

# **Enhancing the Resilience of Urban Transport in Asian Cities after COVID-19: Synthesis of Academic Study Results and General Recommendations**

**Mr. Tim Schwanen**

Professor in Transport Geography  
Transport Studies Unit, University of Oxford



Background Paper for the Regional Workshop on  
Sustainable, Inclusive and Resilient Urban Passenger Transport:  
Preparing for Post-Pandemic Mobility in Asia

28-29 October 2021



# **Enhancing the Resilience of Urban Transport in Asian Cities after COVID-19: Synthesis of Academic Study Results and General Recommendations**

## **Mr. Tim Schwanen**

Professor in Transport Geography  
Transport Studies Unit  
University of Oxford  
United Kingdom

Background Report for the Regional Workshop on  
Inclusive, Sustainable and Resilient Urban Passenger Transport:  
Preparing for Post-Pandemic Mobility in Asia

28-29 October 2021

Final Version  
31 August 2021

## **Disclaimer**

This report has been issued without formal editing. The designation employed and the presentation of the material in the report do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The views expressed, analysis, conclusions and recommendations are those of the author(s), and should not necessarily be considered as reflecting the views or carrying the endorsement of the United Nations. Mention of firm names and commercial products does not imply the endorsement of the United Nations.

The report is issued without formal editing.

## Table of Contents

Executive Summary .....	i
1 Introduction .....	1
2 Sustainable Urban Transport Index.....	3
3 Understanding Resilience .....	9
3.1 Two approaches to resilience.....	9
3.2 Implications for intervention .....	11
3.3 Conclusion.....	12
4 Impacts of COVID-19 on Transport in Asian Cities .....	13
4.1 Introduction .....	13
4.2 Short-term impacts.....	13
4.3 Longer-term impacts.....	17
4.4 Conclusions.....	22
5 Towards Resilient Urban Transport after COVID-19.....	24
5.1 Introduction .....	24
5.2 System consolidation through greater engineering resilience .....	25
5.3 System transformation with the help of socio-ecological resilience .....	27
6 Conclusion .....	33
6.1 The Sustainable Urban Transport Index.....	33
6.2 Impact of COVID-19 on urban transport in Asian cities .....	34
6.3 Enhancing the resilience of urban transport in Asian cities after the COVID-19 pandemic .....	35
7 References .....	37

## Executive Summary

In Asian cities, the COVID-19 pandemic may be accelerating the longer-term trend towards greater use and ownership of private cars and motorcycles, while reducing the use of and trust in public transport and shared taxi and car-pool services and generating structural financial difficulties for public transport operators. It may also induce more active travel – walking, cycling and micro-mobility – and substitution of physical mobility by online activity. With the exception of the effects on active travel and online activity, these trends contravene the United Nation's commitments to sustainable, equitable and resilient urban development as laid down in the *Sustainable Development Goals*, the *2030 Agenda for Sustainable Development*, and the *New Urban Agenda*.

This Study Background Report discusses how Asian cities might reconfigure the trends of accelerated growth in private motorised mobility and diminishing use and financial viability of public transport and shared taxi and car-pool services. To this end, it uses the Sustainable Urban Transport Index developed by UN ESCAP, proposes a framework for understanding and promoting resilience in urban transport, and reviews the academic literature published until July 2021 on the short- and long-term impacts of the COVID-19 pandemic on urban transport in Asian cities. It also offers a series of recommendations for enhancing the resilience of urban transport systems in the short (0-2 years after the pandemic), medium term (2-5 years) and long term (5-20 years) in Asian cities.

The Report concludes that the SUTI offers a useful framework for assessing the effects of COVID-19 on transport in Asian cities because it considers the modal share; access, quality, reliability and affordability; and operational costs of, and investments in, public transport. It confirms that the empirical findings in the academic literature on the impact of the pandemic on urban mobility are largely consistent with the suggested impacts on public transport, private car and motorcycle ownership, active travel and online activity.

Two approaches to understanding resilience in relation to urban transport are identified. The 'engineering resilience' approach concentrates on the capacity of a transport system to resist and absorb the impacts of a disturbance in order to maintain an acceptable level of service (robustness), to recover and bounce back to pre-disturbance functioning ('bouncebackability'), and/or to transform to a different stage of operation (adaptability). The 'socio-ecological engineering' approach is primarily concerned with the capacity of a transport system to adapt continuously in light of both expected changes (flexibility) and unanticipated changes (agility) in its environment.

If urban transport in Asian cities is to become more sustainable and equitable after the pandemic, then both forms of resilience need to be enhanced. Key to greater engineering resilience is restoring public confidence in public transport and in spending time in busy public spaces and high-density settings in the short term. This can trigger a virtuous cycle in the medium and long term: greater use will increase fare box ratios, which will facilitate and legitimise large investments in network expansion and new technology, which can further increase use, etcetera.

The flexibility and agility of public, shared and active transport systems in Asian cities can be enhanced by extending the infrastructures and upgrading technologies for those forms of transport and online activity; embedding the transformation of urban transport systems in Asian cities in medium- and long-term changes in urban systems for land use, public health, social care and economic affairs; and capacity building among transport system operators and local government actors.

## 1 Introduction

The COVID-19 pandemic continues to cause havoc around the world. Vaccination rates are now going up – albeit in a deeply uneven manner across the planet – but infections are still ripping through countries and cities, causing widespread illness and mortality. People who have not been ill or have recovered are also affected in myriad other ways. For instance, non-medical responses to the pandemic such as social distancing, stay-at-home orders and lockdowns have affected livelihoods, businesses, education, mental health and social relationships for unprecedented numbers of people, again in ways that are socially and spatially deeply uneven. The transport sector is one of the most affected, with aviation and public transport within urban areas arguably hit hardest in Asia and elsewhere (Earley and Newman, 2021; Rothengatter et al., 2021).

The effects of the COVID-19 crisis on transport in Asian cities are likely to outlast the pandemic itself by a considerable margin. Different future trajectories for urban transport systems across Asia are open. Nonetheless, it is not unreasonable to expect that, in the coming decade, the pandemic will:

- a) accelerate the longer-term trends towards greater use and ownership of private cars and motorcycles;
- b) reduce use of, and public trust in, public transport and shared taxi and car-pool services;
- c) cause structural financial difficulty for public transport operators; and
- d) induce more demand for walking, cycling and micro-mobility.

With the exception of d), these trends would contravene the United Nation's commitments to sustainable, equitable and resilient urban development as laid down in the *Sustainable Development Goals*, the *2030 Agenda for Sustainable Development*, and the *New Urban Agenda*. They would also aggravate a series of challenges urban transport and cities in Asia are already facing, including rapidly increasing greenhouse gas (GHG) emissions, rampant air quality problems, extensive road congestion and associated productivity loss, extensive harm from traffic accidents, and stark social inequalities in mobility capabilities – individuals' potential to undertake trips and participate in activities at destinations across the city in a safe, affordable, convenient and efficient manner.

This Background Study Report argues that the COVID-19 pandemic may indeed result in the above trends in Asian cities, but that proactive and comprehensive policy and governance focused on enhancing the resilience of urban transport systems in the



short term (0-2 years after the pandemic), medium-term (2-5 years) and long-term (5-20 years) can help those cities to 'build back better' transport that also contributes to greater sustainability and equity.

In support of this claim, the Report seeks to realise the following objectives:

- a) provide a framework for understanding and promoting resilience in urban transport that is informed by different strands of academic literature;
- b) review the academic literature published until July 2021 on the short- and long-term impacts of the COVID-19 pandemic on urban transport in Asian cities; and
- c) offer a series of suggestions about how short-, medium- and long-term policy and governance can enhance the resilience of urban transport in Asian cities in ways that contribute to greater sustainability and equity.

Throughout the Report urban transport is understood as a 'system of systems' that are configured around particular modes of transport. These systems are conceived of as socio-technical and complex; they are configurations of different elements – i.e., technology, infrastructure, policy and regulation, cultural values and meanings, user practices, and knowledges – that change, typically in non-linear and difficult-to-predict ways, due to internal dynamics and external pressures and (sudden) shocks (Geels, 2012; Geels et al., 2017). With its multiple waves of infection and government-mandated lockdowns and social distancing, the COVID-19 pandemic is an obvious example of a series of interconnected shocks, while internal dynamics are exemplified by a city government's policies to make public transport more resilient, sustainable and equitable with a view to the post-pandemic future.

The remainder of the Report begins with a brief overview of the Sustainable Urban Transport Index (SUTI) developed by UN ESCAP (Regmi, 2020) in Section 2, before discussing the resilience concept in Section 3. The SUTI framework is introduced because it has informed the review of academic literature on the impacts of the COVID-19 pandemic on urban transport in Asian cities in Section 4, and the thinking in Section

**预览已结束，完整报告链接和二维码如下：**

[https://www.yunbaogao.cn/report/index/report?reportId=5\\_271](https://www.yunbaogao.cn/report/index/report?reportId=5_271)

