Focus of this Publication

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Abstract

With this book we start a multi-dimensional journey from socio-ecological to socio-economic aspects of mobility overall and in selected areas. Mobility by nature projects into other areas of life through a conscious, creative and sometimes unexpected use of information technology and digital accomplishments. Here we focus on functional, economic, and societal aspects. Legal aspects are being considered selectively in some usage scenarios, for example in the field of autonomous driving. This book serves practitioners by introducing initiatives and usage scenarios, checklists and how-tos in order to manage and deploy Smart Mobility. The Smart Mobility Procedure Model guides and informs from distinct entry points and maturity levels. The so-called Building Blocks of Intelligent Mobility (BIM) serve as a blueprint and cover strategic, project related, and innovation triggered activities.

"You can take a watch apart and analyze its parts, but they won't tell you the time of day."
(Ken Wilber)

Focus With this book we start a multi-dimensional journey from socio-ecological to socio-economic aspects of mobility overall and dive deeply into selected areas. Mobility by nature projects into other areas of life through a conscious, creative, and sometimes unexpected use of Information Technology (IT) and digital accomplishments. Here we focus on functional, economic, and societal aspects of mobility. Legal aspects are considered in a few selected usage scenarios, for example autonomous driving.

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B. Flügge (ed.), *Smart Mobility – Connecting Everyone*,
DOI 10.1007/978-3-658-15622-0_6

The authors introduce usage scenarios, the applicability of technological, creative, and network theory adjacent methods and building blocks that are applicable to governmental and business stakeholders. The book hopefully inspires initiative leaders and forward thinkers, public and private organizations. We address this book to all those that are situated in other than the introduced or exemplified geographies with distinct condition frameworks that seek to foster the benefits of Smart Mobility and aim to gather ideas and a suggest a procedure model. Our journey starts with an outlook into the year 2050.

In the Year 2050 How does the year 2050 look like? An estimate by the United Nations [87] predicts that 70 % of the world's population will live in mega cities and the remaining 30 % in rural areas by 2050. Transport volume is projected to increase by 80 % and individual transport volume by 51 %. Those latter estimated numbers are based on the actual numbers from the year 2005.

Mobility is already at present an accelerator for economic wealth and growth. Not all of the mobility needs can be provisioned in a digital format or transformed, for example, into a 3D printed spare part. Human beings expect more and more to accomplish in their professional and learning curves. They also commit to and pursue more activities in their private lives whether family and/or interest driven. With mobility as a critical success factor, non-mobility turns into a slowdown and disadvantage. Hence, mobility evolves into a luxury good which access and usage could turn into a limiting factor once public and private service providers are unable to meet the right to mobility for everyone. Ultimately, mobility turns into a prerequisite that once it is achieved, hence deployed, it allows the individual to ask for more, acting and pursuing further activities. There might be an argument that mobility fits into *Maslow*'s *hierarchy of needs* [88]. We see mobility highly ranked, in the grounding of human aspirations, the physiological level!

Unanswered needs often result in uncertainty and a greater effort to identify opportunities. As depicted in Fig. 6.1, the time span left between now and 2050 asks us to act against a growing field of uncertainty. We identify three key areas of uncertainty. Firstly, there are unpublished efforts in assets and infrastructure maintenance and rebuild. Numbers so far are being calculated in an isolated manner, for example by urban planning departments or government transport departments responsible for road planning and highway connections. Secondly, there are unknown and uncalculated efforts on how to estimate mobility and other daily business demands in rural areas. Thirdly, there could be an additional effort caused by the shift of duties, for example when you think about the logistics related efforts that turn into infrastructure efforts, or when you think about the construction maintenance and rebuild that will be handed over to facility management. As long as we look at these individual elements in an isolated manner, these elements that are a key factor of Smart Mobility design, then any area whether a city or other hubs such as seaports and airports, will suffer.

Without the appropriate measures, uncalculated and non-calculable efforts in conjunction with asset and infrastructure maintenance and renewal augment. The public sector and politicians will be faced with questions concerning mobility management and demand fulfillment.

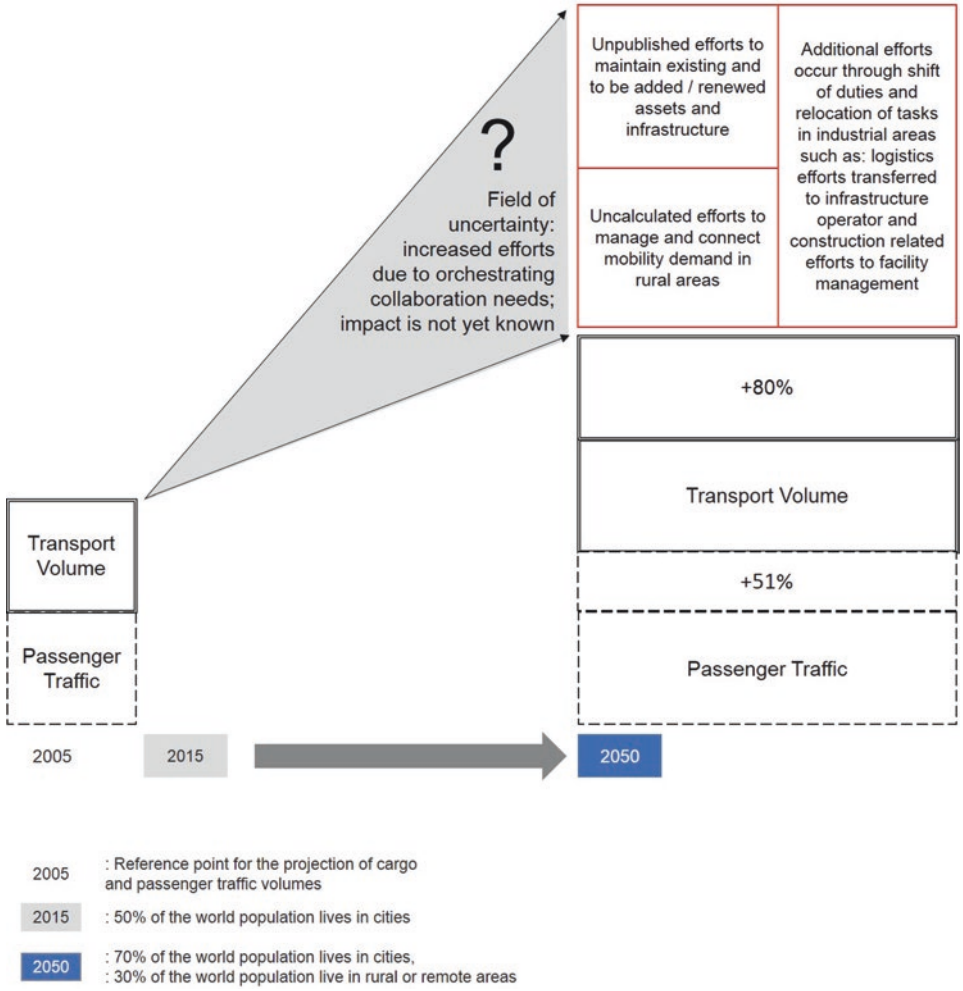

Fig. 6.1 Mobility in the year 2050 – the field of uncertainty

Carriers and the retail industry will start considering de-listing rural areas due to low-if-existing business rationale and margins. Furthermore, positive events such as concerts and sport events generate additional mobility management efforts and could turn into traffic related bottlenecks. The same applies to negative events that, for example, ask for the evacuation of a subway platform or an airport caused by a technical defect.

Elsewhere we encounter discussions about competences and responsibilities and to-be-expected, unexpected, or unnecessary re-assignments of competences to another department. Structural transitions are reasonable once the decision making process takes place in a fact driven, transparent, and outcome oriented manner. We observe, for example, structural transitions in industrial assignments. Who is retailer and who is wholesaler? Are those companies that serve as postal providers not per se insiders into mobility

management needs? Organizations expand, change, and shift their activities and leave their industrial home turf more and more:

- German Post turning into an automotive company by acquiring Streetscooter, an electric vehicle manufacturer [89]
- Airport operators turning into event organizers, shopping mall operators and city planners [90].

From an entrepreneurial point of view a smooth transitioning from product to service, from industry A to industry B, goes hand in hand with considering holistic concepts to address as many distinct personae as possible.

In contrast, those transitions that cannot be followed due to a lack of transparency or information generate uncertainty. In the public sector, uncertainty allows constituents to get a voice in case public interests arise due to protest movements, media reports, and news updates. For example, the case of Stuttgart21 and the discussion about turning the upper ground central station into an underground station complex in a geological ambitious terrain. Or tearing down an entire city district and transitioning the constituents into a new, suburban, and more remote area. In the latter example, the centrally located city district is a target for real estate businesses to serve as upscale investment hubs and resulted in increased housing and condominium prices.

Once we accept that the functional and network elements of an ecosystems, its energy, production, nutrition, and fulfillment flows, and the connectedness of the population, are applicable to any city, region, or an event, both participation and collaboration turn into two crucial sponsors for any habitat, any ecosystem: to foster an ecosystem continuity or to foster a new issue in case of a timely event, for example. We even go further with our hypothesis that any citizen is able to establish his assets as service provider – if he wants to do so. The *sharing economy* scales digitally and there are no limits in the digital ecosystem!

Both the public sector and its adjacent segments can only benefit from the *digital economy*. Offerings are doable with creativity, foresight, and innovative strength and safeguarded by the corresponding local governance framework:

- The Open Government Data Lab initiative of cities such as Boston [91] or Linz [92]
- The smartPORT initiative from Hamburg Port Authority [46]
- The Project "Z" of the automotive cluster Styria (ACStyria) to create a role model region for autonomous driving [93]
- The Round Table "Autonomous Driving" of the German Federal Ministry of Transport and Digital Infrastructure [94].

What are further opportunities that emerge from a holistic acting? As outlined in Fig. 6.2 constraints turn into opportunities such as:

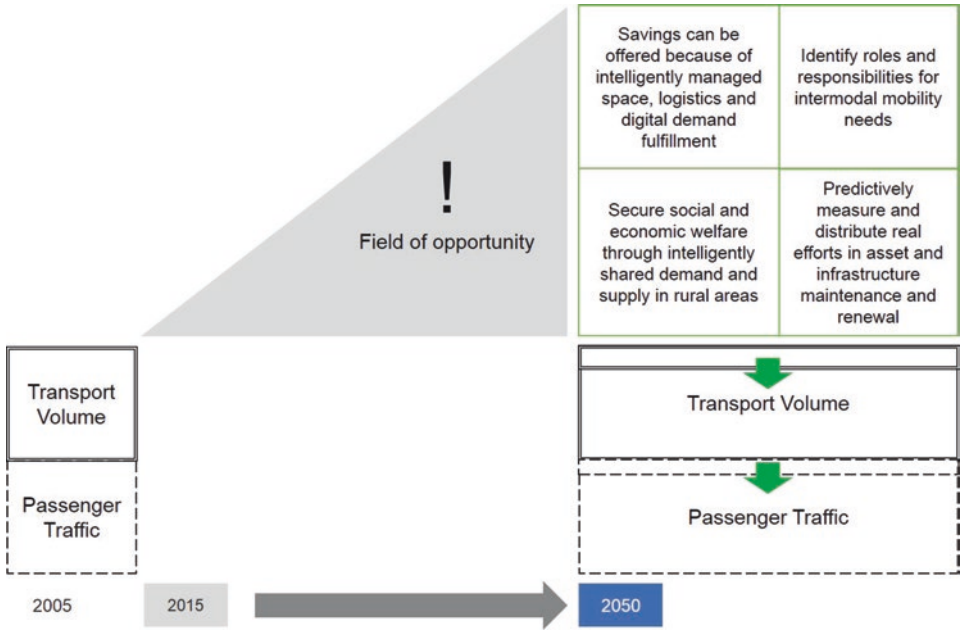

Fig. 6.2 Mobility in the year 2050 – projecting sustainable growth

- Savings through intelligent space management and predictive logistics and cross-organizational collaboration
- Shared cargo deliveries to ensure social and economic welfare in rural areas
- Establishing an innovative and modern role model for intermodal mobility management
- Shared assets and infrastructure following a shared service center approach.

In case you already imagine your very own fields of opportunities, please write them down! Here are some more inspirational examples:

- Imagine that we were able to predict the savings that could be offered because we transformed the physical demand fulfillment into a digital format. Because we used our catalogue of KPIs to measure a city's transportation capabilities and even more compared the outcome with other locations.
- Imagine that we identified the roles and responsibilities for intermodal transport needs and aligned the stakeholders with each other. Imagine that we deliver the blueprint of a zero traffic city, meanwhile ensuring the transport of goods and services in a timely manner.
- Imagine that the field of opportunity is digitally managed to save time and money for physical and semi-automatic business processing amongst organizations. Imagine that it is your account that co-designs and deploys an innovative, creative concept for sustainable growth in the areas they operate, produce, manufacture, deliver, and reside in.

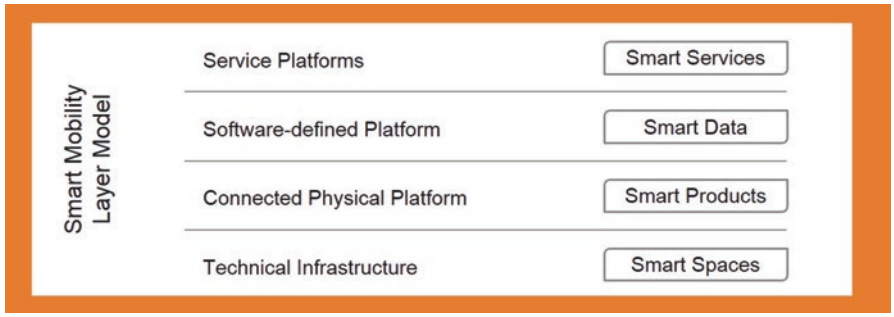

Fig. 6.3 Structural overview of the Smart Service World (With kind approval © acatech 2015)

Turning your focus to the realization of Smart Mobility, we now outline the structure of the following parts and chapters.

Realizing Smart Mobility In Part II we introduce a variety of usage scenarios. Some of them are fictitious, others real examples and deployments. The fictitious ones will have a short shelf life as enterprises and government leaders are already on the move. Part III depicts also the fields of seamless navigation, smart ticketing, and mobility diagnostics.

Part III introduces the *Building blocks for Intelligent Mobility* (*BIM*), see Chap. 12. The Smart Service World from acatech [95] serves here as a structural foundation with its four layers: Smart Services, Smart Data, Smart Products, and Smart Spaces, see Fig. 6.3.

The *Smart Mobility Procedure Model* we introduce serves as motivator and coach along your very own mobility initiative. Regardless your starting point, the procedure model guides you through the key tasks and activities. The *Smart Mobility Reference Architecture* gives input and insights for colleagues from the IT and product management departments.

Part IV outlines recommendations and introduces areas of transformation opportunities in a practical manner. New roles and responsibilities demonstrate how a holistic mobility management could look like. The service paradigm and innovative offerings provide a further subject as well as a deep dive into maturity assessments.

The book concludes with a summary, followed by a glossary and references.