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## Future mobility insights: a trend receiver approach

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**Abstract.** The mobility sector is changing due to its negative consequences and companies' reactions thereupon. New mobility solutions enter the market quickly, while it is uncertain where the shift in the industry will lead. Thus, companies ought to understand people's future mobility needs to successfully adjust their innovations accordingly. This study examines customers' insights into future mobility via trend receiver interviews in Europe, the United States and China. Findings reveal that some companies' current strategies align with future customers' mobility expectations, while other innovations may be under- or overestimated. These insights are of value for automobile manufacturers, marketing managers as well as for governments and city planners to positively influence the mobility future of mobility.

**Keywords.** future mobility, trend receiver, customer insight, autonomous vehicles.

### 1. Introduction

The large-scale introduction of cars was one of the decisive changes in the 20th century (Geels, 2012). The car's development resulted in an increased quality of life for many, becoming a status symbol itself (Urry, 2004). Yet, the introduction of cars is also associated with disadvantages. Consequently, mobility companies began to reconsider their business models and the mobility industry is experiencing a shift. The question arising is how customers expect mobility of the future in order for companies to adapt their innovation processes accordingly.

The paper is structured as follows: the next part identifies reasons for the shifting mobility sector and demonstrates current companies' solutions. Hereafter, the topic is put into a theoretical context, followed by an explanation of the applied method. Subsequently, a result section explores the research questions, which are evaluated in more detail in the discussion section. Lastly, the study's limitations are presented.

### 2. The Shifting Mobility Sector

There are several negative consequences of the mass use of cars, causing the current shift in the mobility sector. Firstly, the global political and financial situation is putting pressure on economies, including the mobility industry (Strauss, 2019). However, these factors, will not be

considered in this study, as they are not customer-driven. Secondly, mass car adoption results in road congestion in many regions. Consequences include time loss, car crashes and high stress levels of the involved (Dixon et al., 2019; WHO, 2018). For instance, an average car commute in the USA lasts 27 minutes, corresponding to 225 hours per year (USCB, 2018). Further, traffic jam is associated with negative economic consequences, as time spent in traffic cannot be used otherwise. Thirdly, the car sector is a major contributor to climate change. It emits large amounts of fine dust and CO<sub>2</sub> and represents 9% of global greenhouse gas emissions (United Nations, 2017; Stephan, Lee and Kim, 2019). Fourthly, there are further ecological factors such as noise pollution, land use and biodiversity loss, to only name a few. Overall, these factors are related to costs of respective countries and harm the environment and society (van Essen et al., 2011). Additionally, urbanisation, i.e. people moving from rural to urban areas, has been intensifying for the last decades. Until 2050, ca. 68% of humans will live in cities (United Nations, 2018). While urbanisation has various benefits and downsides, one of the latter is concerned with growing population density, resulting in an intensification of aforementioned factors (Dixon et al., 2019; Pojani and Stead, 2015).

People are becoming more aware of drawbacks of individual car mobility and have begun to reconsider their mobility patterns. There is a shift in people's mindset towards more thoughtful and sustainable mobility behaviour (Sheth et al., 2011; White et al., 2019). This shift is fostering the development of the *sharing economy*, creating new business models based on sharing instead of owning. According to Belk (2014), shared business models depend on the Internet and provide temporary access to consuming goods without possessing them. Industries using sharing models include the finance, music, clothes and hotel industry, among others (Puschmann and Alt, 2016). The *sharing economy* also provides new opportunities in the mobility sector, as one shared vehicle can meet multiple customers' needs (Belk, 2009; 2014). Thus, mobility companies are adapting their business models to shifting customers' mobility patterns. Technology advances facilitate this adaptation, which will be reinforced by the fifth generation (5G) of cellular network technology (Cohen and Kietzmann, 2014; Heineke et al., 2019).

Some companies' responses to negative consequences of individual car mobility already exist today in the form of new mobility solutions, usually introduced by automotive or technological companies (Hanley et al., 2013). These solutions base on new technologies and many benefit from the advantages of the *sharing economy* (Cassetta et al., 2017). Firstly, some new mobility solutions use cars as means of transportation and provide carpooling (one driver picking up several people to share a ride to same or close-by destination/s) or carsharing (people sharing the same car, either privately or commercially via sharing-platforms) options (Bardhi and Eckhardt, 2012). Moreover, fully autonomous vehicles (AVs) are currently being developed and will enter the market at some point in the future. They will either be used individually or via ridesharing/carsharing offers (Kässer et al., 2019). Today, most car-based models run on internal combustion or electric engines, with a long-term perspective to multiply the share of the latter (Mounce and Nelson, 2019). Secondly, further new mobility solutions rely on e.g. scooters and bicycles, so-called micro mobility solutions, which usually function electrically on shared models (Schellong et al., 2019). Thirdly, investments in mobility solutions include the enhancement of public transport. This encompasses faster trains and buses, tighter timings, additional stops and more efficient routing (Loxton, O'Connor and Salman, 2019). In contrast to these responds, some authors criticise that mobility companies are not adapting fast enough to the mobility shift and the relevance of their business models

will stagnate (Collie et al., 2019). The adaptation is thus also reinforced by governments, demanding and fostering a more sustainable mobility industry (Docherty, Marsden and Anable, 2018).

Overall, many authors assert that new mobility solutions are advantageous for society and the environment, concluding their development should be intensified in the future (De Souza et al., 2019). In contrast, other studies reveal their downsides: according to Ke, Chai and Cheng (2019), there may be too few carsharing options available for people to restrain from using private cars. Regarding micro mobility, authors argue that it is a burden for pedestrians and impairs the cityscape (Schellong et al., 2019). Additionally, improving public transport can be problematic as constructions are often outpaced by population growth (PTUA, 2018). In general, mobility solutions launch in short intervals and customers regularly face new options. Many companies are pressured to adjust their business models by a fear of losing customers in the future. Yet, it is unclear where the shift in the mobility industry is leading to. Companies wonder if current mobility developments are still going to meet customers' needs in the future (Collie et al., 2019).

Using customer insights for creating new innovations has been widely examined in innovation research. Studies show that processing customer-based knowledge influences companies' innovation capabilities (Holmström and Roberts, 1998). Cohen and Levinthal (1990) establish the construct *absorptive capacity* as an organisation's competence to influence the ability to innovate and be competitive. This ability requires identifying new external knowledge, assimilating it and using it profitably. Moreover, the construct *open innovation* introduced by Chesbrough (2003) suggests opening innovation processes towards external stakeholders such as customers or partners to use their knowledge for maximising innovation potentials. Further innovation research includes consulting lead users (von Hippel, 1986). According to the author, lead users are people whose needs anticipate mass market needs and who expect high benefits from problem solving. Thus, asking lead users for their opinion may be profitable for companies' innovations, as their opinions are transferable to mass markets (Baldwin, Hienerth and von Hippel 2006). Although these constructs are not new, they are still relevant today due to fast changing environments. As claimed by Foss, Laursen and Pedersen (2011), companies require close relationships with customers to gain insights into their needs. Nowadays, though, customer bases change faster and current customers may not inevitably be future customers. Hence, while mobility companies might know what their customers expect within a short-term period of *two* years, they may not know what is needed within a long-term period of *ten* years and more. The research questions (RQs) this study aims to explore read as follows:

RQ1: How do customers expect future mobility within the next ten years?

RQ2: How can companies base their future offerings on customers' future expectations?

### **3. Method**

To answer the RQs, this study uses the construct of trend receivers (TRs) to generate knowledge into future customer insights. According to Hofmann (2014, p.10) TRs are people "who perceive changes and potentials of the new in a specific domain in a highly sensitive and differentiated way". Thus, in contrast to lead users, TRs can better understand changing environments and perceive potentials of the new in a certain area in a highly sensitive and differentiated way. TRs have a large global network and interests in many topic areas. Their characteristics differ from the profiles of an innovator and a multiplier. Rather, TRs' are

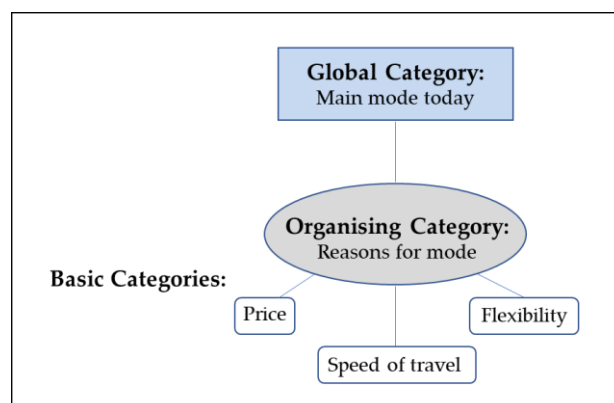
valuable for companies due to their visionary competence which is beneficial in managing immaterial assets such as changing customer expectations. Thus, based on TRs' future insights, companies may better prepare their long-term (product) strategy adjusted to customers' future needs and expectations (Hofmann, 2014).

In total, thirty TR interviews were conducted. Semi-structured interviews were applied to obtain explorative, subjective and comparative insights by offering standardised questions, allowing for flexible in-depth discussion of specific topics (Denzin and Lincoln, 2000). Overall, this study uses a subjectivist ontology and interpretivist epistemology. All TRs were acquired via pyramiding contacts. Pyramiding stands for systematically networking by recommendation from human to human until a person with desired characteristics is found (von Hippel, Franke and Prügl, 2006). Here, TR characteristics, as described above, were searched for. The face-to-face interviews took place in Europe (London, Munich, St. Gallen, Zurich), USA (New York, Boston) and China (Shanghai). The interviews took place in large cities in order to gain insights for urban environments, rather than rural areas. Thus, findings and implication only cover urban areas. Although the selection of countries could have allowed for an identification of cultural differences, this was not the aim of the study. Rather, similarities across these countries besides potential cultural differences were searched for. For every country, 10 TRs were chosen. TRs were both men and women aged 20 to 30 as this group of people may influence both their parent generation and their children's generation and is hence highly valuable for companies.

The duration of interviews ranged from 1:30 hours to 2:45 hours, while not all questions targeted the topic of future mobility. Some questions approached different topics (e.g. future working, cooking, shopping), but are not included in this study. All interviews were audio recorded and essential questions were transcribed verbatim. Interviewees were provided with informed consent forms and were able to withdraw from the interview at any time. Analysis was conducted in the form of coding to subdivide insights into Global Categories while identifying thematical patterns and create Organising and Basic Categories, based on the analytical tool for qualitative research by Attride-Stirling (2001).

#### 4. Results

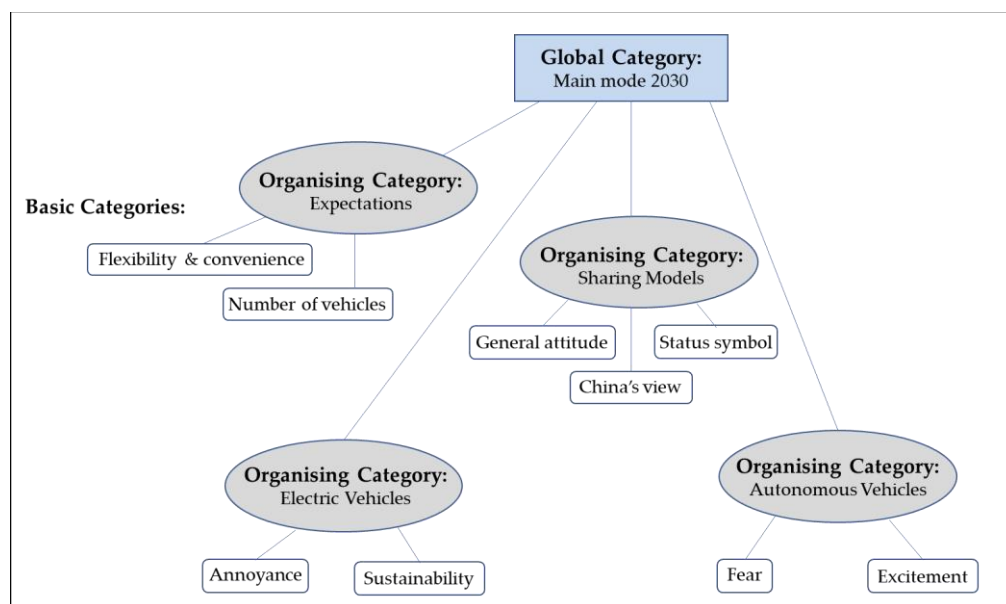
All interview findings are presented based on the established categories. Overall, there are two Global Categories with respective Organising and Basic Categories. Firstly, findings for Global Category 1 (Figure 1) with one Organising and three Basic Categories will be illustrated, followed by a demonstration of Global Category 2.



**Figure 1.** Global Category 1

Today, public transport is the main mode of transport for TRs due to diverse motivations. For some TRs it is the cheaper price, yet the more prevalent reason was the fact that public transport provides more flexibility and does not require searching for parking spaces. TRs travelling by car drive as public transport does not offer routes – or only routes taking much longer – to their desired destination. Thus, flexibility, speed of travel and pricing are main factors influencing TRs in their mobility behaviour. TRs from Europe also mentioned sustainability as a motive for using public transport as, in their view, busses and trains are eco-friendlier. TRs from USA were less concerned with sustainability and most TRs from China did not show any reservations at all. Their explanation was that if ecological mobility is not enforced by government, they will choose the most convenient mode of transport, no matter how sustainable. *“Anywhere I go [...] I can just take the subway. We have too many cars here, finding parking slots takes a long time and parking fees are quite high.”* (Male TR from Shanghai).

In the next step, TRs should imagine living in 2030. Figure 2 depicts the Global Category “Main mode 2030”, from which four Organising and nine Basic Categories emerged. When questioned how their ideal mobility environment would look like in 2030, TRs described that mobility has evolved and sharing rather than owning cars has become the norm. This shift was perceived positively and most TRs claimed that owning a car will no longer be a status symbol, or at least it is diminishing strongly.



**Figure 2.** Global Category 2

*“I think mobility is going to drastically change. [...] We will progressively move away from individuals owning cars to individuals being able to access them, use them whenever they want. [...] I think this is a great shift as it offers more flexibility for the user and also for society.”* (Male TR from Zurich).

As many of the interviewed TRs live close to the city centre where parking tickets are expensive, cars are not perceived as nice-to-have but rather as an unnecessary burden. New status symbols will be experiences (Europe) and material objects, e.g. purses and smart products (USA). As per Chinese TRs, cars will still be status symbols for poorer populations, otherwise it will rather be education and smartphones. *“[...] none of my friends own a car. It's just very*

*inconvenient here. I don't think it is a status symbol here in New York to own a car. It's more about which kind of bag you have.*" (Female TR from New York).

Main expectations TRs had of future mobility were even greater flexibility to increase convenience. More shared vehicles and higher public transport frequencies should enhance current offers to reduce searching or waiting times. Simultaneously, many TRs claimed they would appreciate having less vehicles on the roads to reduce congestion and noise pollution. When asked if they would carpool with strangers to reduce overall vehicles, most TRs agreed, provided the journey itself does not take longer. Generally, the faster a journey, the higher its perceived quality. *"Streets will be a lot quieter in the next 10 years, which I'm looking forward to. With hybrid cars and electric cars, I do believe that this will become the standard pretty quickly, I'm hoping I could see that."* (Female TR from London). *"Overall I prefer using my own Uber just because it is faster. It takes so much longer to go everywhere. If it took the same time, I wouldn't mind at all, though."* (Female TR from Boston).

Most TRs did not specify which mode of transport they choose in the future, but will use the most convenient, i.e. fastest, safest and cheapest option, including micro mobility. An exception was if something heavy needs to be transported. In this situation, TRs would consider booking a carsharing ride. Chinese TRs described how they will own a car once they have a family. Owning a car as a family is part of their culture and unlikely to change soon. Yet, many of these TRs were open for sharing a car with neighbours to reduce costs and congestion. *"If I have a family I would probably rent or share a car with another family. If my colleague lives near me we can very possibly have a shared car if it can fit 6-7 people in it. So, we can get from A to B without having to pay ridiculous amounts of money for parking, gas or electricity."* (Male TR from Shanghai).

Overall, the majority accepts paying higher prices if mobility options will improve and some TRs are willing to pay more for premium shared cars. According to them, *owning* will no longer be a status symbol but *driving* one will always be an enjoyment. It should be noted, though, that this group of TRs was rather exceptional in contrast to most TRs who consider cars solely as mobility objects. *"It will no longer be about selling cars individually, but more about how to get the most value out of people without selling a car [...]. There are always people who want to buy their cars individually, but that will be much less."* (Male TR from Munich).

Towards electric vehicles, TRs had an indecisive attitude. Although electric cars may be more sustainable in their eyes, they would not be willing to pay higher prices for them. Some TRs expressed annoyance over poor charging infrastructures and high prices, and thus electric propulsions were not mentioned in their ideal mobility environments in 2030.

Concerning AVs, all TRs were receptive but hesitant towards their use. Most TRs do not want to be early adopters of AVs but will use them once many people have experienced them positively. The rationale behind this assertion is lack of trust, which was stressed when asked if TRs' (future) children should use AVs to drive to school. This was denied by TRs as they would not want a machine to care for their children. Besides lack of trust, TRs had positive associations with AVs and are excited for them to enter the market. If asked what an ideal AV should look like, many TRs suggested several types of AV should be available on-demand to perfectly meet several needs (e.g. working, sleeping). *"I'm all for autonomous vehicles, I think it is a really fascinating and potentially exciting technological advancement [...]. It obviously has its own issues but for the most part I can see its potentials."* (Male TR from New York). *"I'm definitely not going to be the first one to jump in an AV. Right now, they're still very underdeveloped. They would have to pay me at least a million to sit in such a car right now."*

*But [...] once the technology is mature enough, I would love to try one of those and even start eating my breakfast in the car [...].” (Male TR from Shanghai).*

#### **4. Discussion and Implementation**

Results from global interviews revealed that, across countries, there were different expectations regarding future mobility, yet similar patterns could be identified. A desire for increased convenience was obvious among all TRs. In 2030, mobility solutions need to be more flexible, enabling people to move safely with minimised restrictions and delays. The current introduction of various sharing solutions is a positive development as most TRs do not mind sharing if convenience and speed are not impeded. This finding is in line with current developments in the *sharing economy* and a factor that future mobility could make greater use of. According to data, current offers are not adequate to meet (spontaneous) demands without having to wait and walk. Thus, it can be assumed that although mobility providers are already aiming for providing high levels of flexibility, this level is not yet adequate.

Mobility providers may consider further enlarging their sharing offers without impairing cityscapes, as roads should be less congested in the future. The challenge for these companies is therefore to find a *balance* between an adequate offer mobility options and fewer vehicles overall. One way to achieve this is to install more organised stands for all types of vehicles for easy access, a tidy cityscape and empty streets. For instance, instead of providing electric scooters all over the city with no fixed place to park them, which would result in them blocking the way for pedestrians, providers could set up dedicated places where the electric scooters could be collected and returned.

Moreover, interviews showed that privately owned vehicles will be far less common in 2030. Whilst this finding may not be new (e.g. Collie et al., 2019; Hensher, 2018), the extent of this shift is remarkable. Perceiving cars as an expensive burden and not as a status symbol – as interview revealed – creates a new need and thus new basis of selling strategy for carmakers. Current business models targeted at solely selling cars might need to be reconsidered faster and more diversely as previously expected. Carsharing options can be offered by carmakers in addition to selling them. Furthermore, carmakers may need to overthink their promotional strategy to target potential consumers’ convenience and flexibility rather than their emotions and alleged luxurious associations with cars.

Additionally, while mobility companies currently try to be eco-friendlier, data showed that customers are less concerned with sustainability than is expected by scholars and industries (e.g. Sheth et al., 2011; White et al., 2019). Reducing one’s ecological footprint should yet be a noteworthy competitive factor for companies, particularly if governmental pressure increases. However, it is decisive to notice that overall convenience will still be superior in the mind of customers in the future. Companies offering electric vehicles may consider alternative ways to increase sustainability – besides electric propulsions, which may be perceived negatively – may be one way to attract future customers. Thereby, companies may comply with environmental regulations and yet meet customers’ demand.

Regarding AVs, interviews demonstrated how TRs are fascinated by them albeit being anxious. The level of AVs’ novelty is high, resulting in their adoption depending on other people using them first. As barely any TR was open for trying them as soon as they are available, it can be assumed that population in general has reservations. Thus, for companies producing AVs, it will be crucial to find early adopters to quickly increase the share of people using them. A means of finding early adopters could be financial incentives for the use of AVs,

e.g. by paying testimonials or influencers for trying and reporting on them. Another option could be the provision of AV testing areas to facilitate people's familiarisation with them. The more people familiarise with and create an understanding for the technology of AVs, the less fear may they show towards them. AV providers should not assimilate customers' insecurity towards AVs as a barrier for inventing them, as overall theoretical acceptance towards them is very high among TRs. A crucial step towards their acceptance and use is reducing this uncertainty, though.

In sum, data showed that companies already adapting their business model have good prerequisites to manage the shifting mobility sector. Companies need to consider today what customers expect within ten years to successfully adjust mobility offerings. As per TRs, not all current developments are perceived as positively as assumed, while other factors may be underestimated. These findings are relevant not only for mobility companies, but also for governments and urban planners to prepare infrastructures for new mobility solutions.

## 5. Conclusion and Limitations

The aim of the study was to gain insights into customers' expectations regarding future mobility and how companies should adapt their offerings thereupon. These questions were answered by interviewing thirty TRs in Europe, USA and China. Findings revealed that some companies' current strategies are likely to meet future needs, such as introducing sharing solutions and thus encouraging more flexibility. However, some relevant factors may be over- and underestimated, for instance electric vehicles and insecurity towards AVs. As with all foresight methods, a limitation of this study involves the occurrence of unforeseen circumstances (war, natural disasters, etc.), affecting the validity of the findings. Another limitation is the disregard of TRs from emerging countries and from rural areas, which could be subject to future studies. Nonetheless, this study provides a basis of understanding for customers' expectations regarding future mobility, valuable for various stakeholders.

## References

- [1] J. ATTRIDE-STIRLING: Thematic Networks: An Analytic Tool for Qualitative Research. *Qualitative Research*, **1** (3), 385-405 (2001). <https://doi.org/10.1177/146879410100100307>
- [2] C. BALDWIN, C. HIENERTH, E. v. HIPPEL: How User Innovations Become Commercial Products: A Theoretical Investigation and Case Study. *Research Policy*, **35** (9) 1291-1313 (2006). <https://doi.org/10.1016/j.respol.2006.04.012>
- [3] F. BARDHI, G. M. ECKHARDT: Access-Based Consumption: The Case of Car Sharing. *Journal of Consumer Research*, **39** (4), 881-898 (2012). <https://doi.org/10.1086/666376>
- [4] R. BELK: Sharing. *Journal of Consumer Research*, **36** (5), 715-734 (2009). <https://doi.org/10.1086/612649>
- [5] R. BELK: You Are What You Can Access: Sharing and Collaborative Consumption Online. *Journal of Business Research*, **67** (8), 1595-1600 (2014). <https://doi.org/10.1016/j.jbusres.2013.10.001>
- [6] E. CASSETTA, A. MARRA, C. POZZI, P. ANTONELLI: Emerging Technological Trajectories and New Mobility Solutions. A Large-Scale Investigation on Transport-Related Innovative Start-Ups and Implications for Policy. *Transportation Research*

- Part A: Policy and Practice, **106**, 1-11 (2017)  
<https://doi.org/10.1016/j.tra.2017.09.009>
- [7] B. COHEN, J. KIETZMANN: Ride on! Mobility Business Models for the Sharing Economy. *Organization & Environment*, **27** (3), 279-296 (2014).  
<https://doi.org/10.1177/1086026614546199>
- [8] W. M. COHEN, D. A. LEVINTHAL: Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly*, **35** (1), 128-152 (1990).  
<https://www.jstor.org/stable/2393553>
- [9] B. COLLIE, J. v. WYCK, C. SCHAETZBERGER, K. MILLIKEN: An Automotive Downturn Is Coming - It's Time to Prepare. June, 2019. <https://www.bcg.com/de-de/publications/2019/automotive-downturn-coming-time-to-prepare.aspx>
- [10] J. DE SOUZA, A. d. MELLO, R. MARX: When is an Innovative Urban Mobility Business Model Sustainable? A Literature Review and Analysis. *Sustainability*, **11** (6), 1-18 (2019). <https://ideas.repec.org/a/gam/jsusta/v11y2019i6p1761-d216599.html>
- [11] N. K. DENZIN, Y. S. LINCOLN: Handbook of Qualitative Research, *ISBN-10: 0761915125* 2nd edition Thousand Oaks: Sage Publications, 2000.
- [12] S. DIXON, H. IRSHAD, D. M. PANKRATZ, J. BORNSTEIN, J: The 2019 Deloitte City Mobility Index, 2019. <https://www2.deloitte.com/us/en/insights/focus/future-of-mobility/deloitte-urban-mobility-index-for-cities.html>
- [13] A. FONTANA, J. FREY: The Interview: From Structured Questions to Negotiated Text, *ISBN-10: 0761915125* (Eds. N. K. Denzin and Y. S. Lincoln). Handbook of Qualitative Research, 2nd edition. Thousand Oaks: Sage Publications, 2000
- [14] N. J. FOSS, K. LAURSEN, T. PEDERSEN: Linking Customer Interaction and Innovation: The Mediating Role of New Organizational Practices. *Organization Science*, **22** (4), 980-999 (2011). <https://doi.org/10.1287/orsc.1100.0584>
- [15] W. F. GEELS: A Socio-Technical Analysis of Low-Carbon Transitions: Introducing the Multi-Level Perspective into Transport Studies. *Journal of Transport Geography*, **24**, 471-482. (2012). <https://doi.org/10.1016/j.jtrangeo.2012.01.021>
- [16] M. HANLEY, J. HENNING, A. VALSAN, R. BYRON: Eight Mega Trends Shaping the Light Vehicle Industry (2013)  
[https://www.ey.com/Publication/vwLUAssets/Eight\\_mega\\_trends\\_shaping\\_the\\_light\\_vehicle\\_industry/%24FILE/Eight\\_mega\\_trends\\_shaping\\_the\\_light\\_vehicle\\_industry.pdf](https://www.ey.com/Publication/vwLUAssets/Eight_mega_trends_shaping_the_light_vehicle_industry/%24FILE/Eight_mega_trends_shaping_the_light_vehicle_industry.pdf)
- [17] K. HEINEKE, A. MÉNARD, F. SÖDERGREN, M. WRULICH: Development in the Mobility Technology Ecosystem – How Can 5G Help? (2019)  
<https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/development-in-the-mobility-technology-ecosystem-how-can-5g-help>
- [18] D. A. HENSHER: Tackling Road Congestion—What Might it Look Like in the Future Under a Collaborative and Connected Mobility Model? *Transport Policy*, **66**, A1-A8 (2018). <https://doi.org/10.1016/j.tranpol.2018.02.007>
- [19] R. HOFMANN: Visionary Competence for Long-Term Development of Brands, Products, and Services: The Trend Receiver Concept and its First Applications at Audi. *Technological Forecasting and Social Change*, **101**, 83-98 (2014).  
<https://doi.org/10.1016/j.techfore.2014.06.005>
- [20] B. HOLMSTROM, J. ROBERTS: The Boundaries of the Firm Revisited. *Journal of Economic Perspectives*, **12** (4), 73-9 (1998).

- <https://www.aeaweb.org/articles?id=10.1257/jep.12.4.73>
- [21] M. KÄSSER, F. KLEY, T. MÖLLER, P. SCHAUFUSS, A. TSCHIESNER: How Automakers Can Master New Mobility (2019). <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/how-automakers-can-master-new-mobility>
- [22] H. KE, S. CHAI, R. CHENG, R: Selling or Sharing: Business Model Selection Problem for an Automobile Manufacturer with Uncertain Information. *Journal of Intelligent & Fuzzy Systems*, **36** (1), 609-624 (2019). <https://content.iospress.com/articles/journal-of-intelligent-and-fuzzy-systems/ifs18961>
- [23] E. LOXTON, D. O'CONNOR, N. SALMAN: Declining Bus Ridership: Improving the Efficiency of Transit Networks. (2019) <https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/declining-bus-ridership-improving-the-efficiency-of-transit-networks>
- [24] D. POJANI, D. STEAD: Sustainable Urban Transport in the Developing World: Beyond Megacities. *Sustainability*, **7** (6), 7784-7805 (2015). <https://doi.org/10.3390/su7067784>
- [25] PTUA PUBLIC TRANSPORT USERS ASSOCIATION: Stories of Growth Population, Transport and Melbourne's Future. (2018) [https://www.ptua.org.au/files/2018/PTUA\\_201811\\_Stories\\_Of\\_Growth.pdf](https://www.ptua.org.au/files/2018/PTUA_201811_Stories_Of_Growth.pdf)
- [26] D. SCHELLONG, P. SADEK, C. SCHAETZBERGER, T. BARRACK: The Promise and Pitfalls of E-Scooter Sharing. (2019) <https://www.bcg.com/de-de/publications/2019/promise-pitfalls-e-scooter-sharing.aspx>
- [27] J. N. SHETH, N. K. SETHIA, S. SRINIVAS: Mindful Consumption: A Customer-Centric Approach to Sustainability. *Journal of the Academy of Marketing Science*, **39** (1), 21-39 (2011). <https://link.springer.com/content/pdf/10.1007/s11747-010-0216-3.pdf>
- [28] D. STRAUSS: Decline of Motor Industry Drives Global Economic Slowdown. (2019) <https://www.ft.com/content/cd2f8bdc-fef6-11e9-be59-e49b2a136b8d>
- [29] UNITED NATIONS: Global Map - Annex I. (2017) [https://di.unfccc.int/global\\_map](https://di.unfccc.int/global_map)
- [30] J. URRY: The 'System' of Automobility. *Theory, Culture & Society*, **21** (4-5), 25-39 (2004) <https://doi.org/10.1177/0263276404046059>
- [31] H. VAN ESSEN, A. SCHROTEN, M. OTTEN, D. SUTTER, C. SCHREYER, R. ZANDONELLA, M. MAIBACH, C. Doll: External Costs of Transport in Europe. (2011). [http://ecocalctest.ecotransit.org/CE\\_Delft\\_4215\\_External\\_Costs\\_of\\_Transport\\_in\\_Europe\\_def.pdf](http://ecocalctest.ecotransit.org/CE_Delft_4215_External_Costs_of_Transport_in_Europe_def.pdf)
- [32] E. VON HIPPEL: Lead Users: A Source of Novel Product Concepts. *Management Science*, **32** (7), 791-805 (1986). <https://doi.org/10.1287/mnsc.32.7.791>
- [33] E. VON HIPPEL, N. FRANKE, R. PRÜGL: Efficient Identification of Leading-Edge Expertise: Screening vs. Pyramiding. IEEE Technology Management for the Global Future-PICMET 2006 Conference, **2**, 884-897 (2006). <https://ieeexplore.ieee.org/abstract/document/4077464>