



## Media Release

### **How does Ridesourcing Substitute for Public Transit Network?**

*New research by SMART finds that one third of Ridesourcing substitutes Public Transit*

- Study uses ridesourcing data to investigate the relationship between ridesourcing and public transit
- It seeks to answer whether ridesourcing substitutes or complements public transit, and how the substitution effect changes over time and space
- Study shows that the substitution effect is more common in the city center while complementary effect is more pronounced in the suburban areas

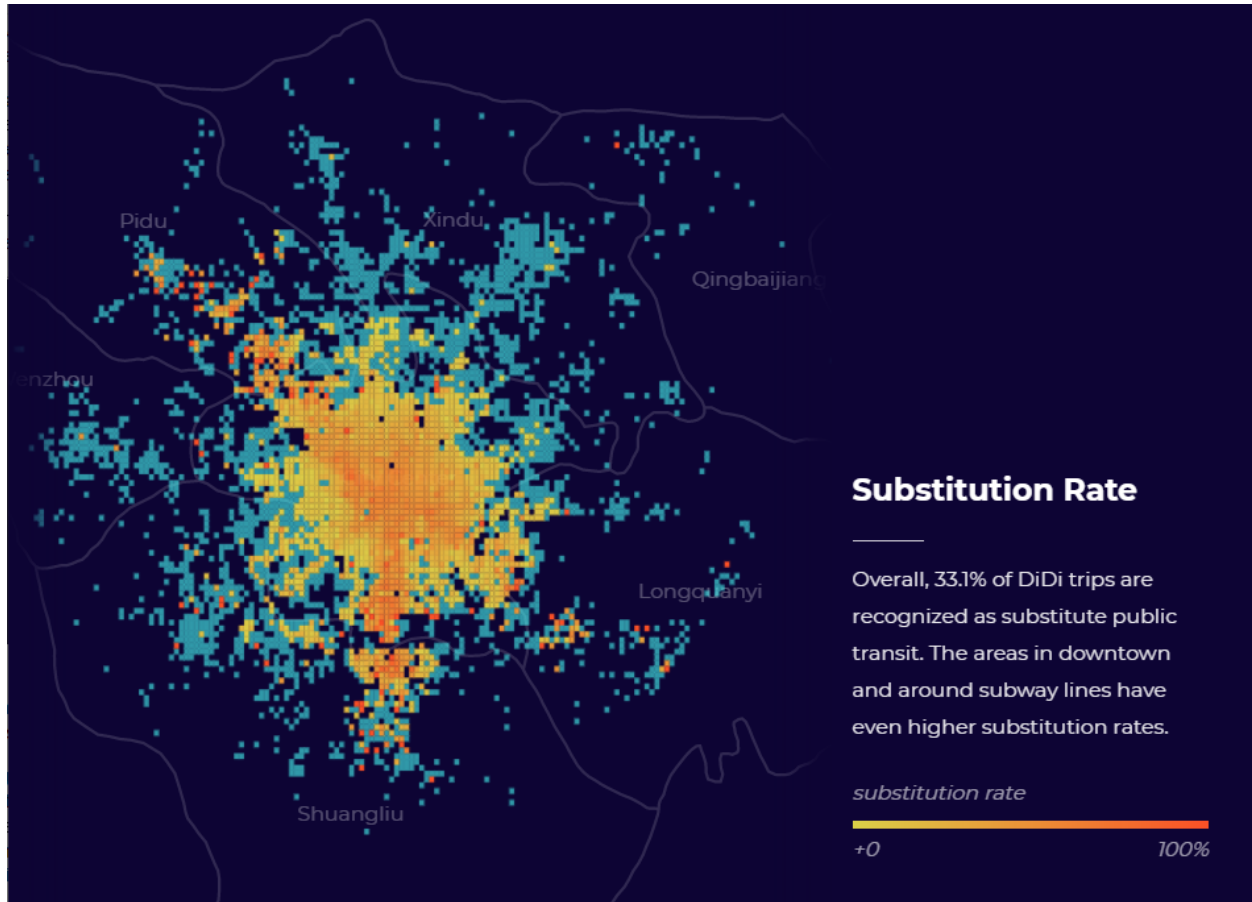
**Singapore, 21 July 2020** - Ridesourcing apps like Uber, Grab, and DiDi have become ubiquitous in cities around the world but have also attracted much backlash from established taxi companies. Despite its adoption worldwide, regulation of ridesourcing services still varies greatly in different parts of the world - as policy makers struggle to assess its impact on the economy and society, with limited information and yet unidentified risks involved. One major consideration to improve mobility and sustainability in cities is whether ridesourcing apps serve as a substitute or complement for public transits. In an ideal situation, ridesourcing could complement transit service and help to reduce private car usage. However, as an alternative travel mode, it may also substitute for the transit.

To understand more about this and the impact upon cities, Hui Kong, Xiaohu Zhang, Jinhua Zhao from SMART Future Urban Mobility IRG and MIT JTL Urban Mobility Lab recently conducted a study that investigates the relationship between ridesourcing and public transit using ridesourcing data. Their findings were published in a research paper "[How does Ridesourcing Substitute for Public Transit? A geospatial perspective in Chengdu, China](#)" in the Journal of Transport Geography, and with a visualization of the study available [here](#). Future Urban Mobility (FM) is an interdisciplinary research group (IRG) of [Singapore-MIT Alliance for Research and Technology](#) (SMART), MIT's research enterprise in Singapore.

### **Complement or Substitute**

In the first such study undertaken by any researcher around the world to look into the substitution effect of each individual trip at the disaggregated level, SMART researchers used DiDi data in Chengdu, China, a major urban centre with a population of over 16 million people. They developed a three-level structure to recognize the potential substitution or complementary relationship between ridesourcing and public transit, while also investigating the impacts through exploratory spatiotemporal data analysis, and examining the factors influencing the degree of substitution via linear, spatial autoregressive, and zero-inflated beta regression models.

Through this, the researchers found that one third of DiDi trips potentially substitute for public transit, with a ridesourcing trip considered potentially a substitute for public transit if the trip can be effectively served by public transit.



*Photo credit: Singapore-MIT Alliance for Research and Technology (SMART)*

The time of the day and the location does matter as well. The researchers found that the substitution rate is higher during the daytime (8am to 6pm) and more significant in the city center. Also, substitution trips appear more in the areas with higher building density and land use mixture. During the day, around 40% of DiDi trips have the potential to substitute for public transit, but the researchers found that this substitution rate decreases as the supply of transit decreases.

The researchers also found that the substitution effect is also more significant in the city centre and in more developed areas covered by subway lines, while peripheral and suburban areas were dominated by complementary trips. However they also note that house prices were positively correlated with the substitution rate, highlighting the importance of public transit to ensure less wealthy populations are served.



“High substitution rate implies the necessity of implementing ridesourcing regulations (e.g. spatial quotas, strategic pricing) or optimizing public transit service (e.g. shorten travel time, lower fee, improve crowdedness) in that area,” said Dr Hui KONG, SMART FM Investigator and Postdoctoral Associate at JTL Urban Mobility Lab and MIT Transit Lab. “The lower substitution in suburban areas can highlight areas where the current public transit service is inadequate and would help regulators decide on where to implement new bus or train lines.”

This research shows that ridesharing substitutes a large proportion of public transit. Therefore, it also amplifies the issue of digital divide. After all, most of the ridesourcing services rely on smartphone apps and credit card fare-paying. As a result, the unbanked population and the population that do not own a smartphone may not have access to ridesourcing services. Policymakers may have to rethink digitalisation efforts.

###

## **About Singapore-MIT Alliance for Research and Technology (SMART) [新加坡-麻省理工学院科研中心]**

Singapore-MIT Alliance for Research and Technology (SMART) is MIT’s Research Enterprise in Singapore, established by the Massachusetts Institute of Technology (MIT) in partnership with the National Research Foundation of Singapore (NRF) since 2007. SMART is the first entity in the Campus for Research Excellence and Technological Enterprise (CREATE) developed by NRF. SMART serves as an intellectual and innovation hub for research interactions between MIT and Singapore. Cutting-edge research projects in areas of interest to both Singapore and MIT are undertaken at SMART. SMART currently comprises an Innovation Centre and six Interdisciplinary Research Groups (IRGs): Antimicrobial Resistance (AMR), BioSystems and Micromechanics (BioSyM), Critical Analytics for Manufacturing Personalized-Medicine (CAMP), Disruptive & Sustainable Technologies for Agricultural Precision (DiSTAP), Future Urban Mobility (FM) and Low Energy Electronic Systems (LEES).

SMART research is funded by the National Research Foundation Singapore under the CREATE programme.

For more information, please visit: <http://smart.mit.edu>

## **About the Future Urban Mobility (FM) Interdisciplinary Research Group (IRG)**

The Future Urban Mobility (FM) Interdisciplinary Research Group (IRG) is one of five IRGs in the Singapore-MIT Alliance for Research and Technology Centre (SMART). FM harnesses new technological and institutional innovations to create the next generation of urban mobility systems to increase accessibility, equity, safety and environmental performance for the citizens and businesses of Singapore and other metropolitan areas, worldwide. SMART-FM is supported



Singapore-MIT Alliance for Research and Technology

by the National Research Foundation (NRF) Singapore and situated in the Campus for Research Excellence and Technological Enterprise (CREATE).

For more information, please log on to: <https://fm.smart.mit.edu>

**For media queries, please contact:**

Gavin Choo

SMART@bluetotem.co

+65 92975828