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Editorial

# Smart urban mobility – Escaping the technological Sirens

Home to an ever-growing share of the world's population (54% in 2014, projected to rise to 68% in 2050 when between six and seven billion people will live in a city), and facing dramatic and extremely dynamic social transformations, economic challenges and environmental problems, cities are undoubtedly the key arena of the history of the 21st century. As cities strive to be more and more attractive, sustainable and efficient, they must also become smarter. Related to this, no city can aspire to play a leading – global or local – role if its mobility system is not smart enough.

Transport infrastructure and vehicles have always been key benefiters and promotors of technological advances – suffice here to mention the fascinating journey which led from animal-powered means of transport to electric vehicles, passing through steam-powered vehicles, followed by internal combustion engines. Unfortunately, so far technology has not been able to eradicate the disbenefits brought about by the provision of mobility for people and goods. On the contrary, often the technologies developed to make travelling faster and smoother have been deployed indiscriminately, with the consequence of exacerbating some of the internal and external costs of mobility. Waste of public space, congestion, accidents, air pollution, noise, diseases linked to lack of physical activity trouble cities all over the world. Transport is among the main culprits of global warming and of depletion of non-renewable resources. In the last years, the digital revolution – with its paraphernalia of sensors and big data, systems for data elaboration and exchange, internet of things and artificial intelligence – has burst onto the transport field as well, raising new hopes of reducing and/or mitigating the negative impacts of transport, and of improving the urban environment by making mobility smarter.

But "digital" is not a synonym of "smart". Urban mobility becomes smart when smart actors take advantage of smart technology in the context of smart regulations, policies, plans and interactions. In a smart mobility system, real-time big data is collected from, shared among and used by controllers, travellers, vehicles, and infrastructure. Local and global decision makers integrate and analyse data, make short and long-term predictions based on the resulting information, and take actions to improve travel experience and system operations while reducing the consumption of resources and the impact on the environment.

Smart and connected (and in the next future driverless) vehicles, alternative fuel and electric vehicles, car and bike sharing schemes, vehicle tracking technologies, advanced traveler real-time information, smart booking, hailing and ticketing systems, communication through social media and virtual networks are but a few of the phenomena that characterise cities' changing mobility paradigms; more will be developing. Nowadays people want to buy mobility packages and vehicle manufacturers are restyling themselves as mobility service providers. Further research is clearly needed in concepts, approaches, technologies and behaviours related to smart urban mobility systems.

This special issue was conceived on the occasion of a workshop on Smart Urban Mobility held at Edinburgh Napier University in November 2016. The aim was to foster reflection on smart mobility in urban contexts, trying to capture and possibly develop the understanding of the attribute "smart" besides its more technological aspects. We called for papers dealing with visions, policies and plans, case studies, evaluation, analysis and simulation of urban smart mobility systems. Eventually, the issue includes nine papers, whose topics span from conceptual aspects of smart mobility (the content and the governance of smart mobility), to smart services (car and bike sharing, ride-sourcing services) and policies (regarding parking), to cooperative intelligent transport systems (intersections, in particular). Surprisingly, we do not have any contribution on autonomous vehicles specifically – possibly a sign that autonomous vehicles are still much more a technological challenge than a mobility resource/problem? From the (obviously limited) point of view of the special issue, urban smart mobility seems to concern mainly the mobility of people and does not tackle yet the increasingly relevant problems generated by urban logistic.

Two papers raise questions about what smart urban mobility is and how it can benefit our world. Lyons (2016) notes the vagueness of the term smart and draws on the existing literature in search of a definition which may give a direction to the investments in smart mobility. He warns against reducing smart to technologically advanced and advocates an affordable, effective, attractive and sustainable urban mobility. Starting from a parallel between the smart socio-technical transition and the automobility

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one, Docherty et al. (2017) introduce and discuss some of the challenges for the governance of smart mobility. The state power in the transport domain – they write – is often too weak to impose strict regulations on the new actors, networks and technologies that make up the world of smart mobility. However, they hope that an early debate may still lead to smart mobility solutions generating broader social goals, to avoid that in fifty years society regrets having taken a wrong direction and missed the opportunities offered by the smart transition.

The decline of vehicle ownership in favour of vehicle usership and the consequent increasing success of shared options are probably the most prominent and evident features of smart urban mobility. Hence, it does not come as a surprise that several papers in the special issue deal with shared mobility. Perboli et al. (2017) study the business model of car-sharing companies. Such companies share the goal of reducing the environmental impact of mobility and concurrently offering users a more efficient option than car ownership but differ on the operational characteristics of the service. The paper presents an analysis of the annual cost of alternative services to several classes of users by means of a Monte Carlo simulation using Turin, Italy as a case study. Also Rotaris and Danielis (2017) are interested in car-sharing business models but in the context of small-to-medium size cities and lower density areas. In these contexts, more challenging for shared services because of their more car-oriented current mobility, car-sharing must aim at providing social benefits and be supported by local governments. The authors report the results of a survey of Friuli Venezia Giulia, Italy that shows the existence of a low but non-negligible demand for car-sharing. Hyland et al. (2017) deal with shared bikes. Their goal is to explain the usage of bike stations. To this aim, they develop and implement an approach combining econometric methods with machine learning. They apply their method to the Divvy system in Chicago, US and find that the determinants of usage vary significantly across stations, concluding that forecasts can be reliable only if they take such heterogeneity into account.

Contreras and Paz (2017) contribute to the debate about ride-sourcing services, credited with the capacity of complementing traditional services efficiently by their supporters but accused of not playing according to the rules by their competitors. A dataset including ride-sourcing trip count data gives the authors have the possibility to observe what has happened in Las Vegas, US after Uber and Lyft were authorised to operate in the city. Their data prove a significant negative impact of ride-sourcing services on taxicab ridership (which instead is surprisingly found positively correlated to the use public transport).

Choudhury et al. (2017) compare the willingness to pay for three smart mobility options – shared taxi, one-way car rental, and a combination of park-and-ride and school bus – and other more traditional measures. They carry out a stated preference survey in Lisbon, Portugal using a non-conventional design and analyse the results by multi-dimensional mixed logit models. Smart mobility options – in particular one-way car rental and shared taxi – are preferred to traditional options for non-commute trips, whereas the opposite occurs for commute trips.

The paper of Fabusuyi and Hampshire (2018) extends the scope of the special issue to smart policies, focusing on SFpark, a demand-responsive parking pricing system piloted in San Francisco, US. The authors estimate demand elasticities of parking demand and use them to optimise the rates the system should implement. With minimal changes to the actual rates, the performance of the SFpark program in terms of block occupancy can improve despite the rather inelastic nature of parking demand.

The special issue is closed by the paper from Edwards et al. (2017), who present an evaluation of the European project Compass4D. By means of field trials and microsimulation, they find that energy efficient intersections improve energy efficiency and emissions of heavy and – to a smaller degree – light vehicles but are not effective or even detrimental to buses. Furthermore, they increase number of stops and crossing times. The authors conclude that energy efficient intersections have the potential to deliver environmental policy objectives but there is a need to understand better where and how to deploy them.

Having worked on the special issue, we have the impression that the transport field is undergoing the digital revolution like a middle-aged man would deal with a new mobile phone: He is keen on buying the best he can afford, because he has heard that it will be useful somehow, although he does not yet know how. He downloads apps that sometimes make his life easier and merrier but in other occasions prove to be a waste of time or money. This might be an unavoidable learning experience, and the excitement of experimenting is what will lead him to discover something new. However, his mobile phone is only a means to have a better quality of life. Therefore, he has to learn quickly what he really wants from his mobile and use it accordingly, to avoid shipwrecking enchanted by the voices of the technological Sirens.

We hope the special issue will contribute to the scientific and social discussions on urban smart mobility and so help to transform opportunities in successes.

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