1 Introduction

J. R. Kotzebue and T. Townsend

in:

Towards Sustainable Transport and Mobility

Perspectives on Travelling and Commuting in Small Island States

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1 Introduction

J. R. Kotzebue and T. Townsend

The idea for this book "Towards Sustainable Transport and Mobility: Perspectives on Travelling and Commuting in Small Island States" emerged from the interdisciplinary sustainable transport working group at The University of West Indies, St. Augustine, Trinidad and Tobago in collaboration with the Institute of Geography, University Hamburg. In discussions with practitioners, experts and students, we realised that the scientific literature rarely addresses travelling and commuting in Small Island States (SISs). Experts primarily focus on the economic-touristic aspects and change that heavily affect SISs, but publications on sustainable transport are relatively thin. A literature search with Google Scholar search engine shows that the number of scientific works related to the search keyword "sustainable transport" increased by over 1300 per cent from 2200 publications in the period 1990 to 2000 to over 34.300 in 2001 to 2020. The vast majority addresses sustainable transport in urban areas and barely less than one per cent (n 248) of the articles address it within SISs.

One can argue that SISs are insignificant, but the estimate is that they are home to over 63.2 million people (UN, 2014). Hence, United Nations (UN) the name SISs in an umbrella for a heterogeneous group of countries in the Caribbean, Mediterranean, Atlantic, Pacific and Indian Seas (Nurse et al., 2001). They share the following realities; they are relatively remotely located, have a small domestic market, small-scale enterprises and high cost for transportation, infrastructure, information and communication technology (ICT) development (Briguglio, 2018; UN, 2014). Partly inherited from a colonial past, SISs often have a single urban and economic centre around one major sea port (Allam & Jones, 2019).

This book aims to deal with the marginalised knowledge and provides insights on trends in sustainable transport transition, policies, practice examples, challenges and solutions of commuters and travellers in SISs. This is a necessity because the experiences and study resulting from continental urban and rural areas only partly fit with the spatial, social, economic and environmental conditions of the islands. Already the UN

Report of the World Commission on Environment and Development: Our Common Future called Brundtland Report (1987), placed sustainable transport on the international political agenda and warned that the transition to sustainable development needs informed choices and new policies for developing states, because copying energy patterns is undesirable and infeasible.

Sustainable Transport

The Brundtland Report does not define sustainable transport, but linked transport systems to land use and urban settlement patterns, air pollution, human health, consumption and food security. Although there is no agreed uniform definition, the UN Secretary General's High-Level Advisory Group on Sustainable Transport states that:

> "Sustainable transport is the provision of services and infrastructure for the mobility of people and goods advancing economic and social development to benefit today's and future generations in a manner that is safe, affordable, accessible, efficient, and resilient, while minimising carbon and other emissions and environmental impacts".(UN, 2016 p. 1)

The vague definition provides room for interpretations. By comparison, the World Bank Group's initiative Sustainable Mobility for All (SuM4All) (2019) developed a more concrete four-policy goal framework that is aligned to the UN's Sustainable Development Goals:

1. Universal access that refers to transportation for all at all geographical locations according to their social and economic needs.
2. Efficiency aims at predictable, reliable and cost-efficient mobility.
3. Safety deals with a reduction in crashes, injuries and fatalities.
4. Green relates to reduction of adverse environmental effects of transportation and mobility like (GHG), noise and other air pollution.

While the UN definition speaks about sustainable transport, the World Bank Group uses the term "mobility". The differentiation between transport and mobility is unclear, however, transport is traditionally linked to transport modes, sectors, the physical infrastructure, systems, networks, economic efficiency, and technical parameters (Barr, Prillwitz, Ryley, & Shaw, 2017).The purpose of transportation is to overcome space. This goal is attached to efficiency in terms of time and money (Rodrigue, Comtois, & Slack, 2016).

Crucial is the economy of scale, innovation, and technical diffusion to increase the efficiency (Holz-Rau, 2018).

By comparison, scholars associate the idea of mobility with the social and cultural aspects of travelling (Merriman, 2009, Urry, 2002). It is about the personal subjective experience, meaning, ethical and political perspectives. Mobility includes all forms of movement and all possibilities of moving individuals, objects, and ideas (Cresswell, 2011). The concept also includes the context, the spaces, how people move and rest (Adey, 2017). Therefore, the idea takes into consideration barriers and constraints of mobility. This includes the question of availability, accessibility and affordability. Virtual mobility is also part of the concept that increasingly becomes important, such as remote working, telemedicine, e-learning, e-government, and online shopping (Kenyon, Lyons, & Rafferty, 2002; Velaga, Beecroft, Nelson, Corsar, & Edwards, 2012).

Policy and planning

Although transport and mobility are crucial to the overall development, SISs consider transport policy seldom as an independent policy field. Other policies, such as land use, economic and tourism policy rather than transport policy, determine the transport development (Schwedes, 2016). Some SISs still have no national transport authorities. Planning can be outdated and deficient in key area. In some cases, there are no national or local-wide development strategies. This is partly because of high costs and inadequate resources and many depend on funding from governmental and non-governmental organisations like the European Union (EU), the World Bank Group (Attard, 2005; Fay, Andres, Fox, Narloch, & Slawson, 2017). The transportation system often emerged without systematic planning for the entire island. Instead, entrepreneurs and governments supported specific purposes like the former plantation-based economy in the colonial past and links to tourist resorts and shopping centres nowadays (Alberts & Baldacchino, 2017; GovTT, 1996).

Regarding the transport governance, many SISs have a centralistic or a poor planning culture, and limited inter-organisational communication is noted due to operating in silos. This is a major challenge for a sustainable transport development (Jordan, 2007). The continuing disunity about measuring and policy priorities hampers the systematic monitoring of the development, despite scholars and experts have recommended indicator sets and analytical frameworks (Dolcy & Townsend, 2020; Gudmundsson, 2004; Richardson, 2005). Lacking systematic traffic, commuter and travelling data, forecast and planning has led to reactionary and adaptive transport policies.

Accordingly, some governments and private actors make investments without little consciousness about the societal, economic and environmental interdependencies and adverse effects. The project-based approach is especially problematic regarding a resilient transport infrastructure, risk management, climate change mitigation and adaption. A resilient transport infrastructure is critical given the Climate Emergency. In many SISs hurricanes, heavy rains and landslides frequently damage the road infrastructure and disrupt transportation.

To that end, authors widely agree that a prerequisite for sustainable transport and mobility is an integrated policy and planning. The concept relates to management, physical elements, and operation of transport systems (Givoni & Banister, 2010). The integration can develop several dimensions. For instance, Carstensen and Holz-Rau (2020) identified (a) modal integration, (b) sectoral integration, and (c) vertical integration. Modal integration deals with the incorporating of all transport modes like walking, cycling, scooter, train, tram, bus, taxi, and car. The sectoral dimension refers to interdisciplinary approaches. The linkage of housing, transport and health policy exemplifies this type. Vertical integration deals with the governance aspect, the cooperation of international institutions, national, local authorities and stakeholders. Concerning the geographical situation of SIS, a fourth type, the spatial integration could be added. It refers to the even and just distribution of transport modes in areas, their connectivity and their access. For instance, urban areas often show a variety of transport modes while rural depend on one or two modes.

A Transition to Sustainable Transport

Inherent to an integrated transport approach is a goal-oriented or evolutionary transition to sustainable transport and mobility. Transitions include technological innovations and system improvements that create non-linear processes, which can also affect other sectors (Kemp & Rotmans, 2004). Part I of this book deals with the transition in personal transportation solutions. By addressing the energy and policy aspects in Chapter two (2), the authors King and Maharaj compare the transition to e-mobility in several SISs. They stress that governments should take a very proactive approach to encouraging the rapid adoption of Battery Electric Vehicle (EV) in tandem with a transition to renewable electrical energy to reap a wide swathe of economic and environmental benefits. Simultaneously, the authors highlight the need to invest in an environmentally friendly public bus system. However, they also address the economic challenges that

could hamper the feasibility of the suggested transition despite the worldwide trend of decreasing battery and vehicle prices.

Linked to the preview chapter, Addison and colleagues bring the attention to the electricity distribution that needs to accommodate EVs in Chapter three (3). They argue that a management of EV penetration is necessary, since uncoordinated charging can produce load imbalances and sharp variations in current voltages and power. However, real data is insufficient in many SISs and, therefore, estimates of variables reflecting charging behaviour are necessary. The chapter provides an assessment of some probabilistic models based on weekday load curves derived from the charging data over one year, for a data-set consisting of 348 vehicles corresponding to 200 households in the Midwest region of the United States. The authors conclude that the data-driven approach will inform the decisions suitable for the local landscape. Still, there is the need to involve the many players and actors (public, private and non-profit), and to let them actively contribute to a successful EV adoption.

Because of its impact on the transport development, the book dedicates Part II to the digitalisation of transport and mobility. In Chapter four (4), Kotzebue and Bryan analysed the transport smartphone applications in Barbados. They investigated to what extent the apps address their target market and if they meet local transport needs and stated governmental goals. The analysis of the product descriptions and customer reviews revealed that most users are satisfied, but the apps poorly support government's goal to create a green and sustainable transport sector. Some apps provide wrong information, which discourages customers. Also, the partly insufficient ICT infrastructure hampers the proper function and use of apps. The authors recommend a supporting ICT policy to attract investments in the small market. The app market needs some guidance to exploit its potentials and to support government's goal.

In Chapter five (5) Kotzebue subsequently investigates the role of the digital capacity for the use of Participatory Geographic Information Systems in the North-East Tobago Man and Biosphere Reserve (MAB). The concept of digital capacity differs from the idea of digital literacy, which relies on the personal abilities. By comparison, digital capacity incorporates several kinds of input, including the ICT infrastructure and personal abilities. Additionally, the process, thus the interplay and collaboration, as well as the outcome, which must be beneficial for the community, are crucial. She concludes occasional, project-based use of digital tools will not empower the community to learn and to consider the tool as an opportunity for proactive behaviour. The author recommends integrating the use of such tool in the learning for sustainability in the MAB areas.

Although crucial, none of the chapters reflect on non-motorised mobility and its role in the transition to sustainable transport. Given the relevance, Part III of the book deals with non-motorised mobility. Non-motorised strongly relates to transport equity because pedestrian and bicycle infrastructure is often subordinated to the motorised transport system (Wigan, 1994). However, the collection of data is difficult because walking is a component of almost every travelling and commuting trip (Lee, Sener, & Jones, 2017).

Equity and Gender

Equity is associated with the distribution of the transport cost and benefits. Hence, an equal distribution is relative and must be socially acceptable (Cass, Shove, & Urry, 2005). However, the concept is hard to measure. For instance, the construction and maintenance of a highway creates working places and income, but it also generates a spatial inequity between users and non-users (Adey, 2017). Scholars differentiate between three types of inequality:

- Inequality of resources including, vehicle ownership, infrastructure and services:
- Inequality in travel behaviour, trip-frequency, travel time, travel distances, and needs.
- Inequality in the level of accessibility, which often refers to the easiness of reaching a location, the quality of mode and network, travel time, distance, and travel costs (Pereira, Schwanen, & Banister, 2017; Van Wee, Hagoort, & Annema, 2001).

The settlement structures, high costs of transport development and operation, low investments in public transport and state subsidies, encouraged in many SISs a relatively high car dependency and inequalities. Thus, commuters' and travellers' primary mode of transport is the car, or they consider the car as the only acceptable choice in terms of costs, time, safety and prestigious status (Wiersma, 2020). Some remote areas on the islands are only accessible by car, although in some islands the rural population depends on public transport or privately owned mini busses (Kotzebue, 2020). Studies showed that geographical remoteness can be a significant barrier to social inclusion (Cass, Shove, & Urry, 2005; Lucas, Mattioli, Verlinghieri, & Guzman, 2016).

In Chapter six (6) Attard, Maas, and Cañas highlight the challenges for active travel in the islands of Malta, the inequality of space and the prioritisation of the car. The authors provide insights and results from an activity workshop on walkability and cycling around the University of Malta, Msida Campus. Furthermore, they investigated

the bicycle-sharing scheme in Malta. The study resulted in over 65 different environmental elements and characteristics of the public space that bear influence on the walking experience, such as the presence and quality of pavements and walkways, pedestrian crossings, street furniture, green urban areas, littering and weather. Concerns over road safety are, however, the main barrier to promoting cycling. Attard, Maas, and Cañas, conclude that the geographical characteristics of Malta create relatively short travelling distances and the good weather supports active mobility throughout the year. Some results also point towards specific policy and planning actions that would benefit and encourage more active travel on the islands.

Subsequently, Warren and his colleagues provide an additional perspective on walkability in Chapter seven (7) Walking in Havana, Cuba. The authors outline the results of a walkability audit for a selected area in a main shopping zone, which is adjacent to a multi-modal interchange for travellers. They discuss walkability with respect to the urban layout. The chapter also defines strengths and weakness of the current urban infrastructure, with conclusions focussed on making walking better for all stakeholders. The discussion highlights some of the inherent barriers found in many island situations and summarises some of the lessons learned which could be applied elsewhere to improve walkability as part of the overall island mobility and sustainability.

Inequalities are also evident between women and men. Compared to men, women frequently have a lower income; they have less access to private vehicles, shorter commuting times and travel distances, and depend more on public transport (Bamberger, Lebo, Gwilliam, & Gannon, 1999; Sánchez & González, 2016). Problematic is also the sexual and gender-based violence that travelling and commuting women are experiencing (ECLAC, 2019). Although the newspapers frequently report assaults, data is lacking in many SISs. As a result, many mothers connect the availability of a car to good parenting. They transfer negative mobility experiences to their children. Hence, children learn that walking and the use of public transport is riskier than using the private car. Additionally, non-drivers like non-car owners, children, the elderly and persons with disabilities become less mobile and increasingly dependent on a driver (Murray, 2009).

A reliable, accessible and sufficient public transport system, private or governmental owned, is therefore an essential for an inclusive and sustainable society. Part IV, the last section of the book, therefore, deals with planning and measuring public transport services and facilities. Bajada and Attard look back to Malta's major bus service reform in 2012. The authors explore people's attitudes regarding bus service quality characteristics and compared them through similar online surveys from 2012 to 2020. The results show that the attitudes changed from positive to negative within a decade. They conclude that the reform resulted in an improvement but did not attract potential

users. Reforming through improvements to some of the bus service characteristics, such as quality of vehicles, route and schedule planning, are all a good start. However, this needs to be consistent and further supported with priority on the road. In conclusion, they highlight the issues with bus service delivery that are not solely borne by the operator, but have to also include a concerted effort by the authorities to prioritise the bus service and its quality.

Finally, in the closing Chapter nine (9), Furlonge and Cudjoe investigated the Park-and-Ride Accessibility and reported the experiences from the design of a pilot study for the island of Trinidad and Tobago. The study aimed at the identification of an appropriate location selection method for park-and-ride (P&R) lots. A major criterion for the lots was the accessibility to maximise the number of motorists who would use public transport. The authors identified through a literature review nine criteria for built-up areas to avoid the use of virgin areas. The analysis resulted in two potential sites. Given the lack of systematic transport data collection in Trinidad and Tobago, the authors conclude that most of the current methods for such require extensive data variables and apply complex computations, which would be prohibitive from the perspectives of data collection cost and analyses. The mixed qualitative and quantitative method proved to be a promising and effective method for site selection.

Conclusion and Perspectives Ahead

SISs have limited land availability for competing uses and limited financial resources for infrastructure and services. It is, therefore, an imperative that sustainable transportation development remains at the forefront when development plans and projects are being evaluated. The Climate Emergency makes this even more urgent since the effects of global warming, drought and mega-storms can create havoc on their economies, which often rely on single agricultural commodities or tourism.

"Sustainable Development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987) p 41. Hence, sustainable transport development in SISs should be based at least on six pillars. These are (a) Integrated Land/Use Transportation Planning (b) Develop Clean, Safe, Efficient, Affordable Public Transportation Options (c) Ensure Access to Affordable Rural Transport Services (d) Address the mobility needs of special groups, e.g., elderly and disabled (e) Facilitate walking & non-motorised transport in urban centres (f) Reduce Air Pollution & Carbon Emissions.

For instance, researchers and practitioners at a recent Transportation Symposium 2021, hosted by the Department of Civil Engineering, Faculty of Engineering of The University of The West Indies, St. Augustine, Trinidad & Tobago, identified two of the key issues in creating sustainable "green transportation" development: (1) High demand for private transportation and (2) Low adoption of Alternative Fuel Vehicles (AFV). The high demand for private transportation is linked to (a) low adoption of public transport, (b) low use of walking & biking as modes of transport, and (c) infrastructure and systems that prioritise private vehicles above all alternatives. The low adoption of AFVs results from (a) high capital costs of acquisition, (b) low incentives and awareness for changing existing internal combustion engines to AFVs, and (c) low access to refuelling sites.

Our future perspective for significant change is that SISs need to develop and implement policies aimed at ensuring sustainable transportation service levels for both urban and rural dwellers without a debilitating drain on the state coffers. These policies need to be supported by strategic institutions with clear mandates, authority and accountability. What many SISs need is the will to take decisive action to change the tendency towards "laisez-faire" or "uniformed" policy making and replace it by scientific data-driven approaches utilising new tools and technologies and aimed at attaining measurable objectives that directly impact on the future lives of their citizens. The book offers some of these informed perspectives on sustainable transport development.

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