THE SUCCESS OF MULTIMODALITY

Multimodality and intermodality, the idea of combining different transport modes to complete a journey end to end – for both freight and passengers – emerged in the 1980s. Today we are seeing a growing trend towards digitalisation. In parallel, efforts are underway to reduce CO2 emissions, congestion and air pollution, based on the goals set by the Paris Agreement signed by 195 member states in 2015 and 2019. In this context, multimodality or intermodal transport have become the key drivers for an ambitious transport infrastructure concept.

Our current world population of 7.6 billion is expected to soar to 9.8 billion by 2050, according to data published by the UN Department of Economic and Social Affairs in 2017. Such dramatic growth means a dramatic increase in energy demand. When it comes to reducing energy consumption and air pollution, rail is the most carbon efficient transport mode. Regulation (EC) No 595/2009 has set the CO2 emission limits for newly-registered heavy-duty vehicles. At the same time, the railways have the advantage of being an environmentally friendly, mass transit mode compared to individual car use.

Supportive incentives such as Horizon 2020 funding for the European Union (EU) single market, have been introduced to promote research and support cross-border transport services. They involve many steps towards innovative developments in the ICT sector and industry 4.0, where SMEs are the driving forces for efficient solutions. One of the major pillars of EU policy is promoting the transport sector, with the goal of shifting more than 30% of road freight over distances of 300km to other modes, i.e. rail, by 2030, according to the European Commission’s 2011 White Paper on Transport.
Multimodal and intermodal transport

Overall, initiatives for transport multimodality or intermodality have supported projects that are environmentally friendly, support transport sustainability, are cost efficient, act as key economic drivers, or relate to safety issues.

Multimodality has also become an increasingly key factor for shipping goods from origin to destination, using several modes of transport and one single bill of lading, specifically for rail, air, maritime, and road haulage.

In today’s freight sector, these multimodal platforms often ensure real-time matching between manufactured goods and the capacity of carriers. They achieve this by selecting the best transport modes based on the needs of loads, congestion, prices, the levels of CO2 emissions, and delivery times. Access to these platforms is often supported by mobile apps for more direct access to potential customers, to existing freight terminals, and for coordination with clients. Furthermore, these platforms can foster seamless information flows in order to match loads with capacity, resulting in lower costs, higher speed, and full transparency. Such developments are, however, still at an intermediate stage.

Taking platforms to the next level

Taking these platforms one step further calls for cooperation to develop the multimodal logistics network. Over the last three decades, companies in Germany like METRANS and DB Cargo have taken major steps in the European rail freight sector, including, of course, in terms of multimodal transport. In 2018, during a meeting in Katowice, Poland, the Rail Freight Forward coalition committed to reducing the negative impact of freight transport on the planet. DB Cargo, a coalition partner, has also signed up for the Rail Freight Vision 2030.

Efforts are underway to modernise rail infrastructure and establish an increasingly dense network of logistics hubs. These developments seek to promote competitive freight corridors in order to handle goods from both within and outside the EU, e.g. accessing the EU by rail via the Silk Road from China.

The rise of multimodal platforms

Due to digitalisation, multimodal and intermodal transport platforms have emerged over recent years and are considered the most important market dynamics. Opportunities available through IoT (Internet of Things) connectivity and Peer2Peer sharing systems have led to the digitalisation of most transport services.

Boosted by these dynamics, the increase in multimodal platforms, their functioning and resulting business models have already led to more efficient transport solutions for end-to-end travel chains, including booking and payment. In the past, it wasn’t always possible to control all the figures and data parameters, or individual operators didn’t have access to the data of other operators.

There has been significant process in the harmonisation of EU legal regulations for both data and the safety and security of passengers and freight traffic. For the latter, intermodal transport mainly relies on the Combined Transport (CT) Directive (Council Directive 92/106/EEC).
Furthermore, in the Efficient Cross Corridor Organisation (ECCO) project, the UIC (International Union of Railways) is coordinating the interests of railway undertakings, i.e. rail freight corridors and the globalised railway world, through ‘Rail Advisory Groups’.

The revised Regulation on Rail Passengers’ Rights and Obligations (PRR), published on 28 September 2017 by the European Commission (EC), seeks to remove barriers to cross-border online activities. By so doing, it has paved the way for various multimodal and intermodal platforms providing Mobility as a Service (MaaS).

MaaS – Cooperative, Connected and Automated mobility for passengers

The MaaS concept combines passenger and freight transport operations, where different transport sectors face the challenges of running flexible, scalable transport networks and providing intermodal or multimodal journeys for passengers. They must integrate different mobility services, which involves addressing issues such as legacy data use, cost certainty for customers, dealing with different software formats, or the lack of data security. MaaS aims to answer the question ‘how do we plan for cooperative, connected and automated mobility’ for passengers?

Furthermore, in the culture of the last century, consumers preferred to travel by car rather than public transport. Overall, convincing them to use public transport and an inclusive MaaS ecosystem as an advanced journey aid have become key drivers for developing business models, as well as encouraging partnerships for the interoperability of technologies and roaming services.

The MaaS concept encourages passengers to click on their smartphone to book door-to-door journeys, automatically reserving a train ticket, car, bus, bike, or further transit modes to complete a trip. Providers of the MaaS distribution model thus offer user-centric and intelligent single platforms and passengers benefit from stress-free travel. In order to optimise MaaS business models for multimodal transport services, the modal split of passenger transport must be categorised into Transport, Infrastructure, Traffic Management and Information, Planning and Payment.

Hannovermobil, the world’s first multimodal platform, was launched by Greater Hannover Transport Association - Großraum-Verkehr Hannover GmbH (GVH) in 2006. Offering customers tailored solutions, it integrated carsharing, taxi services and public transport to provide all the essential mobility services. An approved special taxi rate was offered to public transport customers and the free DB membership card with a 25% (Bahncard 25) discount integrated into the platform.

From multiple to single

In recent months, MaaS business models have shifted beyond the first development stages of air/rail or air/car rental passenger intermodality by multiple carriers contracted to deliver a single journey. Today, passengers can already select multimodal offers from a single carrier, whose one-stop-shop offers door-to-door solutions that include cheap travel options across modes and services, across Central and Eastern Europe. Furthermore, MaaS solutions are already providing single-fare transport for passengers and their luggage.

Integrated mobility platforms provide public sector services that include the train, tram, bus, metro, carpooling and ride sharing for smartphone users. In cities both large and small, the individual use of rent-a-bike, e-bike-sharing, taxi and e-car-sharing are already integrated within the collective use of transport mobility platforms.

These sustainable development business models must understand user needs in order to provide better everyday mobility. Another must is bringing together on-demand modes, public transport, and infrastructure. These requirements are often still under development in order to meet the goals of interoperability projects.

Making progress

Since the introduction of MaaS business models, several study projects have been launched and final solutions introduced. The first three study projects, funded since 2017 and supported by the EC Horizon 2020 fund are:

- **MyCorridor**: MaaS for a multimodal, European cross-border corridor, tailor-made mobility solutions for passengers;
- **MaaS4EU**: to provide quantifiable evidence, frameworks and tools for the MaaS concept, and
- **MOVE4EU**: real-time data collection on user preferences, tools for sharing information, establishing a roaming service.

All three are exploring options for the computer programming API (Application Programming Interface) integration process, as well as studying how MaaS solutions should be deployed. The results are due for delivery in 2020.

Furthermore, in January 2017, UITP launched the MaaS project **Shared Personalised Autonomous Connected Vehicles (SPACE)**. It involves 20 countries and four working groups, with a focus on operational concepts, researching international projects, and the safe operation of automated vehicles as part of an integrated public transport sector. Based on recent studies by VDV Stuttgart and ITF Lisbon, autonomous vehicles could shape the future by reducing car use by 80% by 2030. The outcomes of SPACE will be published in the spring of 2019.
In Germany, DB passengers must validate their tickets with a ticket inspector on trains rather than at a turnstile prior to boarding. Since 2018, the mobile DB navigator app has added a tool – Komfort Check-in (Self Check-in) – that allows passengers to validate their tickets as soon as they have started their journey. It confirms the journey has begun and the seat choice, with the information sent immediately to the ticket inspector’s terminal. This ensures passengers are not subsequently disturbed by the ticket inspector.

Bringing AI into play

With regards the MaaS model, a recent development is the launch of a test network to give platform users greater value for money. It is based on artificial intelligence (AI) agents, the Autonomous Economic Agents (AEA) provided by blockchain and AI start-up Fetch.AI. The approach involves better exploiting underutilised data in ecosystems. This is carried out through market intelligence in the form of AI tools that understand the personal intentions of travellers and can navigate the complexity of transport choices intelligently. This model could simplify travel choices for multimodal passengers, who would no longer need to consult several apps for their journey.

“An agent could live on your smartphone, learning and studying your preferences for travel over time,” said Joshua Croft, software developer and ecosystem coordinator, Fetch.AI, in February 2019 (Fetch.AI and the UK rail network’s digital revolution – railway-technology.com). Overall, this development could simplify journeys for passengers. At the same time, on the downside, they run the risk of their personal data being misused by these agents.

The need for data and regulations

However, if multimodality in the transport sector is to provide optimal services it needs data and data regulations. At the high-level conference ‘Multimodal transport – towards the future of the EU’, held in Brussels on 26 February 2019, the industry called for data to be classified and only shared when authorised.

On the other hand, technical details should not be included in regulations, because this will hinder the open progress of multimodal transport. Overall, the value of data has reached such a point for the multimodal transport that the industry is now requesting the EU provides data, rather than money. At this stage, the question remains open – will data will become a currency of the future, whereby countries with authoritarian regimes that control all the national data will be best placed to provide the best multimodal services?

As ETCS project manager at DB Kommunikationstechnik (telecoms technology), Christine Kraft has implemented the transmission technique along Corridor A in Germany Region West since 2015, as well as for the newly built knot point at Frankfurt City Railway, Homburger Damm, and the upgraded Frankfurt Main Station. In addition to a German diploma in engineering/architecture, Christine has a master’s degree in European Studies with a focus on Digital Europe – Vision 2020 – Flagship Smart Growth.

Moreover, she has completed missions as an engineer/architect in many countries including Vietnam, Libya, Ireland, Germany, the U.I., and Dubai. Further strings to her bow, Christine has worked for governmental bodies such as the Ministry of Education and Training, Vietnam (MoET), for a World Bank project, and the State Building Authority in Germany.

In 2018, Christine signed a contract for remote work with the European Commission, appointed as an expert to assist the Executive Agency for Small and Medium-sized Enterprises (EASME) in managing EU and Euratom research and innovation programmes. “The EU pillars of transport and SMEs are two of my specialist areas,” she says. “My passion for the future of the railway sector is closely linked to my interest in Digital Europe.”