

TEACHING MATERIAL GUIDANCE

1) Title of the material

Butler, L.; Yigitcanlar, T.; Paz, A. How can smart mobility innovations alleviate transportation disadvantage? Assembling a conceptual framework through a systematic review. Appl. Sci. 2020, 10, doi:10.3390/APP10186306.

<https://www.mdpi.com/2076-3417/10/18/6306/htm>

2) Which section of the SUMP it is relevant to?

The authors presented a review of the literature related to technological innovations in the field of smart mobility as a potential solution to help individuals overcome issues associated with transportation disadvantage. Therefore, the article can be linked to the second, third, fourth, fifth and sixth sections of the SUMP circle related respectively to the determination of planning framework, analysis of the mobility situation (in particular the analysis of problems and opportunities for all modes of transport - **subsection 3.2.**), scenario building and joint evaluation (development of scenarios of possible futures - subsection 4.1.), vision and strategy development (arguments for stakeholders – subsection 5.1) and setting targets and indicators (setting indicators for all targets - **subsection 6.1.**).

3) Which Mobility Manager knowledge this material is the most relevant to?

It is related to Transport and mobility planning (section 1 of the Mobility Manager competencies) especially 1b (employment of ITS/ICT and smart measures) and 1c (understanding of travel behaviour).

4) Problem approached and content overview

Problem approach – general understanding of the role of technological innovations in the field of smart mobility in overcoming issues associated with transportation disadvantage. This paper aims to provide a consolidated understanding of how smart mobility innovations can help to alleviate transport disadvantage. A systematic literature review was conducted and a conceptual framework was developed to provide the information needed to address transport disadvantage. The results were categorised under the physical, economic, spatial, temporal, psychological, informational and institutional dimensions of transport disadvantage. The findings reveal that the primary smart mobility innovations identified in the literature are demand-responsive transport (DRT), shared transport, intelligent transport systems (ITS), electric mobility, autonomous vehicles (AV) and Mobility as a Service (MaaS). Smart mobility innovations can benefit urban areas by improving accessibility, efficiency, coverage, flexibility, safety and overall integration of the transport system. Smart mobility innovations have the potential to help mitigate adverse transport impacts. Mobility as a Service and ITS have great potential to mitigate transport disadvantage, primarily due to their ability to integrate a wide range of services.



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Smart mobility has been identified as a potential solution for mitigating many of the problems associated with transport disadvantage. Smart mobility, a generic term used to describe many transport-related technologies that have been deployed in urban areas, represents a new way of thinking about transport, including the creation of a more sustainable system that can overcome some of the problems associated with private motor vehicles (PMV). While the number of research articles on smart mobility is growing, few have focused on how smart mobility can address transport disadvantage. Similarly, when it comes to specific smart mobility innovations, such as "autonomous vehicles" (AVs), "flexible transport services" (FTS) and "free e-mobility" (FFM), or the integration of smart technologies have been explored as potential solutions to transport disadvantage, they are often treated as separate entities, with only a few comprehensive attempts to conceptualise how their integration can contribute to solving or mitigating the problem.

Based on the literature review, a conceptual framework was developed to represent the relationship between the benefits of smart mobility innovations and different aspects of transport disadvantage, with the view that it can help researchers to better understand the relationship between the two concepts. This paper also identifies future areas of research that may help others look at smart mobility innovations to mitigate transport disadvantage.

5) Who could be interested in this material?

This article is addressed to students and those looking for a well-structured and concise introduction to technological innovations in the field of smart mobility as a potential solution to help individuals overcome issues associated with transportation disadvantage. The article contains many references to scientific literature in the smart mobility and mobility management research area. The technologies and measures described can be helpful for those developing measures within SUMP.

6) What is worth mentioning as an innovative factor for the reader?

The paper presents innovative approaches to mobility management. The move towards shared mobility is crucial to ensure that resources are shared efficiently and that the services offered have the required availability and flexibility to reach all users and do not create excessive costs for consumers or dependence on government subsidies. This conclusion is reflected in the research on DRT, AV and MaaS.

The literature review has shown that it is often the combination of innovations that will benefit the most from transport disadvantage. For example, DRT and AV have been shown to operate more efficiently and safely when supported by ITS and other smart technologies, including big data and cloud computing. Furthermore, the negative externalities associated with AV use, including increased vehicle kilometres travelled (VKT), suburbanisation and infrastructure demand, are significantly reduced when operating within a shared economy and infrastructure framework. This highlights the particular advantages of MaaS. MaaS as an integrated system can provide an operational structure within which innovations are tested and brought to market. It can also help



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connect users to shared mobility and provide a platform from which mobility providers share resources. Data sharing between mobility providers can help decision-makers to achieve better outcomes, as issues of transport disadvantage can be addressed in the transport system as a whole, rather than focusing on individual parts of it.

The paper further provides a summary of the potential contributions and risks of smart mobility and how they relate to dimensions of transport disadvantage. The article includes a description of measures useful for planning active mobility to include such measures into SUMP's framework. The article contains many references to the scientific literature on the new issues in the transport system in an urban environment. These references may be useful in the framework of projects and theses being developed.

7) Limitations

Most of the studies presented in the literature review refer only to the theoretical aspects of smart mobility. The article is written at a fairly high level of generality.

Nevertheless, the approach to the topic as well as the references to scientific literature, are a valuable source of inspiration for preparing SUMP's or for research on the impact of different factors and measures on mobility management.

