Mobility4EU – Action Plan for the Future of Mobility in Europe

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Abstract

Global socio-economic and environmental megatrends are urging for a paradigm shift in mobility and transport. An action plan for the coherent implementation of innovative transport and mobility solutions in Europe is thus urgently needed and should be sustained by a wide range of societal stakeholders. The MOBILITY4EU project is working on developing such an action plan considering all modes of transport of passengers and freight. This contribution details the methodology and the results on trends, solutions and opportunities for cross-modal and cross-sector collaboration. The initiative towards a European Transport and Mobility Forum that continues the work beyond the project duration and works on complementing the action plan is introduced.

Keywords: multimodality, user-centric transport, passenger transport, freight transport, societal drivers

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1. Introduction

Global socio-economic and environmental megatrends are posing new challenges and demands on mobility in Europe. Novel technologies and services for passenger and freight transport provide opportunities to answer these. However, in order to become disruptive and change behaviour, these solutions have to make most efficient use of all modes and they need to be tailored to the needs of users. Thus, user centric design concepts and a focus on interfaces between modes have to be employed. Collaborations and exchange are needed across a diverse stakeholder group from various sectors and perspectives to develop efficient solutions and tap the full potential of new opportunities. Last not least, users have to be directly involved in a bottom-up approach.

Mobility4EU is a Coordination and Support Action funded by the European Commission that started in January 2016 and lasts for 3 years. The project is working on delivering a vision for a user-centred and cross-modal European transport system in 2030 and an action plan including a roadmap to implement that vision. Recommendations for tangible measures in research, innovation and implementation targeted towards various stakeholder groups are being derived. Furthermore, a European Transport and Mobility Forum is being initiated in order to enrich and sustain the work of the Mobility4EU project. This forum intends to bring together stakeholders from supply and demand side in passenger and freight transport to discuss and collaborate on topics of cross-modal and user-centred transport.

The consortium of Mobility4EU consists of 19 partners from 11 countries. They represent industry, academia, cities and users and bring in experts for transport of passengers and freight in all t modes, universal design, passengers' needs, environmental and legal aspects. As many of them are key members of European associations and technology platforms working on transport and mobility issues or the relevant societal drivers, the actions recommended by the project can easily be leveraged. During the course of the project a number of further stakeholders from demand and supply sides of passenger and freight transport have actively contributed to the work, thus broadening the expertise of the consortium.

In the following the methodology towards the action plan as well as results achieved so far within the study of trends and solutions are described in detail. Conclusions show how the European Transport and Mobility Forum can support the transformation towards a user-centered and cross-modal transport system.

2. Working towards an action plan for the future of mobility in Europe

The process of editing the action plan for the future of mobility in Europe is structured along distinct steps starting with studying trends and options for solutions, via developing a vision and finally leading to the action plan including a roadmap. It is taking a participatory approach that aims to engage a broad stakeholder community into the consultation processes. This is achieved by employing a structured tool, the Multi-Actor Multi-Criteria Analysis (MAMCA), and an accompanying storymap that supports the process in a more creative and interactive way. While the MAMCA is described in detail elsewhere (Macharis, 2009; Mobility4EU, 2016a), the focus here will lie on the storymap and its contribution within the generation of the action plan. So-called storymaps (Sibbet 2012) are a rather comprehensive approach of graphic visualisation in the context of strategy development. Large murals or a series of posters are created that represent e.g. the history of a problem, challenges and opportunities, individual values and expectation. Typically, it contains a context map, a commonly drawn picture of the future vision and a roadmap describing the action plan for achieving that vision. This approach supports the alignment of goals in a participatory manner. The path along the different stages of the storymap towards the action plan in the case of the project Mobility4EU, namely the context map, the opportunity map, the vision and action plan, is shown in (Fig. 1) and explained in the following paragraphs.

The work towards the action plan is based on the identification and assessment of societal challenges, requirements and needs that will influence future transport demand and supply. Within an interactive workshop with stakeholders from all fields of transport and mobility, stakeholder expectations, economic and political factors and technologies as well as uncertainties and finally overall trends have been identified that together influence the developments towards transport in 2030. Thus, during the discussions the trends shaping the future European transport system have been set into context which was visually recorded within the context map. In the second step, together with European experts from all fields in transport of passengers and freight, promising and innovative solutions and concepts that are either in research stage or have recently been implemented but did not reach wide deployment yet have been gathered. This portfolio of solutions is visualized within the opportunity map that links solutions to user needs that themselves can be linked back to the initially defined trends impacting mobility.

The solutions gathered within the opportunity map have been the foundation for building scenarios for the development of future transport in Europe using the Multi-Actor Multi-Criteria Analysis (MAMCA). Within this ongoing process of a structured stakeholder consultation, the scenarios and the included solutions are being ranked by a broad stakeholder community coming from all fields of transport. A further prioritization of solutions is done through an adapted Failure Modes and Effects Analysis (FMEA). The solutions coming out of these rankings will be taken into a creative process of vision building that is undertaken again together with stakeholders from all fields of transport. This leads to the Vision for Transport in Europe in 2030 which concentrates on interactions, combinations and interfaces between prioritized solutions. Finally, an action plan to implement that vision will be drafted and put into a broad stakeholder consultation. The final action plan will recommend what needs to be done in research, innovation, and implementation both in technical and non-technical domains in order to achieve the vision. The action plan will focus on links between modes, opportunities for collaboration and knowledge transfer. It will furthermore emphasize strategies that will enable the development of a user-centric transport system. Moreover, it will promote consensus building and dissemination of good practices.
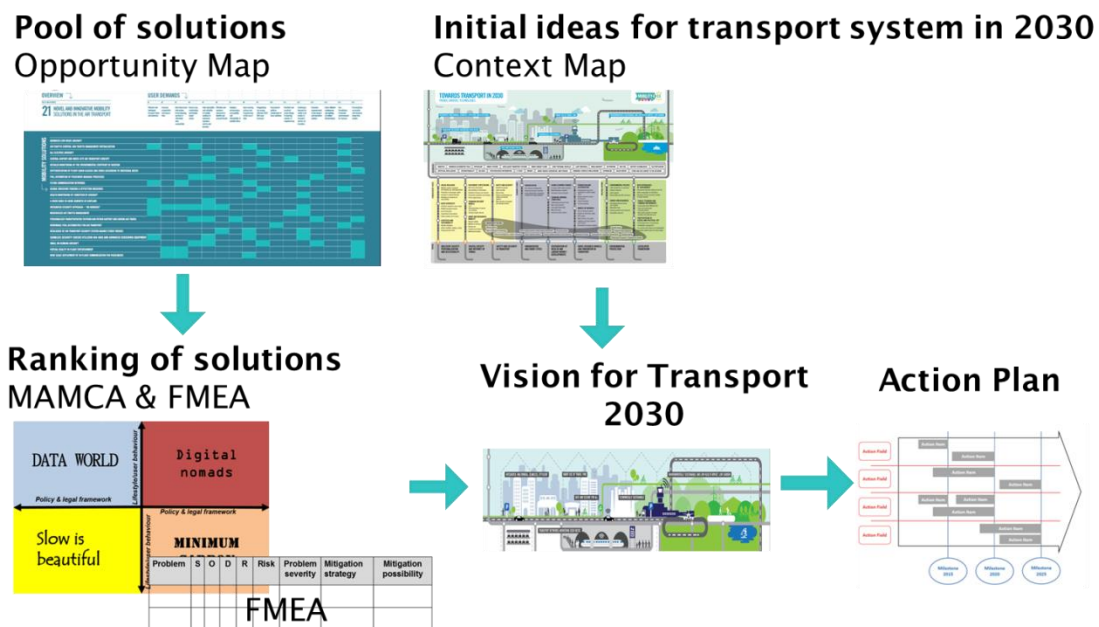

Fig. 1 Mobility4EU process towards vision and action plan for transport in 2030. Focus is here on the storymap that entails the context map, the opportunity map, vision and action plan.

3. Trends and user needs impacting transport in Europe in 2030

The work towards the vision and action plan for the future of transport in Europe in 2030 is based on the identification and assessment of societal challenges and trends that will influence future transport demand and

supply. They were used as a starting point to represent the Mobility4EU context map (Mobility4EU 2016b) that builds one part of the story mapping process. The research on trends and their impact on mobility allowed the definition of user needs setting the requirements in mobility and transport in Europe in 2030. Within this chapter results on trends and user needs are being given.

3.1. Trends

The work of the first phase in the project was to identify trends and drivers that impact transport and mobility in Europe in 2030. Through desk research, expert interviews and a workshop "Societal requirements and challenges for transport" (Mobility4EU, 2016c) with stakeholders from transport of passengers and freight, social, political, economic and technology aspects as well as developments in legal frameworks have been taken into account. The identified trends were investigated regarding their impact on transport of passengers and freight and across modes and markets. This lead within the first phase of the project to the formulation of nine major trends that again divide into all together 29 sub-trends (Mobility4EU, 2016d). The nine major trends cover:

1. Distribution of wealth and labour market developments
2. Inclusive society, personalization, accessibility
3. Urbanization and smart cities
4. Environmental protection
5. Digital society and internet of things
6. Novel business models and innovation in transport
7. Safety in transport
8. Security in transport
9. Legislative framework

These trends are complex and interact with each other. Strong links can be found between societal dynamics and policies supporting or trying to correct them. Further interdependencies exist between societal trends and digital technologies as well as between automation, safety and security.

3.2. User needs

The research on trends and their impact on mobility have been the foundation for formulating user needs. Further input for user needs formulation was gathered at the structured participative discussions with stakeholders within the first Mobility4EU workshop that dealt with trends and led to the compilation of the context map (Mobility4EU, 2016b). There, among other issues, stakeholder needs have been interactively collected. Also, the collection of stakeholder objectives which is one of the first steps within the Multi-Actor Multi-Criteria Analysis (MAMCA) contributed to the derivation of user needs as they are presented in the following. Finally, the results of similar research within other European projects such as FUTRE or METRIC as well as in Mind-Sets have been investigated.

Within Mobility4EU the term "user" includes end users as well as transport operators and service providers or public authorities, cities governments etc. The aims of users are developed by individual or segmental attitudes and their interrelation with trends. User demand in the case here is not equated with product or service functionality. Users may be demanding freedom of choice of a transport mode, whereas the translated product solution could be for example Mobility as a Service. 15 user needs have been formulated for the transport of passengers and freight in all transport modes. The analyzed user needs are rather complex, but have been formulated on a higher level with as little overlap between each other as possible without losing important aspects by reducing complexity. These 15 user needs are (Mobility4EU 2017a, Mobility4EU 2017b):

1. Efficient and intelligently managed transport flows and cross-border networks
2. Enable meaningful spending of travel time
3. Real-time travel information and travel planning services including cross-border & affordable data connectivity
4. Easy-to-use, comfortable, and flexible travel
5. Inter-operability and reliability of mobility solutions & enhanced seamless end-to-end-journeys
6. Effective and seamless measures to identify and prevent threats
7. Statutory inclusiveness, accessibility and affordability of mobility offers especially targeting vulnerable to exclusion groups
8. Data security, privacy and transparency of the use of data

9. Transport protecting climate, environment and health
10. Support for local solutions through transparent, democratic, participative planning
11. Resilient urban design supporting active modes and reducing travel demand
12. Higher safety in freight and passenger transport in all modes
13. Economic empowerment of new players and innovation systems
14. (Cost-) efficient maintenance and upgrade of resilient infrastructures
15. Personalized mobility offers and (shared) ownership models

4. The portfolio of solutions and opportunity map

The user needs as introduced above have to be satisfied by specific user-centric implementations of solutions. Hence, in the next step, a portfolio of transport and mobility solutions that have the potential to respond to these user needs has been compiled. The focus hereby lies on solutions that are either in research or concept state or have just been recently implemented but did not yet reach wide deployment. The solutions have been collected through the input of experts and additional desk research. Many solutions were gathered within the second interactive workshop of the project, the "Workshop on Novel and Innovative Mobility Solutions" (Mobility4EU, 2016e). The solutions concern all modes of transport of passenger and freight. Also walking and biking are included as active modes. The links from the solutions to the user demands they satisfy are visualized within an opportunity map (Mobility4EU, 2017a). This opportunity map composes the second step of the storymap process after the context map.

Many technologies or concepts can be found across several transport modes but with specified applications within the individual modes. This is the case for, e.g. game changers in materials, technologies for emission reduction, electrification and efficiency in propulsion systems, solutions and concepts for low noise (waves/vibrations) in transport vehicles and aspects of modular design. Furthermore, across all modes solutions employing IoT, smart systems, big data and automation are exploited to reach higher safety and security, enable predictive maintenance or smart traffic management and forecasting, support efficiency, comfort and personalization of transport offers as well as accessibility and inclusiveness. Sharing services as well as novel business models enabling on-demand services and multimodality are needed in all modes and especially enabling seamless interfaces between modes. Naturally, the transport of freight and urban transport of passengers calls for multimodal solutions enabling modal shifts and supported and enabled by Mobility/Logistics-as-a-service concepts. Especially in the urban context additional novel solutions as e.g. co-creation, gamification and measures facilitating active modes will be needed to transform today's transport systems.

Several conclusions can be drawn from the portfolio of solutions and especially from the visualization within the opportunity map. It shows for instance where cross-modal collaboration is either a strong enabler or if there are high potential benefits from cross-modal cooperation. In these cases interoperability, standardization or technology transfer across modes may be key to deliver efficient implementation and provide additional benefits and synergies. This applies to all issues of enabling and intelligently managing flows of passengers and freight but also data across modes or across borders. Also solutions concerning safety, security, but also personalized mobility offers and shared models strongly rely on similar technologies and concepts that potentially can be advanced faster and implemented through technology and knowledge transfer between modes. Technology transfer is further especially relevant for technologies listed above which are worked on within the individual transport modes for specific applications. Moreover, many of the technologies in the solutions serving user needs mentioned above are also dependent on players from outside the traditional transport sector, as e.g. IoT, automation, big data, which calls for a broader cooperation strategy. The need for outreach to policy makers or a strong urban focus calls for collaboration across modes, beyond the transport sector and also to local, regional planners and policy makers. This concerns many of the user needs mentioned above and also resilient urban design. Since data flows across and beyond transport sectors, data security, privacy and transparency can only be implemented in cooperation between transport industry sectors and even beyond. Most importantly the inclusion of not only end-users of passenger and freight transport, but also cities, service providers etc. is important in order to design new products and services that answer actual needs. Initiatives in this context make it ever clearer that to tap the full potential of transport innovations employing universal design is a prerequisite. To fulfill this, again collaboration with users is required but also expertise from social sciences and humanities can be brought in beneficially.

5. Conclusions

So far, Mobility4EU has made great advances towards the compilation of an action plan for transport in Europe in 2030 together with all relevant and especially societal stakeholders. Trends and user needs and other factors impacting transport in Europe in 2030 have been compiled and visualized within the context map. Solutions have been gathered and their link to user needs and thus a reference to the study on trends has been compiled within the opportunity map. Opportunities for cross-modal collaboration, technology and knowledge transfer and cooperation with stakeholders from outside the transport sector as well as societal stakeholders have been identified. The next step will be to co-create a vision for transport tin Europe in 2030 based on this knowledge and finally to develop the action plan to implement this vision. The process of action plan development will support the advancement towards a user-centered cross-modal European transport system by bringing together the relevant stakeholders from R&D&I with representatives of users. Furthermore, the structured democratic and participative stakeholder dialogue that is being established will foster the collaboration and cooperation between the stakeholders from the individual modes. Therefore, the results of the Mobility4EU project can be expected to complement the industry and academia-driven roadmaps of the European Technology Platforms and the Strategic Transport Research and Innovation Agenda of the European Commission from a user-centred perspective.

With more revolutionary innovation being imminent in the transport modes and at the transitions points between them, close cooperation of private and public sectors should further grow, and the participation of users should be considered already at the start of the design phase of new solutions. Therefore, it is high time for a European Transport and Mobility Forum that brings together users and industry for the development of new mobility solutions. Such an initiative is being worked on within the project Mobility4EU. The European Transport and Mobility Forum is envisioned to become an alliance that helps identifying, designing and implementing disruptive mobility solutions in synergetic ways and in participatory processes taking into account innovation potentials and user perspectives from the start. It will establish cross-modal links between transport modes for passengers and freight, integrate user representatives into the network and include their perspectives into all transport aspects. It shall involve stakeholders beyond transport and sustain the work of Mobility4EU beyond its duration. This forum shall continue the activities of the project and start by defining next steps and activities to implement the action plan.

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