

Asset Management for the day after tomorrow

PROSE WHITE PAPER IN COLLABORATION WITH THE FUTURES
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What will mobility look like in 2050?

How will the management of rail vehicles change?

Are we prepared for the future?

What steps do we need to take starting today in order to choose the right path?

Guided by these questions, PROSE, together with the Futures researcher Dr. Joël Luc Cachelin, developed theses on mobility 2050 and derived influences on today's asset management.

THREE THESES ON MOBILITY BY 2050

- 1** Metropolitan regions are the most important hubs of mobility in the 21st century
- 2** Innovations mainly take place in the last mile
- 3** Mega platforms put today's mobility operators under pressure

ASSET MANAGEMENT FOR THE DAY AFTER TOMORROW

- 1** Standardisation in vehicle design shapes the infrastructure
- 2** Rail vehicles as data collectors
- 3** Integrated transportation companies are under pressure

INFLUENCE ON TODAY'S DECISIONS

THREE THESES ON MOBILITY BY 2050

1 Metropolitan regions are the most important hubs of mobility in the 21st century

Climate change, caused by the consumption of resources over the past one and a half centuries, has led to partly irreversible consequences. This has driven society and politics to change course, supporting sustainable and energy-efficient business concepts and production methods, and making them a legal requirement. Mobility in 2050 will therefore be exclusively electric or, where not otherwise practicable, sustainably powered with synthetic fuels.

The relevance of proximity between the place of residence and the place of work has decreased due to the development towards a service society. I.e. facilities for social exchange, cultural offerings, sports facilities. People are increasingly demanding a say. Relevant tendencies are the reduction of immissions and traffic areas, the development of green areas and local recreation opportunities, as well as the strengthening of the decentralised and thus local availability of products and services for regular needs.

Borders between cities that previously existed as green spaces are blurring and large-scale metropolitan regions with local centers are being formed. Relevant for the development of livable and attractive metropolitan regions are the economic power of the regions and the local control of the influences from climate change, especially the rising sea level and the increasingly demanding provision of drinking water. The reason for mobility is also shifting from work-related commuting and travel to leisure activities in the form of excursions and travel. The number of routes covered decreases, the average distance increases.

The situation is different in the area of goods transportation. Direct home delivery of goods increases the number of shipments, but production tends to be regional rather than global. This is ensured by the establishment of true costs over the entire life cycle of products, taking into account emissions along the supply chain, and political control to ensure the availability of critical supplier products for the regional economy and society. Rail-bound transports are particularly relevant on route sections where large capacities are required.

Junctions of the rail network are used for detailed distribution and reception of travelers and transports in and out of the area. Systems with fixed lane guidance become less relevant for areas with moderate or low population densities. There is a lack of flexibility enabling to react to medium-term changes in travel routes, and at the same time the operating costs of track-driven systems are higher.

Due to the rise of electric mobility and the associated reduction in emissions from private transport, the moral advantage of the railway is reduced and with it the social acceptance of a general preference for rail when it comes to subsidies. At the same time, metropolitanisation creates a higher average demand, which increases the economic viability of connections and makes subsidies and thus the licensing of large parts of the connections superfluous.

The metropolitan regions are independently responsible for the design of mobility and the definition of the service requirements. The operators thus become providers who vie for the best quality for the customers in the provision of transport services.

The clustering of large cities with moderate settlement densities is becoming more attractive.



The metropolitan region remains the owner of the regional infrastructure, which it also operates, maintains and makes available to providers for a fee.

The further development of the third dimension (cable cars, Ottobahn, Cargo Sous Terrain) offers alternatives, especially in densely populated areas with particularly high demand. The use of drones or other flying shuttle services is even more flexible and therefore more expensive.

*Metropolitan regions
will be the
regulatory authority.*

2 Innovations mainly take place in the last mile

The mobility in the last mile and its linking of goods and people is the decisive challenge for the acceptance of a means of transport. Bridging the last mile is becoming increasingly easier and more flexible with ondemand mobility, but it will reach infrastructure and acceptance limits if it is carried out too small. Depending on the settlement density, a bundling of transport and mobility, and thus the restriction of motorised individual traffic, is necessary for the development of the local area according to the ideas of the residents. Innovative solutions for economical and flexible operation can be found particularly where high demand meets an existing infrastructure (usually roads).

«"Platform eats Asset Management" sounds sexy, "Platform meets Asset Management" is more truthful.»



Prof. Dr. Thomas Sauter-Servaes

Mobility researcher
ZHAW School of Engineering

3 Mega platforms put today's mobility operators under pressure

New metalayers that connect the various mobility providers enable a convenient offering for mobility sales. In order to meet the demands of different customer structures, the marketing of mobility via platforms offers a simple possibility of structuring the mobility offer more finely and making its cost structure more flexible. The metalayers own the customer data and exert cost pressure on the mobility providers through their market power. Higher cost pressure in an established market usually leads to a stronger segmentation of the services of the market participants. In order to be able to react to changing market requirements and to avoid long-term risks from tying up capital, the leasing of asset capacity, even on a short-term basis, is becoming the norm.

Conventional operators must provide new services directly related to the journey and enhance the travel experience with added value. The service orientation becomes the decisive factor for differentiation from the competition. However, operators of previously unimodal means of transport could also be forced to increase their share of the total route. This can succeed if additional downstream and upstream mobility services are offered in the "last mile" area.

Historically grown, formerly integrated transportation companies continue to benefit from the central location of their properties close to transport hubs. The management of these, and the sale of data from operations, enable new or more intensive activities in these business areas. Alternatively, regionally very dominant providers can also act as platforms for the distribution of regionally limited mobility. Links to supraregional metalayers are necessary to enable borderless travel.

The cost pressure from these metalayers carries the risk that offers will disappear from the market. On the other hand, it also offers the opportunity to provide services much more efficiently and at lower cost to the public.



ASSET MANAGEMENT FOR THE DAY AFTER TOMORROW

1 Standardisation of vehicle design shapes the infrastructure

The tough competition with other modes of transport requires greater industrialisation in production. Special solutions and deviations from the standard are becoming increasingly expensive. The reason for this are adjustments that become necessary over the course of the life cycle of a rail vehicle and include significant one-off expenses for engineering and approval. These are only acceptable to operators if they can be broken down into a larger pool of vehicles. In order to facilitate simplifications on the part of the rolling stock, a reduction in the variety of infrastructure equipment must go hand in hand. This means that vehicles can be ordered in larger batch sizes and manufactured more industrially. Inside the vehicle, a consistently more modular design allows the interior to be adapted to the changing needs of passengers and the use of the vehicle over time. Increasingly more compact, software intensive vehicle equipment reduces the size of the technically smallest feasible train unit. These can be flexibly and automatically combined into larger train units or separated again. Overall, increasing operational flexibility leads to a reduction in the necessary asset capacities.

The costs for the required IT systems and their setup are enormous, which means that metalayers and manufacturers have a clear advantage over (usually smaller) operators. Due to the larger area of application, they are able to better streamline their processes and analyses with more powerful systems than smaller companies can. Setting up highperformance IT systems, as well as integrating and operating them, poses major challenges for small organisations. The averting of digital sabotage can also be managed much more efficiently and effectively by large players with specialised departments. For other market participants, it is much more interesting to cooperate with large organisations that can offer extensive market coverage, as this reduces the number of interfaces and one-off expenses. The vertical segmentation of the market with the organisations specialising in individual functions counteracts the reduction of interfaces in principle.

« The future of the industry will depend on whether stakeholders are willing to transparently share data so that it can be used by anyone who needs it.»



Babette Müller-Reichenwallner
Chief Revenue Officer
Railnova

Boundary conditions of the infrastructure must be standardised for cost-efficient operation.

2 Rail vehicles as data collectors

The use of a large number of sensors turns vehicles into data collectors. The vehicles know what they are transporting, their capacity utilisation and the state of their surroundings. This includes external data such as environmental and weather data. At the same time, they determine the technical condition of their systems and subsystems as well as the infrastructure. The train is thus becoming an important supplier for the Internet of Things and makes the data available on digital platforms for evaluation by a wide variety of service providers for a fee. Data ownership as a consequence becomes an economic lever and data availability a decisive competitive advantage. Realising the availability of data and deriving an advantage from it requires all parties involved to have the necessary IT skills and knowledge of how to apply and implement them.



Mastering the challenges of digitisation is crucial for cost-efficient operation.

Correspondingly, apart from the technical and operative management, the administration of the interfaces through an adequate contract management and corresponding monitoring is necessary.

However, the segmentation also makes it necessary for projects and problems, which were previously processed and solved within a company, to happen across organisational boundaries as cooperation partners. The various organisations thus will find themselves in new forms of collaboration and cooperation.

3 Integrated transport companies are under pressure

As vehicle equipment becomes more standardised, manufacturers see greater economic potential in taking over maintenance responsibility. At the same time, this offers opportunities to secure access to basic data for further vehicle development beyond the warranty period. With each additional customer fleet, they increase their leverage in evaluating and utilizing technical condition data for smart algorithms.

The availability of asset capacity is the decisive factor for the profitability of a system. The modularisation and interchangeability of technical systems are gaining importance. Together with predictive diagnostics that detect signal patterns before failure, downtime during critical full-load periods are prevented.

Preventive measures are only retained where automated condition monitoring is not possible or is profitable due to the repair costs incurred as a result of a nonimplementation.

The management of large quantities creates economies of scale through the centralisation of functions such as materials management. Due to the technically realised predictability of module failures and the shortening of delivery times, continuous monitoring enables centralised stock management to be way more efficient than decentralised management by small and integrated companies.

Manufacturers thus increase their added value along the life cycle of rail vehicles and improve their position vis-à-vis their actual customers. By exploiting the potential of digitalisation, not only are the framework conditions under which mobility takes place shifting, but the organisation of the market participants themselves is also undergoing a fundamental change.

The rise of artificial intelligence and the maximization of system interconnection are bases for automating processes and data exchange between organisations via platforms. Automation enables the widespread use of driverless units, not only in city or regional traffic, but also in longdistance traffic.

Recurring planning and organisational activities are carried out by highperformance computers, thus minimising the time it takes to make operational adjustments. Timetable design and vehicle deployment planning are moving away from the rigid model of multi-stage planning with increasingly fine granularity, towards a dynamic and demand-oriented scheduling.

Automation leads to a shift in the roles of market participants. The added value of the "integrated operator" as the central control element between the infrastructure operator, vehicle manufacturer, customer, public authority and authorities is reduced.

At the same time, it makes sense to leverage the operators' familiarity with local and regional conditions as added value on the part of the metropolitan regions. Their expertise is used to define mobility needs and requirements. The operators' expertise is shifting from the planning to the requirements side.

Manufacturers and specialised organisations manage vehicle maintenance more efficiently.



INFLUENCE ON DECISIONS TODAY

The next steps for asset management today can be derived from the asset management scenarios of the day after tomorrow described above. In future vehicle tenders, requirements should be formulated to encourage the use of standardised vehicle designs and more flexible application options and allow adjustments to a modular vehicle interior.

For all market participants, the development of competences with regard to data management and its use is of utmost importance. On one hand, this is in order to increase potential in their own organisation through data collection, analysis and exchange. And on the other hand, to use the economic leverage that arises from the ownership of operational data in the form of new business models.

The next step for infrastructure and operators is to adapt the IT landscape to new framework conditions in train path planning and ordering. This will enable more flexible and rapidly changing operating concepts in a liberalised market.

In a following step, operators position themselves in such a way that they can actively contribute to the design of mobility on the part of the authorities. Efforts should also be made to increase value creation along the mobility chain and to use existing assets apart from rolling stock to create value.

From PROSE's point of view, the described considerations are important building blocks for securing the future of rail-bound mobility. We invite you to a joint discussion of the theses and our conclusions. Furthermore, we would be pleased to support your company in the factual implementation of the next steps

«The operative business takes up so much time for us operators that we often don't have time left to think about "the day after tomorrow".»



Yves Marclay
CEO Region Alps
President VöV-Fachgruppe

At PROSE, we combine expertise, innovation, and independence to deliver world-class solutions within the field of railway technology. As a trusted partner in rolling stock engineering and railway consulting, we help manufacturers, operators, and authorities tackle their challenges, wherever they are in the world.

An independent, proven partner

We are a majority employee-owned company, which means we remain fully independent in our work, allowing us to focus entirely on creating value for our clients. With a team of over 150 dedicated professionals and a presence in Switzerland, Germany, Sweden, Italy, France, and Austria, we're committed to shaping tomorrow's mobility.

9 offices in 6 countries, more than 120 employees, 5'000 projects worldwide

Established in 1982 and with 5'000+ successful projects, we have earned our place as a trusted partner in delivering cutting-edge mobility solutions worldwide.