Micro-mobility use in times of uncertainty: An Auckland case study

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ABSTRACT

The current worldwide COVID-19 pandemic has challenged urban mobilities of all kinds. Micro-mobility had been long recognised as an alternative transport mode for short-distance trips, but has been largely ignored in New Zealand cities in response to safe and alternative urban mobilities during the pandemic. Using Auckland in New Zealand as a case study, this paper explores micro-mobility devices used during the pandemic. It shows that in Auckland, the reactive way of comprehending micro-mobility in the city created confusion about the current and future use of such devices and services, impeded infrastructure management, especially the pedestrian environment, and challenged the right to the public realm. Apart from future research projects, this paper suggests that, with clear policies and regulations, not only can micro-mobility be an additional option for frontline workers and citizens during a time of uncertainty, but they can also be part of the integrated transport system and an alternative for personal and short-distance trips that are mostly undertaken by cars. This paper will further contribute to UN's Sustainable development goal 9, which advocates the resilient infrastructure, and promote sustainable industrialisation and technological innovation.

Keywords: *Micro-mobility, E-scooters, post-pandemic, personal transport, pedestrian environment.*

INTRODUCTION

The COVID-19 pandemic in 2020 has severely impacted on urban mobilities, and made cities to envisage urban movement towards more sustainable approaches, in parallel with maintaining physical distancing. COVID-19 has pushed cities worldwide with the commitment to an investment of widened footpaths, extended cycle lanes and freeing more public space from automobiles, New Zealand is no exception (Auckland Council, 2020a; Wellington City Council, 2020). Micro-mobility, which is acknowledged as an alternative for urban short-distance trips, has also been included in future urban mobility discussions (Auckland Council, 2019). However, the decision-making process for micro-mobility, as well as the adoption of such devices and services, have been reactive ever since the rollout of the first e-scooter trial. Consequently, micro-mobility as a response to the pandemic and post-pandemic urban mobilities have been largely ignored.

Using existing literature, and discussing Auckland's e-scooter trials as a case study, this paper analyses the possibility of adopting micro-mobility devices in times of uncertainty. Aligning with UN's sustainable development goal (SDG) 9, which advocates the resilient infrastructure, and promote sustainable industrialisation and innovation, the purpose of this paper is to discuss the potential contributions of micro-mobility devices being part of both personal transport alternatives and integrated urban transport systems in the long term, while throwing light on the broader issues of the impact of novel mobility technologies on personal transport, and on the use of the public realm, especially a safe environment for pedestrians.

CONTEXT

Definition of micro-mobility devices

Micro-mobility as a service type and as a mode of transport was largely halted during the standstill of urban mobility worldwide due to COVID-19, but short trips in cities were still needed. Though not universally defined, micro-mobility devices generally share the following characteristics: they are personal transport devices; can be human- or electric-powered; can be shared or privately owned; are small and light-weight; and are low in maximum speed (ITDP, 2020; ITF, 2020). It is believed that the mass adoption of rental e-scooters worldwide put micro-mobility at the centre of new urban mobility (Populus, 2018). The term micro-mobility itself has not been fully adopted by New Zealand city governments and transport agencies, but it has emerged in government briefings (Christchurch City Council, 2019; Wellington City Council, 2019). Though micro-mobility devices cover a broad range, city councils in New Zealand put shared e-scooters as their primary focus.

The status quo of micro-mobility policies and uses

Presently in New Zealand, most micro-mobility devices fit in the parameter of 'wheeled recreational devices' or 'low powered vehicles' (Waka Kotahi NZ Transport Agency [NZTA], n.d.). Novel devices will need to be assessed by NZTA on a case-to-case basis to be declared not to be a motor vehicle. For example, e-scooters that fit specific parameters have been declared not motor vehicles and do not require vehicle registration (NZTA, 2018). Based on the current road user rules, these devices can be used on the footpath, shared paths and roads other than a designated cycle lane that is part of the road, and helmet wearing is optional. The use of such devices on designated cycle lanes can be often observed, however, even though not legally allowed.

Since the maximum speed of most devices that fit the parameters of 'wheeled recreational devices' is approximately 25 km/h, there is no restriction on the devices' operating speed other than requiring riders to perform in a "careful and considerate manner" when using the devices and "not at a speed that constitutes a hazard to other persons using the path" (Land Transport [Road User] Rule 2004, Clause 11.1, 11.1A). The New Zealand Ministry of Transport (MoT, 2020) proposed an update of current road user rules, with possible regulatory modifications, including a new category of micro-mobility devices, speed limits when using on the street, and where these devices can be used in the roading system. Currently, the proposals are in the reviewing stage.

Auckland, the largest city in New Zealand, has a population of 1.5 million. Accompanied by the launch of the first shared e-scooter trial in the city, the use of micro-mobility devices in Auckland emerged as a craze in late 2018, but it is still in its infancy as a transport mode regarding decision-making and policy-making locally and nationally. Figure 1 outlines the timeline of rental e-scooter introduction and usage in Auckland from October 2018 to August 2020. There have been three segments of time when operating companies halted services, due to safety concerns (suspension of operation required by Auckland Council) and COVID-19 restrictions announced by the New Zealand Government. The scheduled new e-scooter trial in Auckland is anticipated to commence in early September 2020.

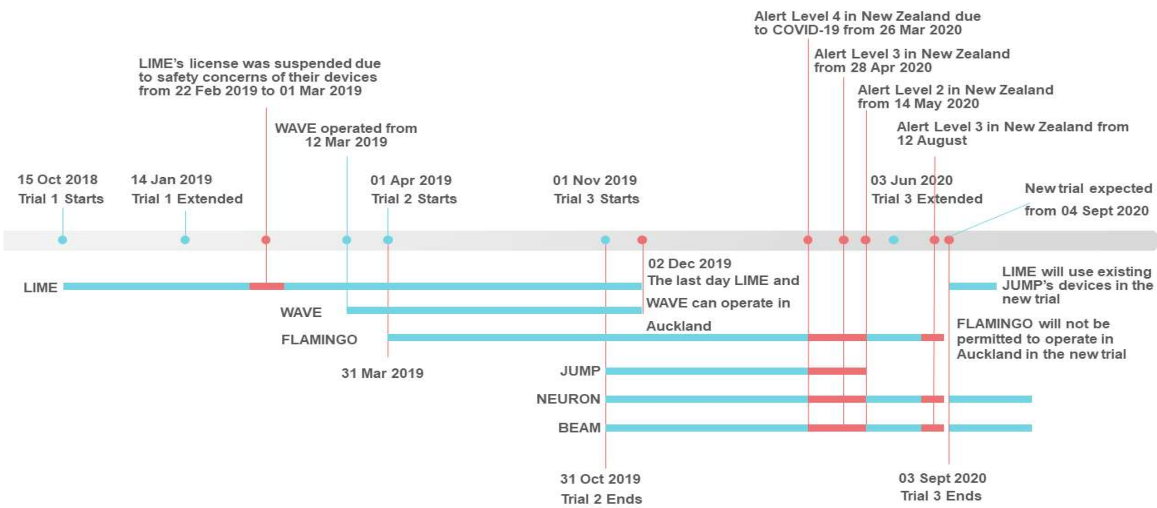

Figure 1: Timeline of Rental E-scooter Trials in Auckland, New Zealand (Data: Auckland Council Website; Mapping: author)

Auckland Council (2020c) has modified requirements for application, conditions of operation, and e-scooter Code of Practice (CoP) within each trial. It is also noticeable that the expectations of operators are stricter each time. For instance, with geofencing technology, more low-speed and non-parking zones were introduced each time the Council updated CoP, in the CBD and other major activity centres across Auckland, and licensed operation time per day was reduced from 20 to 18 hours. In the major entertainment zones, a curfew was layered on top of the permitted hours, after 9 pm on Friday and Saturday. The number of permitted rental e-scooters fluctuates as well: the cap was 1,875 during Trial 2, then 3,125 in Trial 3, and will be decreased to 2,490 in the new September trial (Auckland Council, 2020b).

However, the conditions and requirements in Auckland are only applied to rental e-scooters. Privately-owned micro-mobility devices were not affected by the restrictions of low-speed and non-parking zones. It can also be observed in the Auckland CBD that the use of those consumer devices was up to the riders' discretion of comfort and perceived safety, regardless of the shared scheme requirements. Rental e-scooter trials have also been operated in other New Zealand cities, but the required maximum speed varies.

Benefits and concerns of micro-mobility during the pandemic

Micro-mobility corporations were considered a niche operation and a craze at the beginning, but some have been growing as multi-billion-dollar businesses. It was estimated that this new market could be the next disrupted technology to impact future mobility, but the businesses themselves have been disrupted in the global pandemic. Not only were few allowed to operate, but people were also reluctant to use these services due to concerns of infection (Heineke, Kloss & Scurtu, 2020). Accordingly, many micro-mobility businesses were reported to have laid off employees and removed services worldwide (Hawkins, 2020).

However, the recent analysis pointed out that, once prepared for the 'new normal', the micro-mobility market could expect full recovery from the pandemic crisis and thrive in the long term (Heineke et al., 2020).

It has also been widely acknowledged that the overall air quality worldwide is improving due to the massive reduction of human activities and transportation induced by the COVID-19 lockdown policies (Chen et al., 2020; Mahato, Pal & Ghosh, 2020; Menut et al., 2020). Though the devices were claimed by many shared e-scooter companies to be advantageous of being less carbon-emitting and more sustainable, it is not certain whether they are indeed environmentally friendly. Though micro-mobility devices are electric-powered, for those devices to be deployed on the city streets each day would require delivery vehicles, the majority of which are gasoline-powered, to drive from site to site. Hollingsworth, Copeland and Johnson's study (2019) examined the environmental impacts, particularly the life-cycle CO_2 emissions, of shared e-scooters from the materials to the manufacturing, collection, distribution, charging, and disposal processes. They concluded that only if the system upgraded all the examined criteria could these devices reduce the environmental impacts from the transport system.

Replacing car trips, especially short-distance trips in the city centre, represents a strong indicator of how micro-mobility devices benefit from the public health perspective (Christchurch City Council, 2019), but other research suggested that approximately 55% of walking trips, a more active transport mode, may also be replaced (Fitt & Curl, 2019). This will inevitably offset some public health benefits.

Safety has been the major concern since the rollout of micro-mobility devices. New Zealand's Accident Compensation Corporation (ACC) received 2,432 injury claims during the first eight months from the launch of rental e-scooters in New Zealand (ACC, 2019). However, ACC (2019) also noted that e-scooter injuries claims remain low, both in numbers and monetary cost, compared with other recreational and active transport modes such as skateboards, kick scooters and bicycles.

One critical safety concern during COVID-19 was the hygiene of the devices. It was assumed the virus might stay on the surface of the devices, then transmit to a person when touching the surface. Virology studies reported that the time that the virus could stay on the surface varies depending on the surface materials, temperature and humidity (Chin et al., 2020; WHO, 2020). However it was also argued the chance of virus transmission by touching the surface remains low, and the virus can be easily killed by performing general personal hygiene (Goldman, 2020; New Zealand Ministry of Health, 2020; WHO, 2020).

Maintaining safe and accessible infrastructure for all is one of the main objectives of Auckland Transport (Auckland Transport, 2019). However, the parking for rental micro-mobility devices remains a major challenge. Though some space was allocated for scooter parking on the streets, many devices are still parked randomly by the riders, blocked the footpaths, shared paths and potentially creating an obstacle for others, especially those with disabilities. Managing street space for using and parking the devices will be critical to the existing and future walking and cycling infrastructure, as well as the sense of the public realm. More importantly, it will create a safer environment for people with disabilities.

During the pandemic, New Zealand cities introduced multiple approaches to maintaining public space as a safe environment. For example, in Queen Street - the main street in Auckland CBD - extra space was allocated for queueing around bus loading areas, footpaths have been widened in populous areas, and some space once used for street parking was transformed for non-driving activities while maintaining physical distancing. These approaches were made temporarily (the vehicular lane and the transformed lane were separated by plastic bollards) or permanently (the transformed lane was re-paved and elevated to the height of the existing curb).

Personal mobility in a time of uncertainty

To combat COVID-19, the New Zealand Government announced one of the world's most stringent 'four-level' lockdown alert systems (New Zealand Government, 2020). Except for frontline workers and essential businesses, all other activities during Alert levels 3 and 4 were allowed only on a restricted scale (shopping and exercise within the neighbourhood, for example).

Shared micro-mobility schemes were not allowed to operate in cities, and all the devices were retrieved from the street and made inactive. Meanwhile, with long-distance travel was suspended and public transport services reduced, the level of mobility and accessibility for locals dropped significantly (Apple, 2020; Google, 2020; NZTA, 2020). Currently, the government only allows shared mobility schemes to provide services within the cities under Alert levels 1 and 2, with compliance for maintaining the cleanliness of the devices and safe physical distancing (NZTA, 2020).

Though all the shared micro-mobility services were halted during Alert levels 3 and 4, micro-mobility did not vanish completely in the city, as the use of consumer devices was not affected. They were still often observed by the author during this period (Figure 2), and people used consumer micro-mobility devices in their neighbourhoods and in the parks for recreational purpose.

Figure 2: Using a micro-mobility device to 'walk' the dog during the level 3 lockdown in the park (Photo: Author, August 15, 2020)

Walking and cycling movements were also affected by the lockdowns. To record the daily cycling movements, Auckland Transport had set automated counting equipment across major commuting routes in the inner city. Though there had been a yearly decreasing trend of cycling from March to July (Figure 3), the cycle movements still dropped 8%, 4% and 24% respectively during the lockdown (March, April and May 2020), as compared with the same period in 2019 (Auckland Transport, 2020). Similarly, the recorded pedestrian movements presented in figure 4 shows a near 20-time drop in April 2020 compared with April 2019 (Heart of the City, 2020). It must be noted that both cycling and walking movement data were only collected within inner Auckland, where many jobs were required to be working from home during the lockdown. Data within residential suburbs regarding both categories were not picked up by authorities.

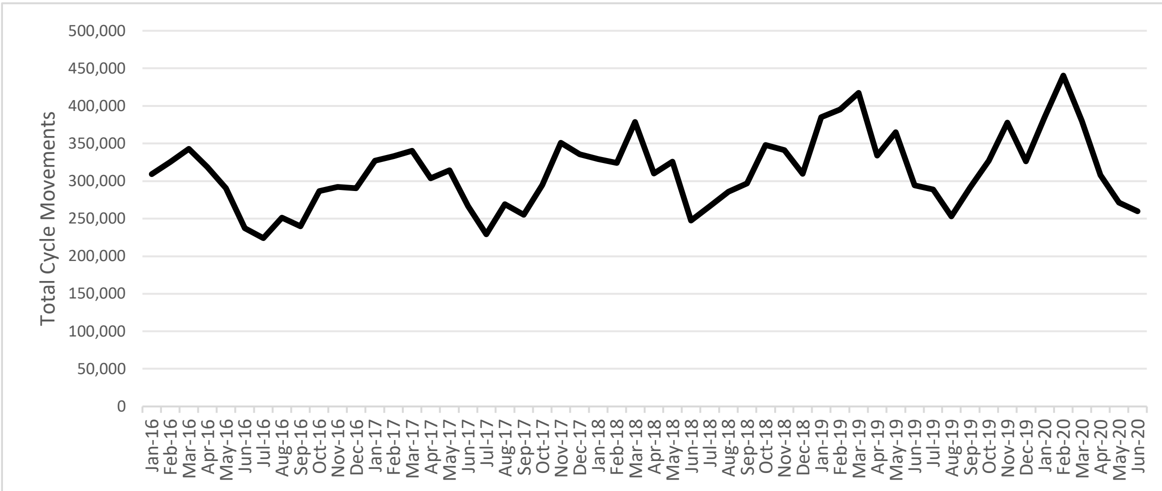

Figure 3: Recorded Total Cycle Movements at Auckland's 27 Sites[1] (Data: Auckland Transport, 2020; Calculation an d Mapping: Author)

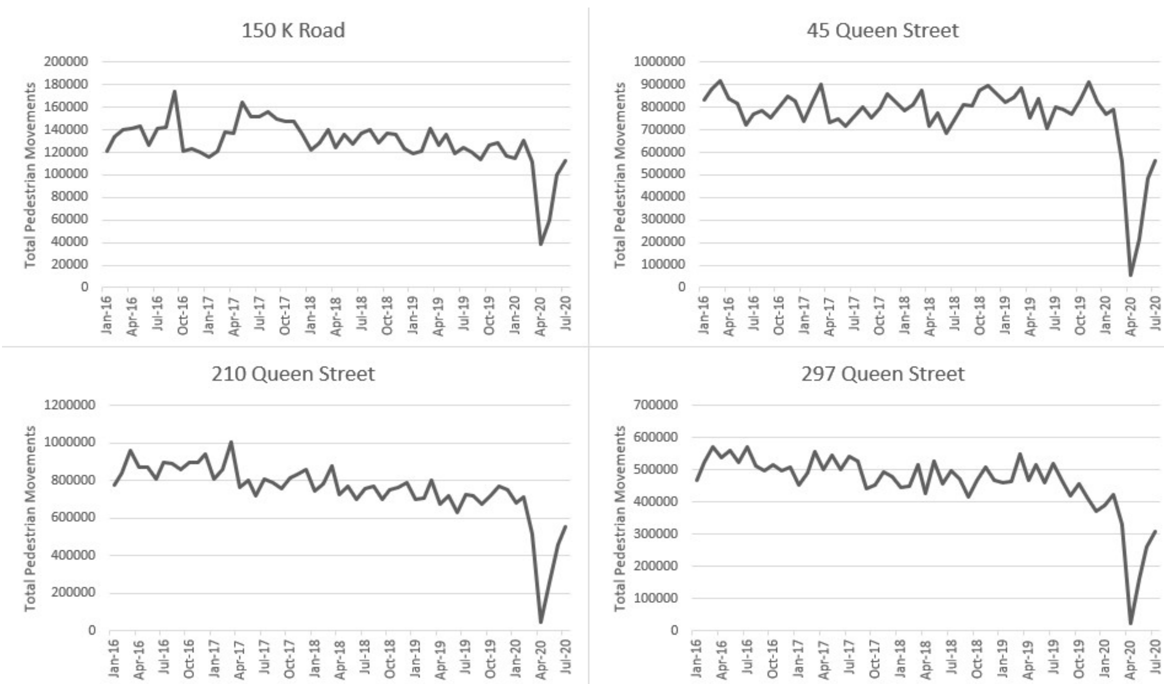

Figure 4: Recorded Pedestrian Movement at Auckland's 4 Sites (Data: Heart of the City, 2020; Calculation and Mapping: Author)

[1] The 27 sites used in this paper are: Beach Road, Carlton Gore Road, Curran Street, East Coast Road, Grafton Bridge, Grafton Gully, Grafton Road, Great South Road, Highbrook shared path, Hopetoun Street, Karangahape Road, Lagoon Drive, Lake Road, Mangere Bridge, Nelson Street Lightpath, Nelson Street cycleway, Northwestern cycleway (Kingsland), Northwestern cycleway (Te Atatu), Orewa shared path, Quay St (Vector Arena), SH20 shared path (near Dominion Road), Symonds Street, Tamaki Drive (both sides of the road), Te Wero Bridge (Wynyard Quarter), Twin Streams shared path, Upper Harbour Drive, Upper Queen Street

Current Challenges

Both figures 3 and 4 represented the continuous challenges of learning micro-mobility: the limitations of data. In Auckland, there has been no separate movement data of micro-mobility devices, regardless of the lockdown impact. Those movements might be inaccurately calculated into the existing pedestrian and/or cycling count data. For example, the pedestrian count only “records movements, not images” (Heart of the City, 2017, p. 1), it is hard to distinguish walkers from micro-mobility devices riders with the speed of walking. Similarly, riders at the speed of cycling might also be counted as a valid piece of cycling data. Though small in proportion, the impact would be diluted when considering micro-mobility as a feasible transport option. Meanwhile, there is no data collection on privately-owned devices’ movement. The unavailability of data inevitably creates uncertainties for future analysis.

There are multiple challenges when analysing the movement trends of micro-mobility devices during the ‘fighting-the-virus’ period in Auckland. All the rental e-scooters were inactive during Alert levels 3 and 4 lockdowns in New Zealand, thus, shared e-scooters’ movement could be expected to be zero. Public transport also adjusted to provide safe services. For example, Auckland Transport adapted some services, such as cancelling school buses and some late-night services, changing schedule frequencies, and limiting onboard capacities. For frontline workers and people who needed to travel during the lockdowns, the travel choices were further restrained with the nil shared micro-mobility network and limited public transport services, leaving the only feasible option for some as private cars or hired transport (for example taxis, or Uber).

Additionally, micro-mobility as transport is still in its infancy in New Zealand. When investigated for the perception of considering different transport modes during the pandemic, current NZTA (2020) research did not consider the use of micro-mobility as an option. Shared mobility was considered, but limited to private hire vehicles. Bikes and e-bikes were surveyed, but the policies and road use rules cannot be fully applied to a range of micro-mobility devices in New Zealand. The possibility for treating micro-mobility devices the same way as bicycles is beyond the scope of this paper, but an investigation would facilitate the utility of those devices.

NZTA has surveyed the general public of their perceptions of street use amid the pandemic response (NZTA, 2020). Due to less traffic and increased perceived safety, 58 percent and 60 percent of the participants, respectively, perceived the streets at Alert levels 3 and 4 as more enjoyable. However, this result does not mean the fewer-vehicle environment is by default better for other modes of transport, nor does it suggest that micro-mobility devices or other modes will replace private cars eventually. This information shows how important the street space is to daily users and highlights the possibilities to develop strategies of allocating street space for more non-vehicular mobilities that include micro-mobility. Reclaiming the street space for a lower speed will also echo the government’s ‘Road to Zero’ actions (MoT, 2019).

Though the New Zealand Government took a cautious approach regarding the use of shared transport services during the lockdowns, micro-mobility devices were welcomed by city governments in other countries as feasible alternatives for trips initially made by public transport or private cars. RideKC, a non-profit organisation in Kansas City, United States, offered free services of shared bikes and e-scooters for healthcare workers and small businesses for delivering purposes (RideKC, 2020). Similar free-of-charge use was also made available in cities in Australia (Neuron, 2020),

Additionally, public educational programmes about the proper use of those devices is of great necessity, to make trips safer for all, and to ease some hygiene-related concerns arose during the pandemic. There has already been some adoption of technologies such as self-disinfecting handlebar (Dickey, 2020). As technology improves, the devices will also be safer and more sustainable.

CONCLUSION

The vigilance required for controlling the pandemic, and the resolution of providing safer and more sustainable urban mobility will not change. The future of micro-mobility is still uncertain in the New Zealand context, but consideration of adopting them as feasible a transport mode, in author's view, should be on the agenda. Micro-mobility provides a new milieu for short-distance travel that previously involved private vehicles, and more effort should be made to avoid a modal shift to private cars in the post-pandemic era.

From the national level, the primary step requires the understanding of micro-mobility devices' role in the New Zealand transport system, including the spaces where these devices and services can be operated. This will pave the way for the integration of future mobility-as-a-service, and anticipate the long-term benefits for the urban mobilities. However, the lack of policies and regulations will challenge the future policy-setting process; the ambiguous data collection and analysis of privately owned micro-mobility devices will further widen this gap. There remain questions for corporations and city planners, and government needs to respond to a robust travel plan, particularly in a time of uncertainty. Micro-mobility can add to increased personal mobility, only before their safety, fast-paced industrial innovations and accommodations in the public realm can be understood.

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