Personal safety and security - Vehicle safety - Emergency procedures and information - Safety information and signage

This table serves as a guideline for public transport operators to evaluate and improve their service offerings across various dimensions to meet or exceed customer expectations.

These areas encompass the broad spectrum of factors influencing public transport service quality, from tangible aspects like accessibility to intangibles like customer perception.

9.4 CERTIFICATION BENEFITS

EN 13816 is instrumental in enhancing customer experience by setting a framework for service quality in the public transport sector. The use of this standard as part of the quality management system shows a commitment to continuously improving service levels and customer satisfaction.

EN 13816 certification can help organizations improve service control, meet customer expectations, and establish a continuous improvement system.

Obtaining certification under EN 13816 can lead to several advantages:

- Improved control and perception of the service by users.
- Guidance of service towards user expectations.
- Establishment of indicators for measuring service quality and customer satisfaction, leading to a system of continuous improvement.
- Employee involvement in service improvement.
- Enhanced company and service image.
- Access to public tenders, which in some regions, like Spain, is an essential requirement.

Public transportation service providers are increasingly adopting comprehensive quality frameworks like EN 13816 to evaluate and improve service quality across multiple dimensions.

9.5 EN 13816 APPLICATION ON RAIL SERVICES

The EN 13816 standard serves as a versatile tool for enhancing the quality of rail services across the spectrum, from commuter to high-speed rails, and underscores a universal commitment to enhancing service quality and ensuring passenger satisfaction.

While the specific applications of the standard vary according to the unique demands and operational characteristics of each service type, the overarching goal remains consistent: to provide a reliable, efficient, comfortable, and satisfactory travel experience for all passengers.

By adhering to this standard, rail operators can not only meet but exceed passenger expectations, fostering loyalty and encouraging the use of public transportation as a sustainable alternative to personal vehicles.

9.5.1 Common Application Across Services

While the application of EN 13816 varies among commuter, regional, and high-speed rail services, common areas of focus across all types include:

- Customer Feedback and Continuous Improvement: Regularly gathering and analysing customer feedback to identify areas for improvement.
- Quality Control and Certification: Implementing quality control measures and seeking certification to demonstrate commitment to high service standards.
- Environmental Impact: Addressing environmental concerns and promoting sustainability in operations, aligning with the standard's emphasis on reducing negative environmental impacts.

9.5.2 Commuter Rail Services

Commuter rail services are designed to facilitate daily travel between suburban areas and city centres, primarily catering to the daily commute of workers.

In this context, EN 13816 focuses on aspects such as:

- Reliability and Punctuality: Given the importance of timeliness for commuters, performance indicators related to schedule adherence are critical.
- Capacity and Comfort: Ensuring adequate space and comfort during peak travel times is essential to meet commuter expectations.
- Accessibility and Information: Clear, timely information regarding schedules, delays, and service changes, as well as ease of access for all passengers, including those with disabilities, are priorities.

9.5.3 Regional Rail Services

Regional rail services connect different cities or regions, often traversing longer distances than commuter rails but shorter than high-speed trains.

The application of EN 13816 here emphasizes:

- Service Coverage and Frequency: Ensuring that service schedules align with user needs across different regions, offering sufficient frequency for flexibility.
- Comfort and Amenities: Given the longer travel times, the comfort of seating, availability of onboard amenities, and overall travel experience become more significant.
- Interconnectivity: Facilitating seamless connections with other modes of public transportation and ensuring coherent information across service points are vital for passenger convenience.

9.5.4 High-Speed Rail Services

High-speed rail services offer rapid connections between major cities, focusing on speed, efficiency, and competitive alternatives to air travel.

EN 13816's application in this context includes:

- Speed and Efficiency: Monitoring and ensuring the high-speed promise is met, along with minimizing delays and disruptions.
- Safety and Security: Given the high speeds, ensuring rigorous safety and security measures are in place is paramount.
- Customer Service and Experience: Providing a premium experience, including ticket purchasing, customer service, and onboard services, is crucial to justify the often-higher costs associated with high-speed rail.

10 UIC´s CUSTOMER EXPERIENCE KPIS PROPOSAL

This section proposes KPIs for measuring customer experience in rail and are developed below.

These KPIs provide a holistic view of the customer experience in rail transport, from comfort and convenience to safety and service satisfaction.

The relative importance of each KPI may vary depending on geographical location, type of passengers (e.g. business travellers versus tourists) and the nature of the rail service (e.g. urban versus intercity).

The perception of its importance may vary over time, influenced by social and technological factors.

KPIs should be integrated into a broader continuous improvement framework, where operators regularly review performance metrics and implement data-driven changes to enhance service quality.

This approach ensures that rail services can adapt to evolving passenger needs and maintain high levels of customer satisfaction.

- Punctuality:
  - Measures the percentage of trains arriving and departing at the scheduled time. Punctuality creates a positive passenger experience, hence the need to closely monitor on-time performance.
  - It is assessed by recording actual arrival/departure times vs. scheduled times.
- Service reliability:
  - Measures the reliability of services, including the frequency and regularity of trains. This ensures that passengers can rely on the railway for their transport needs.

- Safety and Security on Trains and at Stations:
  - Assesses how passengers perceive safety and security within trains and stations, a crucial aspect of the travel experience. Implement robust security measures and regularly evaluate security protocols.
  - Security perception surveys and analysis of reported incidents to assess how passengers perceive their security.
- Service Provision & Utilisation:
  - Service Density (Capacity km per route km): Measures the capacity offered over the network, indicating the availability of service to passengers.
  - Capacity Utilisation (Passenger km per capacity km): Tracks how much of the available service capacity is used by passengers, indicating efficiency and demand alignment.
  - Service Delivery (% scheduled service operated): Assesses the reliability of the service by measuring how much of the scheduled service is actually delivered.
- Accessibility and inclusiveness:
  - Percentage of accessible facilities (e.g., number of wheelchair-accessible stations or accessible toilets).
  - Average response time for accessibility assistance requests (e.g., how quickly staff respond to passengers with special needs).
  - Customer satisfaction ratings specifically focused on accessibility features.

- Percentage of trips completed by passengers with disabilities without issues (related to accessibility support, elevators, ramps, etc.).
- Number of incidents or complaints related to accessibility within a given period.
- Provision of information in multiple languages for non-native speakers.
- Availability of sign language support or other aids for deaf passengers.
- Percentage of staff trained in accessibility and diversity awareness.

Train Interior PRM location. Source: ÖBB

- Environmental sustainability of the service
  - Passengers' perception and assessment of the railway undertaking's sustainability initiatives and their impact on their decision to choose and recommend the service.
  - CO2 emissions per passenger-kilometre for evaluating the environmental impact of rail services in relation to the number of passengers carried.
  - Percentage of energy derived from renewable sources measures the percentage of the total energy used by the rail service that comes from renewable sources, such as wind, solar, hydroelectric, etc.
  - Waste Management tracks the amount of waste produced by rail operations and the efficiency of waste disposal and recycling programs.
  - Customer satisfaction surveys that include specific questions on sustainability, analysis of purchasing behaviour and loyalty programmes, and monitoring of customer participation in green initiatives.

ÖBB Sustainability Report 2023. (Source: ÖBB)

- Seat Availability:
  - Assesses the ability of travellers to find available seats during their journey, indicative of comfort and convenience.
  - Passenger satisfaction surveys and train occupancy analysis to determine the frequency with which passengers find available seats.
- Cleaning and maintenance of trains and stations:
  - The cleanliness of stations, trains and facilities is crucial to a positive customer experience. It is important to maintain a clean and well-maintained environment. Measure passenger perceptions of the cleanliness of trains and stations.
  - Customer satisfaction surveys and regular cleanliness audits to assess perceptions of cleanliness and compliance with standards.
- Customer information and communication:
  - Assess the effectiveness of communication channels and the clarity of information provided to passengers to ensure that passengers are well informed about

timetables, delays and any relevant information.

- Assessment of the accuracy and timeliness of information provided through passenger surveys and systems monitoring.

- Responsiveness of staff:
  - Assesses the responsiveness and friendliness of railway staff during interactions with passengers.
- Service Frequency:
  - Measures the frequency of trains, especially at peak times, to meet passenger demand and reduce congestion.
  - Analysis of train frequencies in relation to passenger demand, using data from ticket sales and satisfaction surveys.
- Waiting time at ticket offices:
  - Average time passengers wait in line to purchase or collect tickets, directly affecting customer satisfaction.
  - Measured with timers or by direct observation during different times and calculated as the average waiting time.
- Wi-Fi Onboard:
  - Evaluates the quality and availability of Wi-Fi connection on board trains, a service increasingly valued by passengers.
  - Network speed and availability tests, along with passenger surveys to assess satisfaction with the Wi-Fi service.
- Availability of Onboard Services:
  - Measures the availability and quality of on-board services such as food and beverage, entertainment and electrical outlets.
  - Service provision monitoring and customer satisfaction surveys to assess availability and perceived quality.
- Station Signage and Orientation:
  - Assesses the clarity and usefulness of signage within stations to facilitate passenger navigation.
  - Visual audits and passenger surveys to determine the clarity and effectiveness of signage and wayfinding.
- Fares and Ticketing Options:
  - Measures passenger satisfaction with the fare structure and the availability of different ticketing options to meet various needs and budgets.
  - Analysis of fare structures, available ticketing options and their comparison with customer satisfaction as expressed in surveys and feedback.

- Commercial Offers:
  - Direct Impact on Customer Decisions: discounts, loyalty programs, and special promotions, can directly influence customer decisions to choose one service over another.
  - Enhanced Customer Perception: Customers tend to feel more satisfied and valued when they believe they are receiving a good deal or exclusive benefits.
  - Competitive Advantage: gain a competitive edge by attracting more customers and generating positive word-of-mouth.
- Ease of Use of the Website and App:
  - Assesses how easy it is for users to navigate the website and mobile app to obtain information and purchase tickets.
  - User experience (UX) analysis, including load times, conversion rate and direct user feedback.
- Complaint Resolution Time:

- Calculates the average time it takes the railway company to respond to and resolve passenger complaints.
- Complaint tracking through customer service management systems to calculate average resolution time.

➢ Accuracy of ticketing and reservations:

- Measures the accuracy and efficiency of ticketing and reservation systems. Improving ticketing processes and ensuring the accuracy of reservations improves the overall passenger experience.

➢ Digital Experience Metrics

- App user ratings reflect customer satisfaction with the app's functionality, usability, and overall experience.
- Time to complete transactions online tracks the average time it takes for passengers to complete transactions online, such as booking tickets, making seat reservations, or updating travel information.
- Passenger engagement with real-time service updates measures how actively passengers interact with real-time updates provided by the rail service, including alerts on delays, schedule changes, platform changes, or disruptions.

➢ Passenger Flow Management

- Average Passenger Waiting Time (Queue Duration)
- Passenger Density Per Square Meter (Crowd Management)
- Missed Boarding Due to Congestion
- Passenger Satisfaction with Flow Management

It's important to note that while these metrics provide valuable insights into customer-centricity, they should be used in conjunction with qualitative feedback and other relevant business performance indicators to gain a comprehensive understanding of the customer experience.

Regularly tracking and analysing these metrics will help identify trends, areas of improvement, and measure the impact of customer-centric initiatives.

11 MONITORING AND MANAGEMENT STRATEGIES

11.1 DYNAMIC KPI MANAGEMENT AND CONTINUOUS IMPROVEMENT

In the context of customer experience in rail transport, the robust monitoring and management of Key Performance Indicators (KPIs) are paramount for sustaining service excellence and adapting to evolving passenger expectations.

The key performance indicators outlined in Chapter 10 should serve as the foundation for the monitoring system. By regularly evaluating performance against these metrics, rail operators can identify trends and areas for improvement, ensuring continuous enhancement of customer satisfaction.

The strategic approach outlined below provides a comprehensive framework for effectively managing KPIs within the rail sector, ensuring that services not only meet but exceed the expectations of today's rail passengers.

The rail industry is dynamic, with passenger needs and technological advancements continually evolving. An effective KPI monitoring, and management strategy must, therefore, be flexible and adaptable. Continuous improvement practices should be embedded within the organization, fostering a culture of innovation and responsiveness to change.

To ensure continuous improvement, it is essential to have periodic strategic reviews of the collected data. These reviews should culminate in comprehensive reports that not only highlight performance against established KPIs but also provide actionable insights for service enhancement. Regular reporting keeps all stakeholders informed and engaged with ongoing performance and improvement strategies.

11.2 DEVELOPMENT OF A TAILORED MONITORING SYSTEM

In the rapidly evolving world of rail transport, delivering an exceptional customer experience is paramount. The development of a tailored monitoring system focused on Key Performance Indicators (KPIs) related to customer experience not only helps in maintaining high standards of service but also ensures continuous improvement.

Regular data collection forms the backbone of effective KPI management. This should include both quantitative data (such as on-time performance, train cleanliness, and ticket purchase efficiency) and qualitative data (passenger satisfaction surveys and feedback).

The integration of these data sources allows for a holistic view of service performance and areas needing attention.

The creation of a specific, detailed monitoring system tailored to the unique needs of the rail industry is crucial. This system should integrate advanced data analytics tools to collect and analyze passenger data continuously.

By leveraging technologies such as real-time passenger feedback systems and IoT sensors in trains and stations, rail operators can gain immediate insights into service conditions and passenger satisfaction.

By implementing a tailored monitoring system focused on critical KPIs, rail operators can ensure that they not only meet but exceed passenger expectations, fostering loyalty and enhancing the overall customer experience in the process. This approach not only aligns with organizational goals but

also adapts to the changing dynamics of passenger needs and technological advancements in the rail industry.

11.2.1 Identification of Customer-Centric KPIs

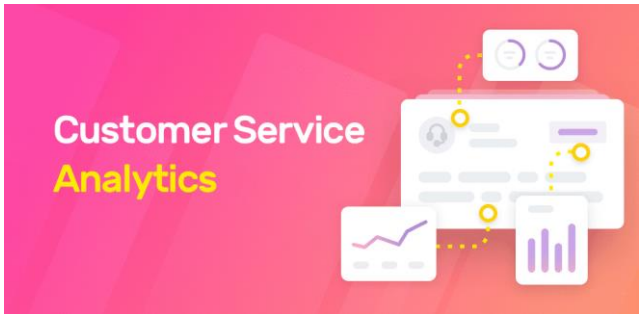
The first step in developing a tailored monitoring system is to identify the KPIs that are most relevant to assessing and enhancing the customer experience. These indicators should be comprehensive, covering all aspects of the customer journey, including:

- On-time Performance: This is crucial as delays are a significant factor in customer dissatisfaction.
- Train Cleanliness and Comfort: Ensuring trains are clean and seats are comfortable can greatly enhance the passenger experience.
- Ticket Purchase Efficiency: The ease and speed of purchasing tickets, whether online, via an app, or at kiosks, affect the initial impression of the rail service.
- Customer Service Quality: This includes the responsiveness and helpfulness of staff both onboard and at stations.
- Passenger Satisfaction Levels: Regular surveys and feedback mechanisms to gauge overall passenger satisfaction.

11.2.2 Integration of Quantitative and Qualitative Data Collection

To effectively monitor these KPIs, a blend of quantitative and qualitative data collection methods is essential:

- Quantitative Data: This includes data from ticketing systems, train operation systems, and customer service logs.
- Qualitative Data: Passenger surveys, feedback forms, and social media monitoring provide insights into the passenger's perspective.



11.2.3 Advanced Data Analytics Tools

The use of advanced data analytics tools is critical for synthesizing data into actionable insights. These tools can process large volumes of data in real-time, providing a dynamic view of service performance and highlighting areas needing attention:

- Real-time Feedback Systems: Implementing real-time feedback systems such as digital kiosks or mobile app surveys at points of service enables immediate customer feedback.
- IoT Sensors: Deploying IoT sensors in trains and at stations can help monitor a range of conditions like train occupancy, cleanliness, and even the functioning of amenities.

Implementing AI-driven predictive analytics enables operators to forecast potential service disruptions, optimize train scheduling, and enhance passenger flow management, leading to a smoother and more efficient customer experience.

11.2.4 Custom Dashboard Development

Developing a custom dashboard that provides a real-time holistic view of all KPIs is crucial. This dashboard should be accessible to both management and operational staff, ensuring that everyone is aligned and can make informed decisions quickly.

- Real-time Updates: Dashboards should update in real-time to reflect the current service conditions.
- Drill-down Capabilities: Staff should be able to drill down to view data at a granular level, from overall network performance to individual train conditions.

11.2.5 Regular Strategic Reviews

Regular reviews of the collected data are essential for continuous improvement. These should be scheduled at strategic intervals to analyze trends, assess the effectiveness of implemented strategies, and recalibrate actions as necessary:

- Comprehensive Reporting: Periodic comprehensive reports should be generated, highlighting performance against each KPI and providing actionable insights.
- Stakeholder Engagement: Regular meetings with all stakeholders, including front-line staff and management, to discuss findings and brainstorm improvement strategies.

11.2.6 Fostering a Culture of Continuous Improvement

Lastly, embedding a culture of innovation and responsiveness within the organization is vital. Staff at all levels should be encouraged to contribute ideas for improving customer experience and should be trained to respond effectively to the insights generated by the monitoring system.

11.3 SURVEYS

11.3.1 Introduction

In the realm of rail transport, understanding and enhancing customer satisfaction is pivotal.

To improve service quality in rail transport it is important the customer feedback through surveys. For example, European EN 13816 offers a comprehensive framework to measure and improve service quality in public transport

Effectively delivering customer satisfaction surveys in rail transport requires a thoughtful approach that respects passengers' time and preferences. By leveraging diverse methods, ensuring survey relevance, and acting on the feedback received, rail operators can significantly enhance service quality and passenger satisfaction. Continuous engagement and transparency about improvements made in response to passenger feedback are key to building trust and loyalty among rail users.

The justification for preparing different kinds of surveys to support customer experience in public transportation, along with identifying pertinent Key Performance Indicators (KPIs), stems from the multifaceted nature of customer satisfaction and service quality.

Each type of survey offers unique insights into various aspects of the customer journey, enabling operators to make informed decisions and implement targeted improvements. Below is a detailed justification for employing a dive survey approach and the associated KPIs that could be monitored.

These surveys are instrumental in capturing the nuances of passenger experience, offering insights that can drive strategic improvements. Below is a description on the types of surveys employed in the rail sector to gauge customer satisfaction and manage service quality effectively.

The deployment of varied surveys is integral to a holistic customer experience strategy in public transportation. By understanding customer needs, preferences, and perceptions through different lenses, operators can tailor their services more effectively, driving satisfaction and loyalty.

- Comprehensive View: Different surveys cover various dimensions of the customer experience, from broad satisfaction to specific service attributes.

- Targeted Improvements: Insights from specialized surveys enable operators to pinpoint areas for targeted interventions, ensuring resources are allocated efficiently.
- Agility: Real-time feedback and mystery shopper inputs allow for quick adjustments, enhancing service responsiveness.
- Strategic Planning: Longitudinal surveys like annual satisfaction studies support strategic planning and long-term service improvements.
- Stakeholder Engagement: Engaging customers through panels or focus groups fosters a sense of involvement and loyalty, enhancing the overall service perception.

The associated KPIs provide a quantifiable measure of success, guiding continuous improvement efforts and strategic decision-making. Together, these surveys and KPIs form the backbone of quality management in public transportation and committed to excellence in service delivery.

11.3.2 Customer Satisfaction Studies

Annual satisfaction surveys are very important for dissecting customer perceptions, shining a light on service strengths like speed and pinpointing concerns such as security. These surveys delve into various aspects of the customer experience, from the initial planning phase to the journey's end. They have to be designed to be representative, capturing a broad spectrum of passenger experiences to ensure that the feedback is comprehensive and actionable.

The satisfaction surveys provide a comprehensive overview of customer satisfaction over a significant period, capturing trends and long-term impacts of service changes. It's crucial for benchmarking and tracking performance against industry standards.

The insights garnered from these surveys contribute to the creation of a customer satisfaction index, a quantifiable measure of overall satisfaction levels, guiding rail operators in targeted service enhancements.

Surveys can be also conducted face-to-face during train rides, which allows for direct interaction and immediate feedback from the clients. This method helps in capturing more nuanced responses and ensures higher response rates.

11.3.3 Corporate Image and Reputation

Beyond individual service experience, studies focusing on corporate image and reputation provide a broader view of public perception. These studies compare the attitudes of both users and non-users, exploring perceptions of innovation, efficiency, and customer care.

Corporate Image and Reputation Studies gauge the public's perception of the brand and service, which is vital for understanding the broader market position and addressing discrepancies between perceived and actual service quality.

Pertinent KPIs that can be monitored in this case are brand recognition rate, brand preference among public transport options, and improvement in public perception metrics.

Such analyses are vital for understanding the positioning of rail services in the public consciousness and identifying gaps between perceived and actual service quality. This broader perspective aids rail operators in crafting strategies that not only address service shortcomings but also bolster their market positioning and brand perception.

Effective management of image and reputation is crucial for sustaining and growing the customer base. Through proactive measures and strategic communication, rail operators can influence how they are perceived in the marketplace.

This involves not just addressing service flaws but also highlighting strengths and innovations. Managing the public image requires a concerted effort to

engage with customers across various platforms, ensuring consistent messaging and fostering positive associations with the service.

11.3.4 Mystery Client Program

The Mystery Client Program serves as a tactical tool, enabling operators to measure the actual service against the intended service blueprint.

Mystery clients, or shoppers, offer an unbiased evaluation of the service, meticulously noting discrepancies and areas for improvement.

This method provides a granular view of the customer experience, uncovering inconsistencies in service delivery and identifying potential areas of customer dissatisfaction.

The program's findings are integral to refining service standards and ensuring that the service delivered aligns with the service promised.

The KPIs to be measured could be compliance rate with service standards, time taken to address identified issues, and customer service excellence scores.

Mystery shoppers, often used in evaluating customer service and compliance with company standards, come in various profiles depending on the specific objectives of the mystery shopping program. Here are different types of mystery shoppers used across industries, including rail transport, to assess and improve service quality.

A Mystery Shopper Program in rail transport offers a unique opportunity to view the service from the passenger's perspective and make informed improvements. By carefully planning, executing, and iterating the program, rail operators can significantly enhance service quality, customer satisfaction, and operational efficiency. The key to success lies in using the insights gained for continuous improvement and fostering a culture of excellence in customer service.

11.3.5 Monitoring and Adaptation

The integration of mystery clients and systematic studies underscores a commitment to continuous service monitoring and swift adaptation.

This dynamic approach allows rail operators to stay abreast of evolving customer needs and expectations, facilitating timely adjustments to service offerings.

By keeping a finger on the pulse of customer sentiment, rail services can remain competitive, responsive, and aligned with customer preferences.

11.3.6 Real-time Metrics Mechanisms

To complement traditional surveys, real-time metrics offer additional layers of insight. Real-time feedback mechanisms capture immediate customer reactions to service changes, enabling operators to gauge the impact of modifications in real-time.

Delivering real-time metrics mechanisms in rail transport requires a comprehensive approach that combines technology, data integration, staff training, and effective communication with passengers.

By implementing such a system, rail operators can enhance operational efficiency, respond more agilely to issues, and ultimately improve the passenger experience. Continuous evaluation and adaptation of

the system ensure that it remains effective in meeting the evolving needs of both the rail service and its passengers.

Real-time satisfaction scores, incident response times, and resolution satisfaction rates are KPIs that can be managed with these mechanisms.

11.3.7 Customer Panels

Customer panels provide an ongoing dialogue with a select group of customers, offering depth and continuity in feedback that periodic surveys cannot achieve, offering qualitative insights that can inform service innovation and customization.

Delivering customer panels in rail transport involves organizing groups of passengers to discuss various aspects of the service, gathering qualitative insights that can help improve the customer experience. Here's a step-by-step guide on how to effectively implement customer panels in the rail transport sector.

Together, these methods enrich the customer feedback ecosystem, providing a multi-dimensional view of service quality and customer satisfaction.

New feature adoption rates, qualitative feedback on service improvements, and customer retention rates post-implementation of suggested changes may be managed with this methodology.

- Satisfaction surveys are mentioned as a method to real-time metrics mechanisms to monitor KPIs in rail transport measure perception by users, which should be representative and conducted at least biennially.
- Quality data must be quantifiable, comparable, objective, viable, and subject to periodic review.
- Mystery shoppers are used to complement satisfaction studies, offering a direct, impartial, and objective measure of service quality, though they are not representative of the overall user base.
- Real-time metrics are also crucial for keeping up with the immediate impacts of service changes and customer needs.

11.3.8 Case Study: CFL Use and Dissemination of Survey Results

This structured approach ensures that CFL (Luxembourg Railways) systematically gathers and utilizes customer feedback to improve their services continuously. By engaging directly with passengers and covering a comprehensive range of service aspects, CFL can effectively identify and address areas needing improvement, thereby enhancing overall customer satisfaction.

- Steering Committee: The results are presented to the Steering Committee to guide strategic decisions and set annual objectives for key leaders.
- Company-wide Presentation: Findings from the survey are shared with the entire company through a one-hour presentation, ensuring all team members are aware of the customer feedback and the areas needing attention.

- Internal Communication Tools: Results are also disseminated through an internal app, the Inside Magazine, and displayed on screens throughout company facilities to keep all employees informed.
- Specific Workshops: To address particular issues or explore deeper insights from the survey data, specific workshops are conducted.

11.3.9 Case Study: SBB

The customer satisfaction measurement system used by the Swiss SBB, a major rail service provider, is described below.

This summary encapsulates the main elements of SBB's approach to measuring and enhancing customer satisfaction, highlighting their commitment to maintaining high standards of service through systematic and structured feedback and evaluation.

- Objectives and Importance of Customer Satisfaction:

Customer satisfaction is identified as one of the nine main objectives of the company. It is measured through various metrics and methods to ensure quality service delivery and to align with the company's broader goals such as punctuality, safety, and image.

- Measurement Methods:

The document describes a detailed approach to measuring customer satisfaction, which includes both subjective and objective components. Subjective measures are derived from customer feedback, while objective measures involve external test customers evaluating the service based on predefined criteria.

- Tools for Gathering Data:

SBB employs a range of surveys to collect data on customer satisfaction:

  - Passenger Surveys: Continuous online surveys targeting ticket shop and season ticket customers.
  - User Surveys: Representing a broader demographic, focusing on users of digital channels and train station services.

- Frequency and Reporting:

The customer satisfaction index is updated monthly and reported on the 11th of each following month. The surveys are structured to capture immediate feedback post-experience to accurately reflect customer sentiments.

- Key Performance Indicators (KPIs):

Customer satisfaction metrics are integrated into broader company KPIs. It also explains how these measurements influence managerial reporting and operational adjustments.

- Challenges and Adjustments:

Challenges such as ensuring the timeliness and relevance of the feedback are addressed. The methodology involves continuous adjustment and validation of the effectiveness of various measures.

SBB´s nine company objectives

- Quality Measurement System (QMS+):

A specific system, QMS+, is used for precise and regular quality control across all SBB stations and trains, utilizing feedback from both customers and trained test customers to improve service standards.

- Future Directions:

The document hints at ongoing improvements and potential future strategies to enhance the accuracy and applicability of customer satisfaction data,

aiming to continuously refine the customer experience.

11.4 TRANSPARENT REPORTING

In the realm of rail transportation, fostering a superior customer experience extends beyond the immediate journey. It encompasses how railway undertakings communicate their performance and commitment to service quality to passengers.

Transparent reporting, as required by European regulations, is more than a legal obligation—it's a strategic tool for enhancing the customer experience in rail transport. By embracing transparency, railway undertakings can build trust, encourage passenger loyalty, and drive continuous service improvement, ultimately leading to a more satisfying and reliable rail service for all passengers.

11.4.1 Service Quality Reports

As mandated by Article 28 of Regulation (EC) No 1371/2007, each railway undertaking is required to publish an annual service quality performance report.

This regulation highlights the importance of transparency and accountability in enhancing the passenger experience.

https://www.era.europa.eu/can-we-help-you/faq/757_en

- Objective Transparency

The publication of annual service quality performance reports serves a dual purpose. Firstly, it provides passengers with a transparent overview of the railway undertaking's performance, allowing them to make informed choices. Secondly, it obligates rail operators to continuously monitor, evaluate, and improve their services based on established quality standards.

- Building Trust with Passengers

Making these reports available on both the railway undertakings' websites and ERADIS (European Railway Agency Database of Interoperability and Safety) ensures easy access to critical information. This openness fosters trust and demonstrates a commitment to upholding passengers' rights and delivering on service promises.

- Detailed Insights for Passengers

The reports offer passengers detailed insights into various aspects of service quality, including punctuality, cleanliness, availability of services, and customer satisfaction levels. By understanding the areas of strength and those needing improvement, passengers can feel more connected to the service they choose.

- Feedback Loop for Continuous Improvement

These reports also function as a feedback loop for railway undertakings. By publicly stating their performance metrics, they set benchmarks for service quality improvement. This process not only benefits passengers but also drives the industry towards higher standards of service delivery.

Case Studies Highlighting the Role of Transparency:

- Enhanced Communication Channels

The railway undertaking South Western Railway (SWR) (UK) introduced a real-time feedback system, allowing passengers to report issues directly through a mobile app.

The resolution of these issues was then reported in the annual service quality performance report, demonstrating responsiveness and a commitment to improvement.

- Benchmarking Success and Areas for Growth

Sydney Trains utilized their annual report to highlight achievements in reducing travel delays and improving on-board services. They also outlined strategies for addressing areas of passenger concern, such as ticketing services and station accessibility, establishing clear goals for the upcoming year.

11.4.2 Recommendations for Railway Undertakings

- Engage with Passengers

Encourage passenger engagement by soliciting feedback through surveys and social media channels. This direct input can inform service improvements and highlight priorities in the annual report.

- Focus on User-Friendly Reporting

Ensure that reports are presented in a user-friendly format, with key findings and improvements highlighted in a way that is easily understandable to the average passenger.

- Highlight Initiatives and Future Plans

Use the annual report as a platform to showcase new initiatives aimed at enhancing the passenger experience. Outline plans for future enhancements, thereby setting expectations and demonstrating a forward-thinking approach.

11.5 CUSTOMERS FEEDBACK

With evolving progression, passengers have higher expectations and are more informed than ever before, however how the rail industry gauges their satisfaction hasn't barely changed in recent years. Net promoter scores are now being used to understand customer satisfaction, using a continual process rather than a set period of time, with the aim to provide an excellent service to passengers and achieve profitable revenue.

There are numerous opportunities for improvement to MaaS experiences, requiring more accessible data. This can be used to understand passenger decision-making factors such as: why a journey was taken, what the pain points were during the journey, and enables those issues to be investigated when planning future initiatives and investment.

Future generations are becoming more open-minded and accepting and will expect a tailored and individualised journey allowing them to be connected on the move and able to work effectively. Extracting and utilising data effectively is key to achieving this.

Customer voice is crucial. This should drive decisions both now and in the future.

Online panels, effective measures and 'in the moment' feedback are all important, but it is essential that data is captured in a way that tells the story behind the information as well letting know what the drivers of dissatisfaction are.

The customer experience model should ensure the incorporation the customer voice in planning for the future, including:

- Listen to customers using a variety of channels to gather feedback in real-time at a granular level.
- Design using tools that have been developed, such as customer journey mapping, customer insights, panel research and our customer personas to design the optimal future end to end journey.
- Transform having a single view of the customer and using the data/insights and design work to focus plans on customer priorities and pain points and understanding how we bring new customers to rail and ensure we have the investment in the right areas to make a difference.
- Measure making sure that customers' needs are met by using CSAT and NPS KPIs.

All this should be enabled by an extensive voice of the customer programme with the right BI that drives continuous improvement.

A representative example is the future rolling stock programme; one potential approach in the early stages could be to gather a range of qualitative and quantitative customer feedback to inform the future customer priorities to be included in the train specification requirements and shared with train manufacturers.

Transparent communication of survey results and actions taken in response to customer feedback can foster a sense of trust and loyalty. Rail operators should consider publishing service quality reports and improvement plans regularly to demonstrate accountability.

Effective customer information strategies, detailed in the following chapter, are a critical component of service monitoring and play a pivotal role in ensuring high customer satisfaction and operational efficiency.

12 CUSTOMERS INFORMATION

12.1 INTRODUCTION

Customers really expect to be kept well informed in real-time. Depending on whether they are regular or occasional users, like tourists, the level of information expected will not be the same.

More and more of our carriages show digital, real-time passenger information. Source: MAV-START

Apps on smartphones can offer this flexibility, whether in the choice of language or the ability to provide detailed information. However, these apps don't provide all practical information, especially anything that relates to the passenger's location on the train. For example, displaying the station exits right above the doors inside a train will speed up the passenger's exit. Information displayed should not only depend on the location, but also on the time of day, or the day of the week.

In case of disruption or on special occasions such as international sporting events, the displays and audio can provide expanded and relevant information as passengers will not be regular line users.

Effective information dissemination is critical in building customer trust, as passengers' perception of service quality is closely linked to how well they are kept informed throughout their journey. As discussed in Chapter 4, timely and accurate information is one of the key drivers of customer satisfaction, particularly in the context of service disruptions.

12.2 INFORMATION IN CASE OF DISRUPTION

12.2.1 Introduction

Traveling by train is a convenient and efficient mode of transportation, connecting people and places across vast networks. However, disruptions, whether due to unforeseen circumstances, technical issues, or natural events, can occasionally impact the seamless operation of train services.

Effective management of customer information during disruptions is paramount for maintaining passenger satisfaction and trust.

By recognizing the challenges inherent to disruptions and implementing proactive measures, railway operators can navigate these challenges with resilience and ensure a more positive experience for their customers.

Passenger Information System. Source: SNCB

One of the responsibilities of the customer service is to provide support and information to the users in case of planned or unplanned closure (fully or partially) and incidents or emergencies in the service too.

Its functions in the event of incidents in the service are to attend to the instructions of the driving staff in everything related to the emergency, in case they are inside the train, and transfer the instructions to the auxiliary personnel, if necessary.

In case of disturbance of the service, most of the operators inform passengers inside the trains and on the platforms using the Dynamic Passenger Information Systems, Public Address System,

applications developed by the operator and through social media like IMessage or WhatsApp.

In case of disruption, when a person with disabilities or with reduced mobility is exposed to the uncertainty, raises the fear of being left, isolated alone and vulnerable. This is worsened when platform changes are notified with too short notice periods without letting enough time for a PRM passenger to make these changes.

This barrier to traveling can be addressed by staff training and by providing accurate information and access to information points onboard.

Centralized information points and assistance are essential. Beyond legal improvements in PRM (Persons with Reduced Mobility) assistance, the primary goal remains enabling PRMs to travel autonomously.

At major stations, there are several sources of information to help travellers. Source: MAV-START

12.2.2 KInd of Disruptions

Railway disruptions will demand swift and well-coordinated responses to ensure customer well-being and maintain service quality. These can be:

- Unpredictable Events: Natural disasters, accidents, and other unforeseen events can lead to sudden disruptions in train services. These situations may result in delays, diversions, or cancellations.
- Infrastructure Issues: Technical problems with tracks, signals, and other railway infrastructure can lead to service interruptions. Maintenance and repair work may be necessary to address these issues, causing temporary inconveniences.
- Capacity Constraints: Overcrowding during peak travel times can strain the capacity of trains and stations, causing delays and discomfort for passengers.
- Communication Breakdown: Ineffective communication during disruptions can lead to confusion and frustration among passengers. Lack of accurate and timely information exacerbates the challenges faced by travellers.

12.2.3 Key Challenges

Railway disruptions can arise from a multitude of factors, ranging from inclement weather to technical failures and strikes. These challenges can significantly impact the normal functioning of train services and create difficulties for both passengers and railway operators.

Some key challenges that railway operators may face include:

- Real-Time Communication: Disruptions require timely and accurate communication with customers. Failing to provide immediate updates can lead to confusion, frustration, and negatively impact customer trust.
- Customer Assistance: Providing on-site assistance to passengers, including those with special needs, requires trained staff and well-defined protocols to ensure safety and comfort.

Information to Passengers. Source: SNCB

- Managing Expectations: Keeping passengers informed about the extent of disruptions, estimated delays, and alternative arrangements can be complex. Striking the balance between transparency and realistic expectations is crucial.
- Resource Allocation: Allocating resources such as replacement transportation, staff, and materials to address disruptions while minimizing service downtime is a challenging logistical task.
- Coordination: Collaboration among different departments within the railway organization is essential for effective disruption management. Coordinating efforts can be difficult, especially during high-stress situations.
- Alternative Routes: Determining and communicating alternative routes or modes of transportation for affected customers requires careful planning to ensure minimal inconvenience.
- According to some national law, travellers have the right to travel anonymously. This mean that they can travel without reservation and without given their personal details (name or email) which makes it difficult to know how many people are traveling on board and to contact them in case of disruption.

12.2.4 Measures to Take

To effectively manage customer information and mitigate disruptions, railway operators should consider implementing the following measures:

- Real-Time Information Dissemination: Establish robust communication channels, such as official websites, mobile apps, and social media, to provide real-time updates on disruptions, delays, and alternative arrangements.
- Clear Announcements: Train station and on-board announcements should be clear, concise, and convey accurate information to help passengers make informed decisions.
- Alternative Transportation Plans: Develop pre-defined plans for arranging replacement transportation, such as buses or taxis, in case of extended disruptions. Ensure these plans are readily deployable.

Replacement services on the Riedbahn (Source: DB)

- Centralized Command Center: Set up a dedicated command centre to monitor disruptions, coordinate response efforts, and provide consistent information across all communication channels.
- Integrated Technology: Utilize technology solutions that allow for seamless sharing of information among various departments and stakeholders, enabling swift decision-making.
- Customer Support Teams: Train customer support teams to handle inquiries and provide assistance with empathy and efficiency. Offer multiple channels for customers to reach out for information.
- Regular Updates: Maintain a schedule for providing regular updates to customers and staff, keeping them informed about the progress of disruption management efforts.
- Training and Drills: Regularly conduct training sessions and mock drills to ensure that staff are well-prepared to manage disruptions and assist customers effectively.
- Feedback Collection: Establish a mechanism to gather feedback from customers after disruptions. This feedback can provide valuable insights for improving future response strategies.
- Post-Disruption Evaluation: Conduct thorough evaluations after disruptions to identify areas for

improvement in communication, resource allocation, and response coordination.

12.2.5 Best Practices

The provision of information to customers in case of disruption is one of the main challenges.

These best practices and potential solutions underscore the importance of proactive planning, effective communication, and collaborative partnerships in managing disruptions for railway customers.

By implementing these measures, railway operators can demonstrate a commitment to customer satisfaction, even in challenging situations.

Best practises could be as follows, although some other measures could be figured out:

- Creation of Contingency Plans:

Develop comprehensive contingency plans that outline specific actions to take in various disruption scenarios. These plans should address communication strategies, alternative transportation arrangements, resource allocation, and coordination among different departments. Having well-defined protocols in place can help streamline responses during disruptions.

- Partnership with Bus Companies and Hotel Platforms:

Forge partnerships with local bus companies to establish a network for providing alternative transportation during disruptions. Additionally, collaborate with hotel platforms like Booking or Airbnb to secure accommodation options for stranded passengers if the disruption leads to extended delays or overnight stays.

- Collaboration with Neighbours, City Hall, and NGOs:

Create a network of collaboration with neighbouring businesses, city hall authorities, and non-governmental organizations (NGOs). This network can provide additional resources, manpower, and support in case of emergencies, ensuring a swift response to disruptions.

- Information Stands Along the Station:

Set up strategically located information stands within the station premises. These stands can serve as central points for passengers to gather accurate information, receive assistance, and access materials such as maps, timetables, and contact details in the event of a disruption.

- Multi-Channel Information Dissemination:

Utilize a variety of communication channels to disseminate information to customers. This includes official websites, mobile apps, social media platforms, text messages, and public address systems. Different customer segments may prefer different channels, so providing options ensures broader reach.

- Regular Briefing of Staff and Customers:

Conduct regular training sessions for staff to ensure they are well-prepared to handle disruptions and assist customers effectively. Additionally, consider holding regular briefings for customers at stations, providing them with updates on the situation, expected delays, and alternative travel options.

- Utilize Idle Trains for Passenger Comfort:

In case of prolonged delays, consider utilizing idle trains to provide passengers with a place to sit, rest, and access facilities. This can significantly improve customer comfort during disruptions, especially if passengers are stranded for an extended period.

- Entertainment and Distraction:

To alleviate the stress and boredom that can accompany disruptions, consider offering entertainment options for waiting passengers. This could include providing Wi-Fi access, setting up charging stations, or even arranging for live performances or interactive activities.

Also providing passengers ice cream, tea, coffee or water, depending on the circumstances or even a gift, like a souvenir can mitigate the negative impact and balance emotions.

- Use of Digital Tools for Disruption Management: AI-based systems can provide predictive alerts to passengers regarding possible delays, helping them make alternative plans well in advance.

- Analyse root-causes
- (Re)Define acceptable levels of service, aligned with operator's partners
- Identify solutions, fixes and enforcements to improve and guarantee agreed levels of service
- Implement measures in all layers of the organisation
- Perpetuate continuous improvement and monitoring through a dedicated Customer Excellence manager
- Facilitating and digitising services.

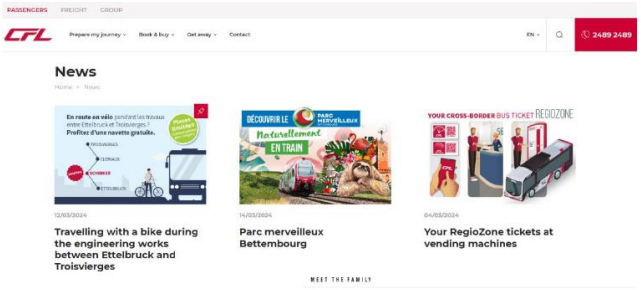
12.3 EASY AND USEFUL COMMUNICATION

Effective communication is essential in enhancing the customer experience in rail transportation. This section outlines strategies and initiatives that aim to provide easy and useful communications to customers, encompassing a broad scope from information dissemination to engaging interactions that foster a strong customer relationship.

The approach to customer communications in rail services must be dynamic, responsive, and customer centric, taking into consideration the purpose of the travel and the destination, and the fact that the rail trip is part of a bigger journey. By continuously evolving and adapting communication strategies to meet the changing needs and preferences of passengers, rail companies can significantly enhance overall customer satisfaction and loyalty.

12.3.1 Expanding Communication Channels

Evolving rail services leverage a variety of communication platforms to ensure that passengers are well-informed and engaged. This includes the use of social media platforms, blogs, and dedicated websites.



CFL website. Source: CFL

These channels serve as crucial touchpoints for disseminating real-time information about service updates, disruptions, and maintenance activities, as well as promotional content.

Although direct promotional activities might be limited in certain regions due to the nature of the service, these platforms still play a pivotal role in enhancing customer awareness and engagement.

12.3.2 Personalized Customer Accounts

The development of personalized customer platforms represents a significant advancement in customer communication. These platforms allow passengers to create personal accounts where they can select preferences for the types of notifications they wish to receive.

Personalized information, such as updates on favourite routes, promotions, or travel history, not only improves customer experience but also strengthens loyalty by making passengers feel valued and understood.

This could include updates on service disruptions, promotional offers, or even ancillary services such as bike sharing availability or Wi-Fi access.

This system not only streamlines communication but also enhances the customer experience by providing tailored information that meets individual needs.

12.3.3 Challenges in Customer Engagement

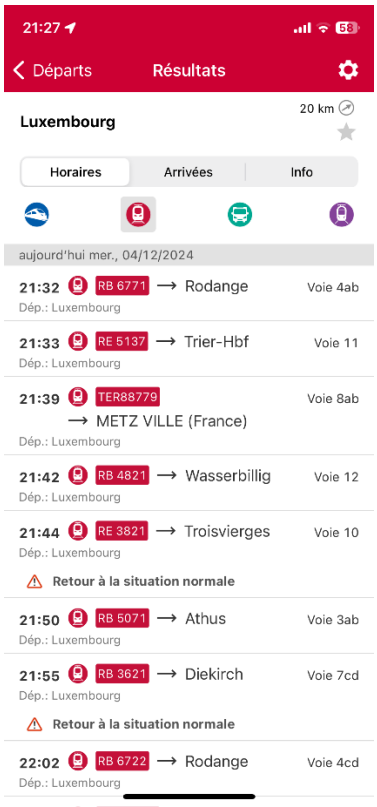
Despite the availability of multiple communication channels, engaging customers effectively remains a challenge. Studies often show that while customers may be aware of digital platforms like blogs and social media, they do not always utilize them to their full potential.

This gap underscores the need for strategies that not only reach customers but also engage them in meaningful ways. Ensuring that content is relevant, accessible, and engaging is crucial to improving the efficacy of communication efforts.

12.3.4 Mobile Applications

The introduction of mobile applications is another strategic initiative aimed at improving communication.

These applications are designed to provide an integrated platform where all necessary travel information, including ticket bookings, service updates, and promotional notifications, can be accessed seamlessly.



CFL Mobile App. Source: CFL

Prioritizing the development of such applications reflects an understanding of the evolving customer's preference for digital solutions that provide instant and reliable information.

12.3.5 Continuous Improvement and Feedback

Engaging with customers on a continuous basis is essential for the refinement of communication strategies.

Feedback mechanisms should be integrated into all platforms, allowing customers to share their experiences and suggestions. This feedback is invaluable in identifying "moments of truth" and "pain points" within the customer journey, which can then be addressed to enhance customer satisfaction.

12.3.6 Future Directions

Looking ahead, the focus will remain on integrating more advanced technological solutions to enrich customer communications. This includes exploring collaborations with various sectors such as High-Speed, Commuter, and Regional Train Services, to ensure a cohesive communication strategy that encompasses all aspects of rail travel.

The potential for using customer journey analysis to further refine communication tactics is also significant, allowing for a more personalized and proactive approach to customer interactions.

Looking ahead, the integration of emerging technologies such as augmented reality (AR) for station navigation and AI-driven chatbots for customer service will further enhance passenger communication.

These tools will make it easier for passengers to access relevant information while traveling, leading to a more seamless experience.

12.4 ENHANCING PASSENGER RIGHTS

The digitalization of passenger rights and communication in rail transport marks a significant step forward in enhancing the travel experience. By providing accessible electronic complaint mechanisms and leveraging digital platforms for real-

time communication, railway operators are setting new standards in customer service.

These initiatives not only facilitate a more seamless and informed journey for passengers but also reflect the rail industry's commitment to embracing digital solutions to meet the evolving needs of today's travellers.

12.4.1 Digital Complaint Mechanisms

In the digital age, ensuring passenger rights in rail transport has evolved beyond current methods. Rail infrastructure managers and railway undertakings are now leveraging software applications to facilitate the electronic lodging of complaints.

This significant digital advancement allows passengers to access an electronic form directly, where they can detail the complaints, they find appropriate. Alongside the digital option, a physical complaints book remains available, offering passengers a choice in how they wish to submit their grievances.

To streamline the process of electronic complaint submission, all websites facilitating ticket purchases or bookings are equipped with direct links to the complaint submission application. This ensures that passengers can easily find and use the digital platform to voice their concerns.

Physical complaints books are maintained across all service facilities, particularly at passenger stations and freight terminals, ensuring accessibility for all. Railway staff are trained to assist any passenger who faces difficulty in completing the complaint forms, especially catering to the needs of the elderly or disabled, and to guide them in using the digital complaint submission tools if requested.

12.4.2 Case Studies in Digital Passenger Communication

- Case Study 1: Real-Time Alerts via Twitter for Sevilla and Bilbao Commuter Lines

The commuter lines of Sevilla and Bilbao (Spain) have introduced a pioneering service, offering real-time alerts through the Twitter account "@InfoCercanias." This service provides passengers with personalized, real-time information about line schedules and updates, directly via private messages on Twitter. This initiative, a collaboration between Renfe and Twitter, represents a novel approach in the rail industry, leveraging social media technologies to enhance passenger information dissemination.

- Case Study 2: Digital Platforms for Service Updates and Passenger Engagement

Railway operators globally are adopting digital platforms not only for service updates but also for engaging directly with passengers. For example, many have introduced mobile applications that provide real-time train schedules, ticket booking options, and live updates on delays or disruptions. These apps often feature push notifications to alert passengers of any changes pertinent to their journey, significantly improving the travel experience.

- Case Study 3: Interactive Kiosks and Digital Signage

In addition to online digital services, physical interactive kiosks and digital signage at stations offer passengers access to travel information, ticketing options, and complaint submission functionalities. These digital touchpoints are designed to be user-friendly and accessible, ensuring that passengers have access to real-time information and services at their fingertips.

13 NEW TARIFFS FOR NEW BEHAVIOURS

13.1 INTRODUCTION

The introduction of new tariffs and pricing in rail services can have a significant impact on customer experience. It's important to consider the needs and expectations of customers, monitor behavioural changes, and continuously improve the service to ensure a positive customer experience.

13.1.1 New Tariffs and Pricing

The new tariffs and pricing may affect different groups of commuters differently, depending on their travel patterns and frequency. The pricing may also incentivize or discourage certain behaviours, such as off-peak travel or longer-term tickets.

Ticket Machine at SNCB Station. Source: SNCB

13.1.2 Customer Expectations

Customers expect clear and transparent pricing and ticket options, as well as easy and convenient ways to purchase and use their tickets. With the introduction of new tariffs, it's important to communicate these changes clearly and provide support for customers who may need assistance.

Tariff changes not only influence immediate travel decisions but also shape long-term customer satisfaction.

Transparent and flexible pricing structures, aligned with evolving travel patterns, can foster customer loyalty and enhance the overall travel experience. Rail operators must regularly monitor customer feedback on pricing to adapt strategies in real-time.

13.1.3 Behavioural Changes

The new tariffs may lead to changes in customer behaviour, such as increased usage of off-peak services, longer-term ticket purchases, or even changes in commuting patterns. It's important to monitor these changes and adjust services accordingly to meet the needs of customers.

13.1.4 Technology and Customer Experience

Technology plays an increasingly important role in customer experience, with many commuters using mobile apps and digital platforms to purchase and use their tickets. It's important to ensure that these technologies are user-friendly and accessible for all customers, including those with disabilities or limited access to technology.

Technology is an opportunity (and not the only way) to ensure that digital platforms and mobile apps are user-friendly and accessible, especially for regular customers. Additionally, technology might be helpful to reassure that the customer has bought the right ticket.

Artificial intelligence and data analytics can enable dynamic pricing models that adjust fares based on demand, time of day, and customer behaviour.

By implementing AI-driven systems, rail operators can optimize fare structures to meet the needs of different passenger segments, ensuring both affordability and profitability.

13.1.5 Feedback and Continuous Improvement

Customer feedback is critical in evaluating and improving customer experience. It's important to collect feedback from customers on the new tariffs and pricing, as well as the overall customer experience, and use this feedback to make continuous improvements to the service.

Customer feedback is of the upmost importance and is critical to collect feedback on the new tariffs and pricing as well as the overall customer experience. It is to be highlighted the importance of using this feedback to make continuous improvements to the service.

Implementing real-time feedback systems can help operators adjust tariffs based on passenger demand and satisfaction. For example, offering immediate discounts during service disruptions or incentivizing passengers to switch to less crowded routes through dynamic pricing can improve both operational efficiency and customer satisfaction.

13.2 NEW TICKETS FOR NEW BEHAVIOURS

The railway industry is constantly evolving to meet the changing needs and expectations of evolving travellers. The COVID-19 pandemic has created new challenges and opportunities for railways as remote working has become more prevalent, and many people are no longer commuting daily. Railway companies are seeking ways to adapt their services to meet the changing needs of customers, and one of the ways they are doing this is by offering new types of tickets and fares.

One of the most popular new ticket options is the flexi-ticket, which allows customers to travel on a specific route at any time without having to commit to a specific train or time in advance. This is particularly useful for customers with unpredictable schedules or those who need flexibility in their travel plans. Flexi-tickets are often available at a slightly higher price point than traditional tickets, but the added flexibility can be well worth it for customers.

Another trend in new ticket options is dynamic pricing. This involves adjusting ticket prices based on factors such as demand, time of day, and other market conditions. Dynamic pricing allows railways to offer more competitive prices during off-peak times while still being able to generate revenue during peak hours. It can be particularly attractive to budget-conscious travellers and help railways optimize their revenue streams by encouraging more people to travel during off-peak times.

Seasonal tickets are another new option that some railways are offering. These tickets allow customers to travel on a specific route for a set period of time, such as a month or a season. They are particularly popular among commuters who need to travel to work or school on a regular basis. Seasonal tickets often come with a discount compared to buying individual tickets for each journey and can be a cost-effective option for frequent travellers.

Group tickets offer a discount for groups of travellers who are all traveling on the same route. They can be particularly useful for families traveling with children or groups of friends who are traveling together for a weekend trip. Group tickets can also be a good way for railways to attract more customers by offering a more affordable option for larger groups.

Contactless and mobile tickets are another trend in new ticket options. These tickets allow customers to buy their tickets online or via their mobile devices and then simply tap their ticket or scan their phone at the ticket barrier. This is a more convenient option for customers who don't want to carry paper tickets or who want to avoid the ticket queue. It's also a more efficient option for railways, as it reduces the need for physical tickets and can help speed up the boarding process.

In response to remote working, part-time season tickets have emerged as an option. These tickets allow customers to travel on a specific route for a set number of days per week or month, rather than every day. For example, a customer might purchase a part-time season ticket that allows them to travel on the

train for three days per week. This can be a cost-effective option for remote workers who only need to commute to the office a few times per week.

Pay-as-you-go tickets are an option for customers who are not traveling every day. These tickets allow customers to pay for individual journeys as they go, rather than purchasing a season ticket or other multi-journey ticket. This can be particularly attractive to customers who have unpredictable travel schedules or who only need to travel occasionally. Pay-as-you-go tickets can be purchased online or via mobile devices and can be used for both peak and off-peak travel.

By encouraging off-peak travel and offering discounts for greener travel options, such as electric trains or routes powered by renewable energy, rail operators can align tariff structures with sustainability objectives. Passengers are increasingly motivated by eco-conscious travel choices, making green tariffs a valuable addition to pricing strategies.

In conclusion, new tickets and fares are an important way for railways to adapt to changing customer behaviours and expectations. By offering a range of ticket options, railways can meet the needs of a diverse range of customers and ensure that their services remain relevant and valuable. The rise of remote working has created new challenges and opportunities for railway companies, and they are actively seeking ways to adapt and stay competitive in a rapidly evolving market.

13.3 CASE STUDIES

The following case studies demonstrate how different railway operators around the world have introduced new tariffs and pricing structures while keeping customer experience in mind.

They also show how technology can play a key role in improving customer experience, and how clear communication and support are essential in ensuring that customers understand and can take advantage of the new changes.

They show how targeted pricing strategies can help to reduce congestion, increase revenue, and support social and economic objectives.

They also highlight the importance of clear communication and marketing to ensure that customers are aware of the new tariffs and understand how they can benefit from them.

A key challenge lies in the differing behaviours of users: while regular customers would explore the best ticket options, incidental users—the largest group—are generally unwilling to navigate the complexities of a system they use infrequently.

13.3.1 Transport for London's fare changes

In 2020, Transport for London (TfL) introduced new fare changes for the London Underground and bus services.

The changes included new off-peak fares, a new daily cap on fares, and a new weekly cap on fares. TfL also introduced a new contactless payment system, allowing customers to tap and pay with their mobile phones or contactless cards.

TfL communicated the changes clearly to customers and provided support and guidance to those who needed it.

The changes were well-received by customers, with many reporting that the new fare structure was simpler and easier to understand.

Following the introduction of the new fare structure and contactless payment options, TfL observed a 15% increase in off-peak travel and a 10% reduction in peak-hour congestion.

Customer surveys indicated that the new daily and weekly fare caps improved perceptions of affordability and convenience.

13.3.2 Keikyu Corporation's commuter pass discounts

Keikyu Corporation, a private railway operator in Japan, introduced new commuter pass discounts in 2020.

The discounts were designed to encourage off-peak travel and reduce congestion during peak hours.

Customers who purchased a 3-month or longer-term commuter pass were eligible for a 20% discount if they travelled during off-peak hours.

Keikyu Corporation also introduced a new mobile app, allowing customers to purchase and manage their commuter passes on their smartphones. The changes were successful in encouraging off-peak travel and reducing congestion during peak hours.

13.3.3 Deutsche Bahn's flexible ticket options

Ticket machine S-Bahn network (Source: DB)

Deutsche Bahn, the national railway operator in Germany, introduced new flexible ticket options in 2020.

The new tickets allowed customers to change their travel plans up to one hour before departure, without incurring any additional fees. Deutsche Bahn also introduced a new digital platform, allowing customers to purchase and manage their tickets online.

The changes were well-received by customers, with many reporting that the new flexible ticket options made it easier and more convenient to travel by train.

13.3.4 West Midlands Trains' Smart Zones

West Midlands Trains, a train operating company in the UK, introduced new Smart Zones in 2019. The Smart Zones were designed to encourage passengers to use the train for shorter journeys within a specific area, rather than driving or taking the bus.

The Smart Zones offered discounted fares for travel within a specific area, with prices based on the distance travelled.

The changes were successful in encouraging more passengers to use the train for shorter journeys, reducing congestion on local roads and improving air quality.

13.3.5 JR East's Green Car campaign

JR East, a railway company in Japan, introduced a new campaign in 2019 to encourage passengers to use the Green Car, a premium class carriage with extra amenities and services.

The campaign offered discounted Green Car tickets to passengers who travelled during off-peak hours or purchased their tickets in advance.

JR East also introduced new services in the Green Car, such as complimentary beverages and snacks, free WiFi, and personal power outlets.

The changes were successful in encouraging more passengers to use the Green Car, generating higher revenue for the company and improving customer satisfaction.

13.3.6 SNCF's TER Illico Solidaire

SNCF, the national railway operator in France, introduced a new fare option in 2020 called TER Illico Solidaire.

The fare option was designed to make train travel more affordable for low-income households and those who have lost their jobs due to the COVID-19 pandemic.

The TER Illico Solidaire fare offered a 50% discount on train tickets for eligible passengers, with prices based on the distance travelled. The changes were successful in making train travel more accessible for those who are facing financial difficulties, helping to support social and economic recovery in the region.

13.3.7 IRYO (SPAIN)

IRYO is a private high-speed operator in Spain, that allows young individuals aged 18 to 30 to travel across the Spanish geography with discounts in line with the measures approved by the Spanish Ministry of

Transport, Mobility, and Urban Agenda. The round-trip tickets to any of our routes are available at a 50% discount, a sale that has been ongoing for a week. Through this initiative, IRYO aimed to facilitate young people's access to travel via a fast and sustainable mode of transportation like the train.

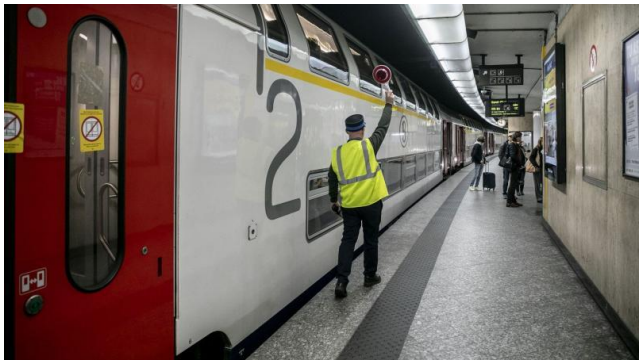
Iryo Train (Source: Iryo)

To take advantage of this subsidy and board the serene speed of Iryo, passengers can navigate to the Iryo.eu ticket search platform. Within the “Include discount card” dropdown menu, select “Young Summer 2023.” To request their MITMA code, it is necessary to register via a form available on the website at least 24 hours before making a purchase to confirm eligibility for the discount.

This initiative exemplifies how targeted tariff strategies can align with new behaviours and preferences, particularly among the youth demographic seeking affordable and eco-friendly travel options. By offering substantial discounts, we not only encourage a shift towards more sustainable modes of transportation but also open up new avenues for young individuals to explore the country. Such measures not only enhance customer experience by making rail travel more accessible but also support broader goals of sustainable mobility and urban development.

13.3.8 SNCB

Early year 2023, SNCB launched a flexible pass designed to accommodate teleworkers who travel by train two or three times a week, offering them an advantageous rate.



Source: rtbf.be

The formula, which was tested in 2022 with seven companies, has matured. It has been adapted to new work patterns, with the aim of attracting more people to our trains.

Specifically, this flexible pass was made available in four options: 80 and 120 days of travel over 12 months, as well as 6 and 10 days of travel within a single month. The Minister officially green-lighted this innovative initiative.

This case study exemplifies the railway sector's adaptive response to changing commuter behaviours, particularly in the wake of evolving work practices such as teleworking. By introducing more flexible ticketing options, SNCB not only meets the needs of a significant segment of the workforce but also promotes rail as a viable and preferred option for commuting.

This strategic adjustment in tariff structures reflects a broader trend in the rail industry to enhance customer experience by aligning service offerings with contemporary lifestyle shifts.

13.3.9 RENFE

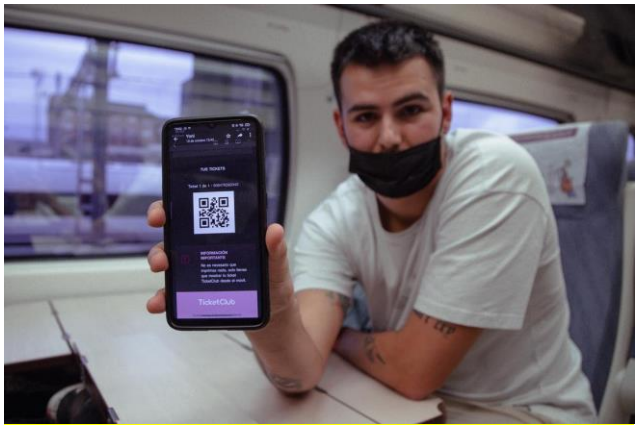
This RENFE case study underscores the complex interplay between tariff strategies and consumer behaviour in public transport. While the initiative has undeniably increased rail travel among the youth and contributed to the vibrancy of Spain's rail network, it also highlights the need for a balanced approach that considers the long-term sustainability of public transport systems and equitable access for all demographic groups.

In an effort to rejuvenate underutilized routes and cater to evolving travel habits, RENFE, the Spanish public rail operator, implemented complimentary passes that significantly impacted ridership patterns.

This initiative, promoted by the government, aimed to attract a younger demographic, including students traveling home or out for social gatherings. Trains that previously operated at semi-vacant capacities witnessed a surge, running at 80% of their capacity on average.

The overall demand for these routes saw an average increase of 19%, with a remarkable 58% spike in regions like Castilla y León.

One notable beneficiary of this scheme was Iker, a student from Palencia, who mastered the use of RENFE's free passes. He utilized these passes for regular trips between Palencia and Miranda de Ebro to visit home, saving the cost of a round trip, and for weekend outings to Madrid for leisure activities.



Iker, young student who commutes to several cities with the RENFE´s free passes/Alba Vigaray

This initiative not only brought life to the trains and stations with an influx of passengers but also showcased an interesting trend: a significant portion of the riders were young people, either returning home or embarking on leisure trips. The increased ridership was not limited to habitual users who would have taken the train regardless but extended to those who, enticed by the free or nearly free access, chose rail travel over other modes of transportation for occasional journeys.

The surge in demand led to trains on specific routes, such as the one from León to Madrid on Friday afternoons, running at near full capacity. This was a stark contrast to the pre-initiative days when occupancy rarely exceeded 10%. The vitality that this scheme injected into rail travel was palpable, with bustling platforms even in smaller towns and a noticeable diversity in the passenger demographic, particularly the youth.

By the end of 2022, RENFE had issued 1.3 million commuter passes and over half a million for medium-distance travel. The initiative mirrored Germany's nine-euro ticket campaign, aiming to reduce CO2 emissions by encouraging public transport over car usage.

Although no comprehensive study has yet been conducted to measure the full impact of this kind of initiatives, it is to be studied if the lower price with the same level of service goes towards the shift from the car to public transport.

The free pass scheme's extension into 2023, with a budget allocation of 700 million euros, reflects the government's commitment to this approach. However, the effectiveness of such measures in the long term remains to be seen, with calls for improved service frequency and logical pricing over temporary free travel offerings.

13.3.10 Tren Italia

This case study reflects the broader industry move towards leveraging innovative tariff systems to adapt to and shape new consumer behaviours, enhancing the overall customer experience in rail travel.

Trenitalia, the Italian rail operator, has introduced an innovative loyalty program named X-GO, targeting customers who frequently travel on Regional and Intercity trains. This program represents a significant step forward in enhancing customer experience through a unique rewards system.

X-GO is meticulously crafted to allow passengers to accumulate points with every ticket purchase, which can then be redeemed for discounts on future journeys. The structure of the program is such that the type and class of the journey determine the points awarded, with Intercity train journeys yielding between 2 to 9 points and regional train journeys

offering between 1 to 10 points. Remarkably, for every 10 points collected, travellers are rewarded with an immediate discount of 3 euros on their next ticket purchase.

X-GO has been thoughtfully designed to cater to a diverse range of Trenitalia's customer base, including those who travel with bicycles or pets. Specifically, on Intercity services, the inclusion of a bike or pet transport supplement to a ticket purchase results in an additional point earned per journey.

This aspect of the program underscores Trenitalia's commitment to accommodating the varied needs of its passengers, promoting a more inclusive travel experience.

Redeeming the accumulated points for discounts is streamlined for ease of use. Customers purchasing tickets online or through the Trenitalia App have the convenience of selecting the "Cashback X-GO" option at the point of payment and specifying the number of points they wish to convert into a discount.

Furthermore, the flexibility of the program extends to the points redemption process, which can be executed not only on the Trenitalia website and app but also at ticket offices, enhancing accessibility for all users.

The X-GO program by Trenitalia exemplifies a forward-thinking approach to incentivizing regular use of public transportation, aligning with new behavioural trends among travellers who value rewards and convenience.

By integrating a cashback system into the customer journey, Trenitalia not only fosters loyalty but also encourages a shift towards more sustainable modes of transport.

13.3.11 MAV-START District Based Passes

MAV-START, the Hungarian passenger railway company, introduced new passes in 2023 which are more affordable and flexible than the previous passes and encourage passengers to use the trains.

The new passes were so popular that they accounted for 90% of all passes sold, so the previous pass structure was discontinued. Customers can buy a Hungary pass or a County pass to use trains and interurban buses most conveniently via the mobile app. Hungary has 19 counties, the 19 types of County passes (zone passes) can only be used within the area of the county.

Cheap county and country passes can be purchased electronically, valid on all vehicles

The Hungary pass, which costs the same as two county passes, is valid throughout the country on interurban buses and trains. Passes can be purchased from any starting date and are valid for 30 days.

The corresponding County pass and the Hungary pass are also valid on local transport in certain cities, e.g. in Zalaegerszeg, Esztergom and Budapest. Special rules apply to passes on trains with compulsory reservation (e.g. IC).

14 GUIDING RAILWAY CUSTOMERS: NUDGING STRATEGIES

14.1 INTRODUCTION: NUDGING RAILWAY CUSTOMERS

Nudging is a popular concept used by railway authorities around the world to influence the motives, incentives, and decision-making of groups and individuals. It relies on positive reinforcement and indirect suggestions to influence passenger behaviour on railways.

Nudging is a subtle and effective way to encourage people to make better choices without imposing restrictions. In recent years, this concept has gained significant popularity within the railway industry.

Nudging involves using gentle suggestions or positive reinforcements to influence behaviour. It's based on the idea that people are more likely to make desired choices when they're presented with options framed in a particular way. In the context of railway customer experience and safety, nudging can encourage passengers to act in ways that benefit both themselves and others.

Nudging is crucial in the railway industry because it can significantly enhance the overall customer experience. By making minor adjustments to the environment, we can guide customers toward choices that not only benefit them but also contribute to a more efficient and pleasant railway journey.

Escalator etiquette: walk left, stand right. Nudging. Source: SNCB

Nudging techniques are not just about behavioural science but also about driving measurable improvements in key performance indicators (KPIs). For instance, nudging strategies can be applied to encourage passengers to provide feedback, which can improve customer satisfaction metrics. Additionally, nudges related to safety, like escalator etiquette or queue management, can enhance safety perception KPIs.

The key is to design nudges that are unobtrusive, easily understandable, and genuinely helpful. Regularly collecting data and feedback can help fine-tune nudging strategies, further enhancing the railway customer experience.

14.2 NUDGING TECHNIQUES FOR RAILWAY CUSTOMER EXPERIENCE

Incorporating behavioural science into innovative techniques is becoming increasingly important as the growing population and increased demand on the network is pushing operators to fine-tune behavioural campaigns.

The use of nudging can enhance railway customer experience in stations, trains, and platforms in normal operation, degraded, and emergency situations. For instance, nudging can be used to encourage passengers to stand on both sides of the escalator instead of just one side.

Lighting is another crucial element, that can create a welcoming atmosphere and draw attention to important areas such as ticket booths or seating areas.

- Warm and inviting lighting in waiting areas can help passengers feel relaxed and at ease.

Another effective technique for enhancing railway customer experience is the use of **signage**. Signage, color-coded maps, and floor markings are highlighted as effective nudging techniques. Including a visual representation (e.g., diagrams or photos) would strengthen the section by providing concrete examples of how nudging can influence passenger behaviour.

- Signage can guide customers to their destinations, provide essential information, and create a sense of order within the station.
- Clear and concise signs that indicate where to board trains or purchase tickets can reduce confusion and frustration among customers.

Seating arrangements also play a significant role in nudging strategies.

- Placing seating areas near essential amenities such as ticket booths or restrooms encourages their utilization.
- Comfortable and ergonomic seating enhances the overall customer experience during the journey.

Another example is the use of nudging to reduce littering in stations. The Dutch railway company NS installed a piano in Utrecht station that could only be played if the area was clean. This resulted in a 70% reduction in littering.

14.3 NORMAL SITUATIONS

14.3.1 Examples of Nudging in Railway Stations

In railway stations, nudging can take various forms, greatly impacting customers' experiences:

- Floor Markings: Floor markings with arrows or footprints guide passengers to ticket machines, waiting areas, restrooms, and emergency exits.
- Trash Can Placement: Properly placed trash cans encourage responsible waste disposal.
- Queue Management: Visual cues like arrows and footprints on the floor maintain orderly queues.
- Clear Signage: Color-coded maps, directional arrows, and symbols make navigation easy for passengers from diverse backgrounds.
- Comfortable Environment: Benches, food and beverage access, clean restrooms, and greenery reduce stress and enhance the station environment.
- Digital nudges, such as mobile notifications offering real-time updates on platform changes or suggesting less crowded train options, can further enhance customer convenience and reduce congestion. These types of nudges can be personalized based on travel patterns and preferences collected from customer data.

14.3.2 Examples of Nudging on Trains

Effective practices for enhancing the customer experience on trains include:

- Spacious Seating: Providing ample legroom, adjustable seats, and personal entertainment systems.
- Air Conditioning: Well-designed systems ensure passenger comfort.

Guiding Young Customers. Source: SBB

- Clear Signage: Throughout the train, clear signage aids passenger navigation.
- Universal Communication: Using color-coding and pictograms for passenger information.
- Seat Reservation Nudging: Encouraging passengers to reserve seats in advance with incentives.
- In-Train Announcements: Automated announcements for safety protocols, stops, and amenities.
- Digital Ticketing: Promoting digital ticketing apps for streamlined boarding.

14.4 DEGRADED SITUATIONS: NUDGING CUSTOMERS DURING DELAYS OR DISRUPTIONS

During delays or disruptions, customers can become frustrated and anxious. However, nudging can guide their behaviour positively. For example, providing clear communication about alternative routes can help customers feel more in control. Offering free

water bottles can prevent overcrowding and keep customers comfortable.

It's vital to use a reassuring and empathetic tone when implementing nudges during degraded situations. Customers need to feel taken care of, and their needs considered, reducing stress and improving the overall customer experience.

14.5 EMERGENCY SITUATIONS: NUDGING CUSTOMERS TOWARDS SAFETY

In emergencies, nudging becomes a powerful tool for guiding customers to safety. Flashing lights and loud alarms can signal evacuation routes and safe paths. Clear placement of emergency exit signs provides directions and minimizes confusion during high-stress situations.

These nudges must be designed urgently and clearly, as every second counts during emergencies. Customers need quick, understandable instructions to ensure their safety.

- Emergency Alerts: Automated systems send urgent notifications to passengers during emergencies.
- Evacuation Plans: Clear routes and instructions are displayed, and staff is trained for passenger assistance.
- Crowd Control: Nudging Customers Towards Responsible Behaviour
- In crowded areas, it's crucial to nudge customers toward responsible behaviour. Signage reminders to wear masks and maintain social distance can be placed strategically. Implementing one-way traffic flows using barriers or floor markings prevents congestion and reduces the spread of germs.
- Capacity Monitoring: Sensors and real-time data analysis control platform and train car capacities.
- Dynamic Pricing: Ticket prices adjust based on demand, encouraging passengers to choose less crowded trains during peak hours.

14.6 DIGITALIZATION: USING TECHNOLOGY TO ENHANCE NUDGING

Digital technology can greatly enhance the effectiveness of nudging in railway stations.

- Mobile apps provide real-time updates on delays and disruptions, allowing customers to adjust their behaviour accordingly.
- Smart sensors monitor crowd flow and identify potential bottlenecks, enabling proactive measures to prevent overcrowding.

AI-driven technologies can offer personalized nudging based on passenger preferences and travel history. For instance, frequent commuters can receive targeted nudges via mobile apps to travel during off-peak hours or explore alternative routes in case of delays. By integrating real-time data, operators can nudge passengers toward more efficient travel decisions.

Personalized nudges tailored to individual customer preferences and needs are possible through digitalization. For example, frequent travellers during peak hours could receive targeted nudges about alternative routes or travel times.

- Mobile Apps: User-friendly apps offer real-time updates and push notifications.
- Personalized Recommendations: Data analytics provide tailored suggestions for passengers.

Nudging can be a powerful tool to promote sustainability by encouraging passengers to adopt eco-friendly behaviours. For example, displaying real-time data on the environmental impact of their journey, such as CO2 savings by choosing rail over other transport modes, can nudge passengers towards more sustainable travel choices.

14.7 NUDGING INTERNATIONAL EXAMPLES

- Japan's Shinkansen (Bullet Trains): Platform markings ensure orderly queuing, and digital ticketing and mobile apps streamline the customer experience.

Promoting physical activity and healthy living. Japan

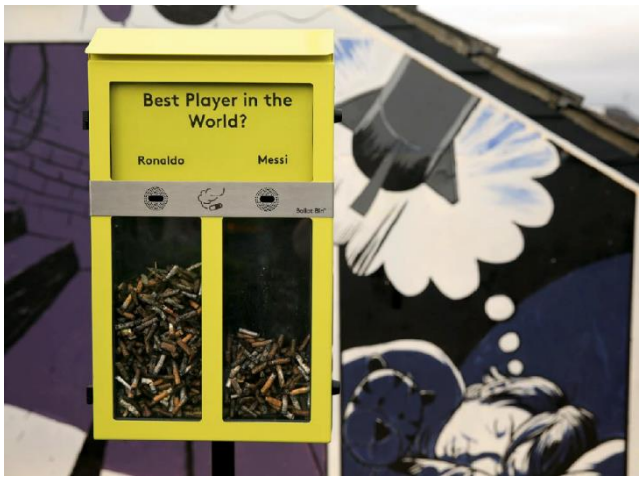
- Thalys (Europe): Announcements and multilingual signs guide passengers on train etiquette and service information, complemented by a user-friendly website and app.
- Taiwan High-Speed Rail (THSR): Platform markings and announcements emphasize safety and convenience, with a mobile app providing real-time updates and e-ticketing.
- Amtrak (USA): Mobile alerts and email notifications inform passengers of changes, and the Amtrak app facilitates ticket booking and onboard information access.

14.8 CONCLUSION

In conclusion, nudging is a powerful tool for guiding railway customers' behaviour in various situations. It enhances the customer experience, promotes safety, and contributes to efficient railway operations. Implementing small changes in station infrastructure, train design, and digitalization can have a significant impact.

By incorporating nudging techniques, railway companies can improve customer satisfaction, increase ridership, and boost revenue. It's essential to remember that even subtle changes can make a significant difference in the overall passenger experience. Achieving successful nudging strategies involves ongoing research, collaboration with industry partners, and a commitment to enhancing railway services for all customers.

To maximize the impact of nudging strategies, operators should incorporate regular feedback loops, collecting data on customer responses to various nudges and refining the approach accordingly. This ensures that nudging strategies remain relevant and effective over time.



Nudging techniques conclusion. Self-explanatory

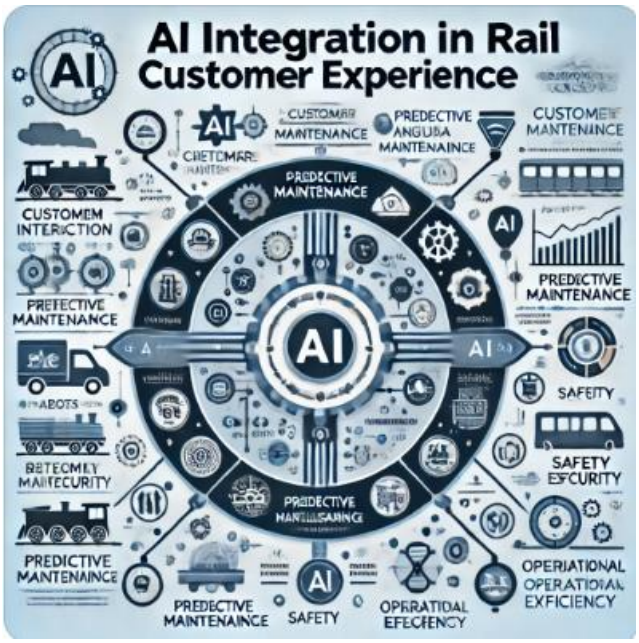
15 FUTURE APPLICATIONS OF ARTIFICIAL INTELLIGENCE

15.1 OVERVIEW

Artificial Intelligence (AI) is transforming the railway transport sector by integrating advanced technologies to improve efficiency, safety, and customer satisfaction.

Customer experience is the overall impression and perception a customer has of a brand, shaped through interactions across multiple touchpoints during their journey. AI has notably transformed this domain, revolutionizing how personalized, efficient, and seamless interactions are delivered at scale.

Understanding customers' needs has become more nuanced with AI. Chatbots that are AI-driven employ Natural Language Processing (NLP) to provide human-like interactions, recommendations, and issue resolutions in a prompt and precise manner. AI's ability to sift through and analyse vast datasets reveals customer preferences and behaviours, allowing businesses to predict and proactively meet customer needs through customized recommendations and timely interventions.



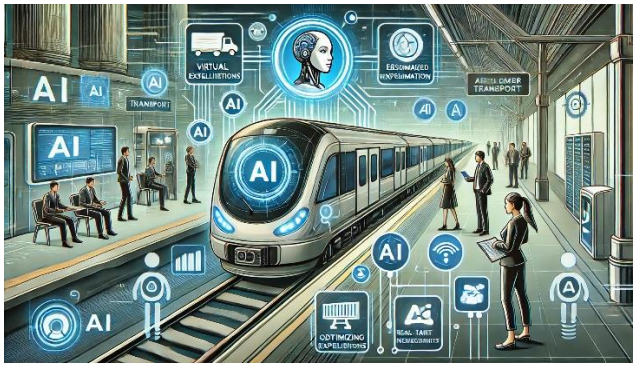
In enhancing customer service, AI has been a game-changer. Virtual assistants, powered by AI, deliver quick and efficient customer support, while NLP is utilized for sentiment analysis, enabling businesses to deeply understand customer feedback. AI's capability in automated ticket routing ensures that customer issues are resolved faster and more efficiently by directing issues to the appropriate agents.

Voice and image recognition capabilities have been bolstered by AI, with voice assistants like Amazon Alexa or Google Assistant enabling hands-free interactions. Image recognition technologies allow for innovative visual search capabilities, streamlining the shopping process. When integrated with Augmented Reality (AR), AI provides immersive experiences, allowing customers to visualize products in real environments, thus enhancing engagement.

AI's analytical power shines in optimizing the customer journey, identifying bottlenecks, and streamlining processes. It also enables the delivery of personalized content that resonates with individual customers. Furthermore, AI is instrumental in mapping customer journeys, providing invaluable insights into how customer experiences can be enhanced.

However, the adoption of AI comes with ethical considerations, particularly concerning transparency and data privacy. Businesses must navigate these challenges carefully, ensuring that customers are informed and in control of their data. Moreover, despite the efficiency of AI, maintaining a human touch is paramount, as some interactions necessitate human empathy and intelligence.

In conclusion, AI presents a myriad of benefits for enhancing customer experience. It equips businesses to deliver a more personalized, proactive, and efficient service, leading to improved customer satisfaction and business success. The next steps involve embracing AI advancements, investing in the necessary tools, talent, and infrastructure, and remaining vigilant about the ethical implications to stay at the forefront of the evolving customer experience landscape.



15.2 METAVERSE

The integration of the metaverse into the railway industry has the potential to significantly transform the customer experience by providing new, immersive ways for passengers to interact with services and environments.

The metaverse refers to a virtual reality space where people can interact with a computer-generated environment and other users in real-time. It is a convergence of the physical and digital worlds, offering immersive and interactive experiences.

When it comes to the railway industry, incorporating the metaverse can enhance the overall customer experience in several ways:

- **Virtual Train Stations**: Railway companies can create virtual representations of train stations within the metaverse. This allows customers to explore and navigate through stations virtually before their journey, providing them with a sense of familiarity and reducing anxiety. These virtual stations could also assist passengers with disabilities by offering accessibility tools tailored to their specific needs, ensuring a more inclusive and user-friendly experience.
- **Augmented Reality (AR)** for Enhanced Wayfinding: In addition to virtual reality applications, augmented reality (AR) can significantly improve wayfinding and navigation within train stations and on-board trains. By using AR-enabled devices or applications, passengers can receive real-time directions, see virtual signs overlaid on their surroundings, and access information about nearby amenities. This technology can be particularly useful in large or complex stations and can help reduce congestion and improve passenger flow.
- **Immersive Travel Previews**: Using the metaverse, passengers can experience virtual tours of train cabins, seating arrangements, and onboard facilities. These previews can be dynamically updated with real-time information such as seat availability or train conditions, allowing passengers to make informed decisions about their journey. Additionally, the virtual tours could offer details about the duration and schedule, helping passengers set accurate expectations.
- **Enhanced Onboard Entertainment**: The metaverse can provide passengers with a range of entertainment options during their train journey. Virtual reality headsets or augmented reality glasses can be offered, allowing passengers to immerse themselves in a variety of experiences, such as virtual tours of landmarks along the route, interactive games, or even virtual meetings with other passengers. This augmented entertainment elevates the onboard experience and provides a unique value proposition for railway customers.
- **Enhancing Training for Railway Staff**: The metaverse can also be utilized for training railway staff in a virtual environment. Employees can participate in immersive simulations of various scenarios, such as emergency response drills, customer service interactions, and operational procedures. This approach not only improves staff readiness and performance but also reduces the costs and risks associated with traditional training methods. Virtual reality-based training can accommodate diverse learning styles, making it more effective for different employees.
- **Personalized Travel Assistance**: By leveraging the metaverse, railway companies can offer personalized travel assistance through AI-driven virtual assistants or avatars. These assistants can guide customers through the booking process,

provide real-time updates on train schedules and delays, and offer suggestions for alternative routes or amenities. Over time, these avatars learn from interactions, improving their accuracy and helpfulness. The system should support multiple languages and cater to diverse customer needs to enhance inclusivity.

Virtual customer support desks in the metaverse can provide real-time assistance to passengers. These virtual desks can be staffed by AI-driven avatars capable of answering questions, providing travel updates, and assisting with ticketing issues. This not only improves accessibility but also ensures support is available 24/7, regardless of physical staffing levels.

Travel Assistance Avatar (Source: DB)

- **Social Interaction and Networking**: Integrating the metaverse with railway ticketing systems can streamline the ticket purchase process. Passengers can access virtual ticket counters within the metaverse, select their desired seats, and make payments securely, supporting various payment methods (e.g., credit cards, digital wallets) and currencies. Robust security measures, such as two-factor authentication, can protect transactions, enhancing trust in digital platforms.
- **Metaverse-Driven Marketing and Engagement**: Railway companies can utilize the metaverse for innovative marketing campaigns and customer engagement initiatives. For example, virtual events, product launches, or interactive games can be held in the metaverse to engage with a younger, tech-savvy audience. These campaigns not only enhance brand visibility but also provide a unique platform for passengers to interact with the railway brand in a novel way.
- **Seamless Ticketing and Payment**: Integrating the metaverse with railway ticketing systems can streamline the ticket purchase process. Passengers can access virtual ticket counters within the metaverse, select their desired seats, and make payments seamlessly. This eliminates the need for physical tickets, reduces waiting times, and simplifies the overall ticketing experience.
- **Post-Travel Feedback and Reviews**: The metaverse can serve as a platform for passengers to provide detailed feedback and reviews about their travel experiences. Railway companies can gather valuable insights, analyse customer sentiments, and make targeted improvements based on the feedback received. Linking feedback directly to specific journey aspects (e.g., cleanliness, service quality) enables more precise service enhancements.

In summary, the use of the metaverse in the railway industry has the potential to revolutionize the customer experience. By leveraging virtual reality, personalized assistance, immersive entertainment, and social interactions, railway companies can provide a seamless and engaging journey for their passengers, ultimately leading to higher satisfaction, loyalty, and positive word-of-mouth.

The use of metaverse to enhance customer experience in the railway industry can raise some privacy and security concerns. Here are some potential issues:

- **Security and Privacy Concerns**: While the metaverse offers significant opportunities for enhancing customer experience, it also introduces privacy and security challenges, such as unauthorized access, data breaches, and crimes like harassment or stalking within the virtual space. To mitigate these risks, railway companies should implement robust cybersecurity measures, user reporting features,

automated detection of malicious activities, and ensure that all digital interactions are secure and transparent.

- **Personal information leakage**: The metaverse can expose personal information to unauthorized access, leading to data breaches and identity theft.
- **Unauthorized access**: The metaverse can be vulnerable to unauthorized access, where attackers can gain access to sensitive data and systems.
- **Metaverse crimes**: The metaverse can be vulnerable to crimes such as harassment, stalking, and theft.

This approach ensures that the metaverse remains scalable and adaptable to evolving passenger needs and technological advancements.

Customer Experience by Rail: Metaverse

Developing a Metaverse Strategy. To maximize the benefits of the metaverse, railway companies should develop a comprehensive metaverse strategy. This strategy should outline the objectives, key applications, technology partnerships, and implementation timelines for metaverse integration. Additionally, it should include guidelines for data privacy, security, and ethical considerations to ensure responsible use of virtual technologies.

15.3 FUTURE OF THE METAVERSE IN ENHANCING CUSTOMER EXPERIENCE

Over the next few years, the rail industry is expected to leverage metaverse-related technologies to create more immersive, efficient, and personalized travel experiences. These advancements will not only enhance the convenience and comfort of rail journeys but also enable rail operators to streamline operations, improve safety, and engage customers in innovative ways.

Key developments in the near future include the use of Augmented Reality to provide real-time information and assistance to passengers, as well as Virtual Reality applications for both staff training and passenger familiarization with stations and trains.

Looking further ahead, the rail industry will explore the full potential of the metaverse by developing virtual rail stations, enhancing customer loyalty through blockchain technology, and creating immersive onboard experiences.

In this context, the metaverse represents a significant leap forward in the pursuit of exceptional customer experience by rail, blending physical and digital worlds to meet the evolving needs of passengers and setting the stage for the future of rail travel.

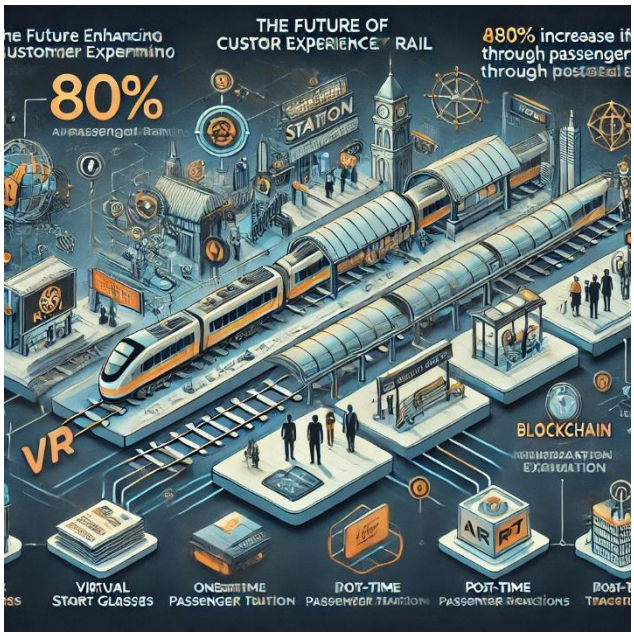
15.3.1 Short-Term Applications (Next 2 Years)

- **Virtual Reality (VR) for Staff Training and Passenger Familiarization**:

VR offers a platform for training rail staff by allowing them to virtually explore complex stations or scenarios before physical deployment. This is particularly useful for preparing staff for emergency situations or managing large, busy stations.

VR technology will be used not only for staff training but also to enhance customer engagement and comfort. Passengers can virtually explore stations or train interiors before their journey, familiarizing themselves with the environment and facilities, which helps reduce pre-travel anxiety and

contributes to a smoother and more enjoyable travel experience.



- **Biometric and Secure Wallets for Seamless Travel:**

The introduction of secure digital wallets integrated with biometric authentication is expected to revolutionize ticket purchasing, verification, and access control processes. This technology will facilitate a seamless travel experience by allowing passengers to move through stations without physical tickets or traditional barriers, thus enhancing convenience and security.

Passengers' faces could be recognized by gates and control devices, enabling frictionless access and enhancing security.

15.3.2 Medium-Term Applications (2026-2035)

- **Smart Glasses for Enhanced Passenger Interaction:**

Smart Glasses could be developed to assist in ticket control and provide personalized services to passengers, such as identifying passengers with specific needs (e.g., those with bikes or PRMs) and offering tailored assistance.

- **Enhanced Maintenance Through AR:**

AR could also be leveraged to improve maintenance activities by providing real-time data and visualizations to maintenance staff, thereby increasing efficiency and reducing downtime.

15.3.3 Long-Term Vision (2035 and Beyond)

- **Augmented Reality (AR) for Passenger Assistance and Experience Enhancement:**

In the short term, AR will be utilized to enhance the passenger experience by providing real-time journey-related information directly through mobile devices or AR glasses at stations and onboard trains.

Passengers can use these tools for wayfinding, locating facilities, and receiving immediate updates on services, which enhances convenience and reduces anxiety during travel.

AR tools could also assist rail staff in improving customer assistance by offering relevant passenger information, such as ticket details, connections, and preferences, thus enhancing the overall customer experience.

AR can also provide enhanced visualizations for passengers with specific needs, such as audio-visual cues for those with hearing or visual impairments, making travel more accessible. Additionally, AR can offer educational content about landmarks or routes during the journey, enriching the travel experience with cultural and historical insights.

- **Blockchain for Enhanced Collaboration and Customer Loyalty:**

Blockchain technology could be used to enhance collaboration between various stakeholders in the rail ecosystem, including tourism, hotels, and other mobility providers. This could lead to the development of interoperable loyalty programs and seamless customer experiences across different services.

- **Immersive Onboard Experiences and Predictive Maintenance:**

As the metaverse becomes integrated into daily life, railways could deploy immersive onboard experiences that enhance the travel journey. Additionally, the use of predictive maintenance technologies, combined with autonomous driving

capabilities, could significantly improve operational efficiency and safety.

15.3.4 Ethical Considerations for Metaverse Implementation

As the rail industry integrates the metaverse into customer experience strategies, ethical considerations must be a priority. This includes addressing issues such as data privacy, consent, and the digital divide to ensure all passengers benefit equally from digital advancements. Ensuring transparency in how passenger data is used and stored within the metaverse environment is critical to maintaining trust and promoting widespread adoption.

15.4 INTERNATIONAL PLATFORM FOR AI AND INTERCHANGE EXPERIENCE IN RAILWAYS

To advance the implementation of AI and enhance the interchange experience in railway systems, an International Platform for Railway Collaboration is proposed. This platform would unite railway companies worldwide to share insights, develop innovative solutions, and establish best practices for integrating emerging technologies into customer experience improvements.

- Objectives of the Platform
  - AI Integration for Enhanced Customer Experience
  - Interchange Optimization
  - Sharing Best Practices
  - Ethical Considerations and Data Governance

By exploring the metaverse, the platform would seek to integrate virtual and physical experiences, offering passengers tools to simulate and plan their journeys in immersive environments. This includes virtual station tours, dynamic ticketing solutions, and AI-driven travel recommendations.

16 CULTIVATING POSITIVE EMOTIONS

"Happy passengers travel more"

This leitmotiv used by NS reflects the impact of positive emotions on the future customer transport mode choice.

This section tries to encapsulate the essence of providing a holistic and serene travel experience that not only caters to the logistical aspects of rail travel but also enriches passengers' journeys with cultural depth, intellectual engagement, and opportunities for mindfulness and relaxation.

16.1 MINDFULNESS

16.1.1 Positive Impact

Mindfulness can have a positive impact on customer experience in the railway industry. Here are some ways in which mindfulness can impact customer experience:

- Increased perceived value: Mindfulness can increase the perceived value of the customer experience. This is because mindfulness can help customers focus on the present moment and appreciate the experience more fully.
- Improved creativity: Mindfulness can inspire creativity, which can lead to better solutions for customers. This can help railway companies come up with new and innovative ways to enhance the customer experience.
- Reduced stress and anxiety: Mindfulness can reduce stress and anxiety among customers. This can lead to a more positive experience and increase customer satisfaction.
- Improved attention and memory: Mindfulness can improve attention and memory, which can lead to a more engaging and memorable experience for customers.
- Antidote to mindless consumption: Mindfulness can be an antidote to mindless consumption, which can negatively affect individual and collective well-being. By promoting mindfulness, railway companies can help customers make more conscious and deliberate choices.
- Improved perception of quality: Mindfulness can improve the perceived quality of the public transport system, including the perceived quality of the passengers' information system (PIS). This can lead to a more positive perception of the railway industry and increase customer loyalty.

16.1.2 How?

Railway companies are increasingly using mindfulness to enhance the customer experience. Here are some ways in which mindfulness can be used to enhance railway customer experience.

- Mindfulness trains: Railway companies can launch mindfulness trains, which are dedicated to promoting mindfulness and relaxation. These trains can be decorated with images of nature, and passengers can download a meditation app to use on the train. The trains can also feature a "meditation corner" at select stations.
- Mindfulness classes: Railway companies can offer mindfulness classes on board the train or at the station. These classes can be led by experts in mindfulness and can help passengers learn techniques to reduce stress and anxiety.
- Mindful design: Railway companies can incorporate mindful design principles into their trains and stations. This can include using calming colours, natural materials, and incorporating elements of nature into the design.
- Mindful customer service: Railway companies can train their staff in mindfulness techniques to help them provide better customer service. This can include techniques such as active listening and empathy.
- Mindful technology: Railway companies can use technology to promote mindfulness, such as providing passengers with guided meditations through in-train entertainment systems.

NS Netherlands Railways has embraced mindfulness as a part of its customer experience strategy, recognizing the growing importance of mental well-being during travel. Through innovative initiatives, NS aims to transform train journeys into opportunities for relaxation, personal growth, and emotional rejuvenation. A prime example of this effort is the MindfulNS initiative.

The MindfulNS app provides passengers with mindfulness exercises designed to reduce stress, foster relaxation, and enhance their overall travel experience. Passengers were equipped with smartphones and headphones to access guided sessions during their journeys. These exercises, led by a mindfulness coach, encouraged participants to start their day with calmness or smoothly transition from work to personal life.

Photo: Maaike Poelen – 2017

Photo: Maaike Poelen - 2017

Passengers listening to instructions on the MindfulNS app (NS Railways)

The results of the initiative were positive. Passengers reported feeling more relaxed, with improved perceptions of the train's ambiance and their overall journey.

The use of mindfulness can help railway companies create a more relaxing and enjoyable customer experience.

By promoting mindfulness, railway companies can help reduce stress and anxiety among passengers, leading to a more positive experience.

16.1.3 Barriers

There are several potential barriers to customers adopting mindfulness practices in the railway industry. Here are some of them:

- Disinterest: Some customers may not be interested in mindfulness practices and may not see the value in them.
- Lack of programming: Railway companies may not offer enough programming or resources to support mindfulness practices, which can make it difficult for customers to adopt them.
- Work overload: Customers may feel overwhelmed with work or other responsibilities, which can make it difficult to find time for mindfulness practices.
- Absences from work: Customers may have to miss work to attend mindfulness classes or workshops, which can be a barrier for some.
- Difficulties with enhanced attention: Some customers may find it difficult to focus their attention during mindfulness practices, which can be a barrier to adoption.
- High levels of stress: Customers who are experiencing high levels of stress may find it difficult to adopt mindfulness practices.
- Lack of prioritization of self-care: Some customers may not prioritize self-care, which can make it difficult to adopt mindfulness practices.
- Motivational barriers: Customers may face motivational barriers such as lack of motivation, lack of time, and lack of discipline.
- Scepticism: Some customers may be sceptical about the effectiveness of mindfulness practices, which can be a barrier to adoption.

16.1.4 Experience of other industries

Mindfulness practices have become increasingly popular in various industries, including the business world. Here are some examples of how mindfulness practices are being used in other industries:

- Large corporations: Many large corporations have adopted mindfulness practices to improve their

productivity and bottom line. These companies offer internal programs such as mindfulness workshops, yoga and meditation classes, and stress management.

- Workplace mindfulness: Many companies are adopting mindfulness practices to improve employee well-being and productivity.
- Mindful leadership: Mindful leadership is becoming increasingly popular in the business world.
- Mindful industry: Mindfulness practices are being adopted in various industries, including banking, healthcare, finance, and more.

16.2 PHYSICAL ACTIVITIES ON BOARD

Doing physical activities on board trains could be a way to enhance customer experience, depending on the type of activity, the duration of the trip and the available space and equipment.

Some possible benefits of doing physical activities on board trains are:

- It could help reduce stress, boredom and fatigue, especially for long-distance travellers or commuters.
- It could improve health and well-being, as physical activity is associated with lower risk of chronic diseases, obesity and depression.
- It could increase customer satisfaction and loyalty, as physical activity could enhance the perceived quality and value of the service.

There are several factors to consider when assessing the feasibility of implementing this idea:

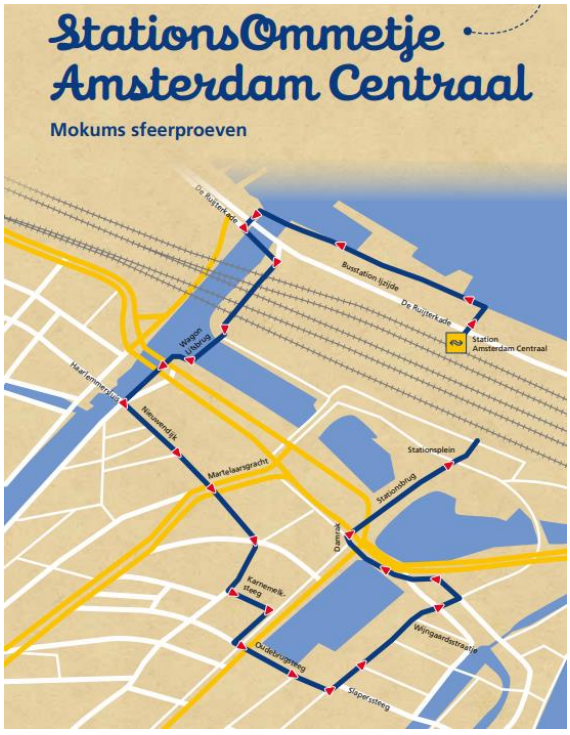
- Available space: Trains often have limited space, especially in the passenger area. It would be necessary to find an efficient way to utilise that space for fitness sessions without affecting passenger comfort and safety.
- Safety: On-board gymnastics sessions should be designed and carried out in a safe manner. Aspects such as train stability during exercise, injury prevention and the safety of other passengers must be considered.
- Rules and regulations: Each country and transport operator may have specific regulations regarding permitted activities on board trains. It would be necessary to make sure to comply with all regulations and obtain the necessary authorisations before implementing fitness sessions.
- Passenger preferences: It is important to consider the preferences and needs of passengers. While some people may be interested in participating in fitness sessions, others may prefer a quieter and more relaxing environment during their train journeys. It would be useful to conduct surveys or collect feedback from passengers to gauge their receptiveness to this idea.

  NS (Dutch Railways) has developed comprehensive survey tools to systematically capture passenger preferences and experiences, making them a leader in understanding customer needs. These surveys are designed to gather insights into customer satisfaction across various stages of the journey, from boarding to on-board experiences and passenger preferences, including their interest in initiatives such as fitness sessions or more relaxing, quiet environments during their train journeys. This feedback forms the foundation for tailoring services to meet diverse passenger expectations, ensuring that innovations align with the needs of the traveling public.

The 'floatile' waterfloor board in the passageway - surf's up! (Source: NS

Considering the space and safety limitations on board trains, it is possible to explore other physical activities that can enhance the customer experience without compromising comfort and safety. Here are some ideas:

- Light stretching and yoga: Gentle stretching or low-impact yoga sessions can be organised to help passengers relax, stretch muscles and promote blood circulation. These activities do not require much space and can be adapted to take place in limited areas.
- Breathing and relaxation exercises: Providing passengers with breathing techniques and relaxation exercises can help reduce stress and improve their overall well-being during the journey.
- Short walks: If the train design permits, short walks can be organised in designated corridors to allow passengers to move around and stretch their legs. This could be especially useful on long journeys.
- Posture-strengthening activities: Exercises or tips can be taught to improve posture and strengthen key muscles, such as the core, while seated. These activities can help passengers maintain proper posture during the journey.
- On-board gym: Similar to the futuristic train designed in Germany, train companies could consider having an on-board gym. This would allow customers to engage in physical activities such as weightlifting, running, and cycling while traveling.
- Inspiring customer experiences often arise from simple yet impactful solutions. A noteworthy example comes from the Netherlands, where NS (Dutch Railways) has developed short walking routes around station areas, like the ones at Amsterdam Centraal. These walks, lasting 5 to 10 minutes, are designed for passengers who otherwise face idle waiting times of 15 minutes or more. By providing an opportunity to actively explore the station's surroundings, this initiative turns waiting into a positive and engaging experience. It exemplifies a customer experience-driven solution that is practical, appealing, and effective in practice.



Example of a short walking route developed by NS around Amsterdam Centraal Station (Source: www.hs.nl)

It is important to note that any physical activity on board must be safe, not interfere with the normal operation of the train and not disturb other passengers. Before implementing any physical activity programme, it is essential to consult regulations and obtain the necessary approvals from train operators and relevant authorities.

16.3 INTEGRATING LIBRARIES INTO RAIL STATIONS

16.3.1 Enhancing Customer Experience through Reading

In an effort to enrich the customer experience for rail passengers, it could be considered the introduction of a unique library concept within rail stations. This initiative aims to provide travellers with easy access to physical books, audiobooks, and digital reading material through a blend of traditional book lending and innovative technology such as book vending

machines and digital platforms. This library service, designed to cater to the diverse preferences of all passengers, will not only make waiting times more enjoyable but also encourage a culture of reading and learning on the go.

The introduction of library services within rail stations represents an innovative step towards enhancing the passenger experience through the joy of reading. By offering a blend of physical and digital reading options, this initiative not only caters to the diverse preferences of today's travellers but also promotes a culture of literacy, sustainability, and community engagement within the rail network.

Train Station Library in the city of Haarlem in the Netherlands. Source: Information Today

In Sweden, libraries integrated into major train stations offer commuters the opportunity to relax and engage with books, fostering a more tranquil travel experience and reducing stress.

16.4 LIBRARY COMPONENTS

16.4.1 Physical Book Lending

- Establish small library units within the station where passengers can borrow books. These libraries could operate on a trust-based system or through a quick, automated check-out process using their rail tickets or a library card.
- Collaborate with local public libraries to rotate book collections, ensuring a wide range of genres and languages to cater to the diverse passenger demographic.

16.4.2 Book Vending Machines

- Install book vending machines in high-traffic areas of the station, offering bestsellers, classics, and children's books. This allows passengers to easily borrow or purchase books using their rail tickets or electronic payment methods.
- These machines can also feature a return slot, making it convenient for travellers to return borrowed books before their departure or upon their return.

16.4.3 Audiobook and Digital Reading Access

- Partner with digital content providers to offer passengers access to audiobooks and e-books. This could be facilitated through QR codes displayed in various parts of the station, which, when scanned, grant temporary access to a digital library.
- Introduce a station Wi-Fi landing page that directs passengers to the digital library, offering free access to audiobooks and e-books for the duration of their stay in the station or their rail journey.

16.4.4 Implementation Strategy

- Pilot Program: Launch the library service in a select number of high-traffic stations as a pilot program. Gather feedback from passengers to refine the service offerings before a wider rollout.

Utrecht Central Station. Free bookchange shops. passengers can grab a book and leave a book for someone else. On the left for adults and on the right for kids. Source: NS Railways

- Marketing and Awareness: Utilize digital screens, station announcements, and social media to

promote the library services. Engaging marketing campaigns can highlight the benefits of reading and learning while traveling.

- Community and Educational Engagement: Work with local schools, universities, and community groups to curate the book selection and promote literacy and continuous learning among passengers of all ages.
- Sustainability Focus: Emphasize sustainability by encouraging the donation of books to the library, implementing eco-friendly practices in the management of physical books, and promoting digital reading options.

16.4.5 Benefits

- Enhanced Customer Experience: Provides a valuable and enjoyable service for passengers, making waiting times more productive and journeys more pleasant.
- Promotion of Literacy and Learning: Encourages reading and continuous learning among the traveling public, supporting educational initiatives and community engagement.
- Sustainable Travel Culture: Supports a culture of sustainability and sharing within the rail network, aligning with broader environmental goals.

16.5 MUSIC AND CULTURAL OFFERINGS

16.5.1 Introduction

Transforming rail stations into cultural hubs offers an innovative approach to enhancing customer experience. By integrating music performances and craft markets within station premises, rail operators can create a vibrant, engaging atmosphere that not only elevates the passenger experience but also enriches the cultural image of the station.

Incorporating music and craft markets into rail stations presents a unique opportunity to redefine the passenger experience, turning transit spaces into cultural destinations.

These initiatives not only enhance the appeal of rail travel but also support local artists and entrepreneurs, contributing to the economic and cultural vitality of the communities they serve. By transforming stations into lively, engaging spaces, rail operators can significantly enrich the customer journey, making every trip an experience to remember.

This proposal outlines strategies for offering services and spaces that provide a completely different experience, catering to the diverse tastes and interests of travellers, and supporting local entrepreneurs and artists.

16.5.2 Music at Stations: Creating a Melodic Journey

16.5.2.1 Live Music Performances

- Organize live music performances featuring local artists and bands, spanning various genres to cater to a wide audience. These performances can be scheduled during peak travel times to entertain waiting passengers and create a pleasant ambiance.
- Designate specific areas within the station for these performances, ensuring minimal disruption to the flow of passengers while still being easily accessible.

London´s last Railway Band. Source: Londonist

16.5.2.2 Station Music Festivals

- Host seasonal music festivals or themed music days at the station, turning the space into a destination for cultural engagement. This can attract not only travellers but also local residents, fostering a sense of community.
- Collaborate with music schools, local orchestras, and bands to provide a platform for showcasing talent and offering diverse musical experiences.

16.5.2.3 Ambient Music

- Curate playlists of ambient music to be played in certain areas of the station, creating a soothing atmosphere that enhances the overall ambiance. Careful selection of tracks can ensure that the music contributes positively to the passenger experience without being intrusive.
- Craft Markets for Entrepreneurs: Supporting Local Creativity.

16.5.2.4 Implementation Considerations

- Space Allocation: Carefully plan the layout and timing of music performances and craft markets to enhance the station experience without compromising safety and convenience.
- Marketing and Promotion: Utilize digital platforms, station signage, and social media to promote upcoming events, drawing interest from both passengers and the wider community.
- Community Engagement: Actively engage with the local community, artists, and entrepreneurs in the planning and execution of these cultural offerings to ensure they reflect local tastes and contribute to community vibrancy.

16.5.3 Case Study: The Use of Music in Sydney Trains - Tekno Train by Paul Mac

Introduction

The Tekno Train serves as an example of how music and technology can be integrated into public transport to elevate the customer experience. This innovative approach not only entertained passengers but also promoted a positive image of public transportation, encouraging more people to utilize these services.

The case study of Tekno Train highlights the potential for creative collaborations to transform everyday activities into extraordinary experiences, making public transport more appealing and memorable for passengers worldwide.

Vivid Sydney and Sydney Trains brought to life the Tekno Train by Paul Mac, a unique event that turned routine train travel into an immersive musical experience. This innovative initiative, exclusive to the Vivid Sydney festival, ran for 23 nights and aimed to transform the everyday commute into a captivating journey filled with rhythm, light, and community spirit.

Paul Mac's Tekno Train.

Concept and Execution

The Tekno Train was conceived as a mobile sensory adventure, where acclaimed Australian musician Paul Mac crafted an original techno soundtrack to accompany the train's movement. This soundtrack was synchronized with custom lighting, designed to enhance the train's interior atmosphere. As the train travelled through Sydney, the lights and music

dynamically adjusted to match the train's speed and the changing scenery outside, creating a melodically synchronized and visually engaging experience.

Objectives

The primary objectives of the Tekno Train were multifaceted:

- Reinventing Train Travel: The event sought to reimagine the mundane experience of daily train travel, transforming it into something thrilling and memorable.
- Creating Joyful Moments: By leveraging the uniting power of music and light, the Tekno Train aimed to foster a sense of joy and togetherness among passengers.
- Promoting Public Transport: Highlighting the role of public transport in a sustainable future, the project encouraged passengers to find delight and wonder in their everyday commute.

Key Features

Music and Lighting Integration:

Paul Mac composed an original techno soundtrack specifically for the Tekno Train. The train's interior featured custom lighting that illuminated the carriages, changing in sync with the music and the train's motion. Hidden lights and speakers created a communal experience, making each journey unique and engaging.

Interactive Passenger Experience:

Passengers experienced a sensory journey where the rhythmic sounds and dynamic lighting elevated the travel experience. This integration of audio and visual elements turned a routine commute into a shared adventure.

Distinct Route Options:

To cater to different preferences, the Tekno Train offered two distinct 60-minute routes:

- The Scenic Route: This journey took passengers through North Sydney, showcasing the sights over the Sydney Harbour Bridge and down a secret spur line to Lavender Bay. This slower route was ideal for families with children.
- Tech Express: This faster, more intense route delved beneath the city through the City Circle and South Sydney, providing a high-energy, pulsating techno experience for those seeking a lively adventure.

Impact and Reception

The Tekno Train was met with positive feedback, illustrating how public transport can be transformed into an engaging experience. Key impacts included:

- Enhanced Passenger Experience: By transforming a mundane commute into a vibrant sensory adventure, the Tekno Train significantly enhanced the overall passenger experience.
- Community and Togetherness: The event fostered a sense of community among passengers, who shared in the unique and joyous experience.
- Promotion of Public Transport: By making train travel an event in itself, the Tekno Train promoted the use of public transport as a vital and enjoyable part of daily life.

16.5.4 Pop-Up Markets

- Facilitate pop-up craft markets within station premises, offering local artisans and entrepreneurs the opportunity to display and sell their handmade goods. This initiative can transform stations into vibrant marketplaces, providing passengers with unique shopping experiences.

Christmas market held at Zurich Main Station is one of the largest indoor Christmas markets in Europe (Source: www.zuerich.com)

- Ensure that these markets are strategically located to maximize visibility while maintaining smooth passenger flow.
- Zurich's (Switzerland) most central Christmas market takes place in the main concourse of the Main Station. Featuring about 120 stalls, it is one of the largest indoor Christmas markets in Europe. As soon as travellers alight from the train, they are drawn to the market by the irresistible scent of mulled wine and cinnamon. The highlight of the Christkindlimarkt is the richly decorated Christmas tree.

16.5.5 Themed Craft Fairs

- Organize themed craft fairs, such as holiday markets or cultural heritage festivals, to celebrate different occasions and traditions. This not only promotes local crafts but also educates and entertains passengers through a cultural lens.
- Partner with local cultural organizations and community groups to curate the selection of vendors and artisans, ensuring a diverse and high-quality offering.

16.6 ART IN RAILWAY STATIONS

16.6.1 Introduction

Integrating art into railway stations presents a meaningful way to enhance the customer experience, offering beauty, engagement, and cultural enrichment as part of the travel journey, while promoting cultural heritage and community engagement.

Through thoughtful collaboration with artists and the community, railway stations can become vibrant cultural hubs that reflect the spirit of the places and people they serve, making every journey a more memorable and enjoyable.

By transforming railway stations into galleries of public art, including exhibitions, murals, mosaics, and decorative tiles, rail operators can create an environment that not only appeals to the aesthetic sensibilities of passengers but also serves as a platform for artists and fosters a deeper connection with the local community. This approach turns the mundane act of commuting into an enriching cultural experience.

Valencia Estación del Norte (Spain). Interior with mosaics. Source: Ximo Villoro

16.6.2 Strategies for Integrating Art in Railway Stations

- Engage the community in the creation process, perhaps through participatory art projects or contests, to imbue the station with a sense of local pride and ownership.

- Art Exhibitions and Installations
  - Designate spaces within railway stations for art exhibitions that rotate throughout the year. These can feature works by local artists, historical exhibitions related to the railway or the region, and interactive art installations that engage passengers.
  - Collaborate with local art institutions, museums, and galleries to curate these exhibitions, ensuring a diverse representation of styles and cultural backgrounds.
- Decorative and Functional Art
  - Integrate decorative art elements such as bespoke tiles and sculptures into the architectural design of railway stations. These elements can enhance the visual appeal of the stations and contribute to a unique identity.

- Consider the functionality of art by incorporating sculptural seating, artistic lighting fixtures, and wayfinding elements designed by artists to combine utility with beauty.

➢ Murals and Mosaics

- Commission artists to create large-scale murals and mosaics that reflect the identity of the local area, its history, and its people. Such artworks can transform station walls, ceilings, and floors into captivating visual narratives.

Mural in Graz Station (Austria). Source: ÖBB

➢ Benefits of Art in Railway Stations

- Enhanced Aesthetic Appeal: Art transforms railway stations from purely functional spaces into aesthetically pleasing environments, improving the overall travel experience for passengers.
- Cultural Showcase: Railway stations become platforms for showcasing local art and culture, reflecting the community's identity and heritage, and offering educational value to passengers.
- Increased Passenger Engagement: Art installations and exhibitions can provide entertainment and engagement for passengers, potentially reducing the stress associated with travel and waiting times.
- Community and Economic Benefits: Art programs can stimulate local economies by supporting artists and attracting visitors. They also foster a sense of community by involving local residents in cultural initiatives.

16.6.3 Implementation Case Studies

➢ The 'Art Stations' Initiative in the UK

Several railway stations across the UK have embraced the concept of 'Art Stations,' where ongoing art projects and installations breathe life into historic and evolving railway environments. Collaborations with local artists and community groups have turned these stations into cultural landmarks.

➢ Philadelphia's 30th Street Station Art Program:

The 30th Street Station in Philadelphia hosts rotating art exhibitions and permanent installations, enhancing the passenger experience and providing artists with a high-visibility platform to display their work. The program includes collaborations with local art schools and cultural institutions.

➢ The Art of Travel in French Railway Stations:

In France, SNCF has initiated art projects across its network, including large-scale murals and digital art displays in stations like Paris Gare de Lyon. These projects not only beautify the stations but also celebrate French culture and innovation in art.

16.7 FEEDBACK

To ensure that tranquillity-focused initiatives are meeting passenger expectations and contributing to overall customer satisfaction, it is essential to gather direct feedback from the passengers themselves.

This can be achieved through a variety of feedback mechanisms that allow for real-time and post-journey assessment of passenger experiences. Implementing these tools helps rail operators identify areas for improvement and ensure that tranquillity efforts are aligned with passenger needs.

➢ Post-Journey Surveys:

Post-journey surveys provide passengers with an opportunity to reflect on their travel experience and rate the effectiveness of tranquillity-related features, such as quiet zones, noise control measures, and onboard comfort.

Surveys can be sent via email or app notifications immediately after a journey, with questions specifically focused on how tranquillity initiatives impacted their comfort. Questions can cover aspects like noise levels, the availability of quiet spaces, and whether passengers felt they had an enjoyable, stress-free journey.

Key metrics to track could include:

- Passenger satisfaction scores related to noise control.
- Percentage of passengers utilizing quiet zones.
- Suggestions for improving the overall tranquillity of the journey.

➢ In-Station Kiosks:

In-station kiosks offer passengers a convenient way to provide feedback immediately after their journey, allowing operators to gather quick insights into passenger satisfaction, particularly around tranquillity features.

Touchscreen kiosks located in high-traffic areas of the station can display a simple, user-friendly interface with questions about the passengers' experience related to tranquillity. Passengers can rate their satisfaction with features such as quiet areas, acoustic design, and overall noise levels both at the station and during their journey.

Data collected through kiosks can be used to measure:

- Immediate passenger sentiment about tranquillity initiatives.
- Feedback on specific station areas where noise control could be improved.
- General satisfaction with the design and placement of quiet spaces.

➢ Mobile App Feedback:

Mobile apps provide an integrated platform for passengers to submit feedback, either in real-time during their journey or after its completion. This method enables the collection of more detailed insights into how tranquillity-focused initiatives are perceived.

Passengers can be prompted via the app to provide feedback on specific tranquillity-related factors such as seating comfort, ambient noise, and the effectiveness of quiet zones. Real-time feedback options allow passengers to report any disruptions to tranquillity (e.g., noisy passengers) while still onboard.

The app can track:

- The number of real-time tranquillity-related issues reported.
- Overall satisfaction with the app's role in supporting a peaceful travel experience.
- Ratings for tranquillity-focused services such as noise-cancellation or quiet cars.

17 REFERENCES

- UIC Customer Experience by Rail. State of the Art and Best Practices with a Vision 2030 Case Study. January 2022
- A Classification and Categorization System for Tourist-Friendly Railway Services and Experience UIC TOPRAIL, 2023
- TOPRAIL Guidelines on Sustainable Rail Tourism, UIC TOPRAIL, 2017
- Key Performance Indicators for performance benchmarking, 2018. PRIME – Platform of Railway Infrastructure Managers in Europe
- Technology as enabler for customer-centricity in the rail industry (globalrailwayreview.com)
- Artificial Intelligence in Mass Public Transport. UITP, 2018
- A Framework for Sustainable Data Sharing Public Transport. UITP. November 2021
- Rail Success Stories. UITP, 2022
- Knowledge Brief. Gender Best Practices in Public Transport. UITP, June 2024
- RAIL 2050 VISION (ERRAC, 2018)
- Manifesto of Future Mobility – ERRAC (2022)
- Performance Indicators & Expected Benefits. Feasibility Study to Rail Collaborative Decision Making (Rail CDM). Work Package 2 Report. Hacon Ingenieurgesellschaft mbH, Hannover, Germany. Date: 06. July 2021
- ScanMed RFC – Train Performance. Management Reference Manual. A reference manual for actual and future partners of Train Performance Management- 2016 Edition.
- Railway Station and Interchange Design: A Station Design that Perfectly Fits the Quality Needs of Passengers. Mark Van Hagen, 2022.
- Development of an Innovative Train Using Evidence Based Design. Mark van Hagen, Netherlands Railways, et al. 2020.
- Give train passengers something to do! Mark van Hagen & Evelien ten Elsen, NS Netherlands railways. European Transport Conference, 9-11 October, 2019, Dublin
- Las cercanías de Sevilla y Bilbao se incorporan al servicio de avisos por mensaje directo de Twitter (vialibre-ffe.com)
- Iryo creará un "bosque inteligente" con la ayuda de sus clientes - Trenvista
- Influence of internet on consumer behaviour while purchasing mobile: an empirical study. Riddhish Narendra, Pratiksinhsureshsinhvaghela. September 2015
- A New Model for Defining the Criteria of Service Quality in Rail Transport: The Full Consistency Method Based on a Rough Power Heronian Aggregator Đorđev´c, Stevic, Pamucar, Vulevic, and Mišic
- Determinants Of Passenger Satisfaction Toward Rail Transport Service. Hew Wen Han, Ui Xiang Ting, Ng Shu Wei, Lee Yi Jia, Ooi Chun Xi.
- An analytical investigation on passenger satisfaction: a perceptual study on Indian railway. Mitra, 2018.
- Hine, J., Munday, D., & Grieco, M. (2006). Investigating the characteristics and motivations of occasional rail travellers. Transportation Planning and Technology, 29(4), 277-296.
- Sisinni, M., Eboli, L., & Mazzulla, G. (2012). Commuters' perception of railway services: A stated choice approach for quality improvement. Journal of Transport Geography, 22, 211-218.
- Urry, J., & Sheller, M. (2006). Mobile Technologies and the Incipient traveller. Space and Culture, 9(3), 261-277.
- Zou, B., Li, S., & Kockelman, K. M. (2018). Understanding the Preferences and Perceptions of Intercity Rail travellers in the United States: A Latent Class Analysis. Journal of Transport Geography, 72, 141-154.
- Staszewski, J. P., & Beckman, E. (2015). The commuter experience: Perceived crowding, satisfaction and mode loyalty. Transportation

Research Part A: Policy and Practice, 78, 448-461.

- https://railway-news.com/tips-for-rail-operators-when-designing-a-metaverse-experience/
- MTR creates a virtual rail station on the metaverse | Marketing-Interactive
- https://www.pymnts.com/metaverse/2022/german-railway-bets-industrial-metaverse-will-cut-delays-boost-safety/
- https://virtual-market.prowly.com/219326-a-railway-station-on-metaverse-launched-at-virtual-market-2022-winter
- Youmanity Launches World's First Mindfulness Train
- https://www.bbc.com/news/business-60140862
- https://www.lner.co.uk/news/unwind-your-mind-on-the-wellness-train/
- Demand just keeps growing – Evo-Rail
- Mais pourquoi diable les sièges de nos trains sont-ils de moins en moins confortables ? (lefigaro.fr)
- Global Railway Review's Roundtable: Improving On-Board Experiences. July 2023
- https://www.southernrailway.com/about-us/corporate-and-social-responsibility
- Factors affecting traveller's satisfaction with accessibility to public transportation. MG Woldeamanuel, R Cyganski - European Transport Conference …, 2011.

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