From the ger districts to the city centre: contrasts and inequities of access and mobility in Ulaanbaatar, Mongolia

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Abstract

This paper focuses on access, travel and social equity in the *ger* districts of Ulaanbaatar, Mongolia. These areas, radiating outwards from the central part of the city, are home to approximately 60% of Ulaanbaatar's population and a considerable range of socio-economic groups. The few available studies on transport and mobility across the *ger* districts (e.g. Velez et al. 2016; ADB 2009) indicate a relatively low level of automobile access, creating high levels

of public or informal transport use. However, motorisation in Mongolia has increased (ADB, 2018). Drawing from a mixed methods research approach, the focus of this article is: what are the key mobility and access challenges facing *ger* district residents, and what social equity impacts do these have? This paper compares travel survey data from a *ger* district study site with data from an adjacent site in an apartment area linked to the core area of the city. Drawing from ethnography conducted among *ger* district residents, the paper then builds a higher resolution picture on the difficulties that residents face when travelling within their neighbourhood. The findings indicate that *ger* district residents face considerable access and mobility shortcomings compared to residents in central, built up areas of the city. Residents in *ger* districts are required to engage in considerably higher forms of innovation and collaboration to meet transport needs. This imbalance could perpetuate further motorisation in a city that already experiences high levels of traffic congestion in both *ger* district and apartment building areas.

Keywords: Public transport, mobility, equity, Ulaanbaatar

Introduction

Speaking with several people living in a harder-to-reach newer area of one of the case study ger *districts, residents often voiced frustration of the lack of equitable, affordable public transport. Private taxis servicing the area had become to be known according to their expensive price, literally called the '500 taxi' (*tavan zuun *taxi) referring to the 500 tögrög (approx. .20cUSD) price of a single 4-minute ride. One person told the researcher of their increasingly expensive price – firstly a ride in one direction had been 200 tögrög, then 250, 300, 350 and so on. Residents who need to navigate and traverse this socially and physically uneven landscape on a daily basis sometimes developed strategies to alleviate kinds of costs that they might incur. One man described how his children walked down the steep road from the more north-eastern area of the district towards school, but only caught taxis back home to traverse back more easily up the steep incline. A woman we spoke to, Saraa, had two children who attended primary school.*[i] *There are no primary schools in the district in which she lives. Her children need to travel each day beyond the main road at the far south of the* ger *district to an apartment area to attend school. This requires them to traverse the length of the district every day to get to school, crossing a main busy road to get there. The school, Saraa said, had for a while provided a school bus service. However, it cost 1200 tögrög [almost $0.50 USD] per child per direction, making it an extremely expensive option in a context where, if one was able to find work, they might earn 10000 tögrög per day [approx. $3.50 USD]. In an area in which people engaged in itinerant, fluctuating employment, this taxi fare is a considerable expense. If using the 500 tögrög taxi instead, she explained, her children can sit on each other's laps, where they are only charged the rate for one person. Fewer and fewer children used the school bus,*

and the school finally decided to stop the service. Saraa said that now her children use the taxi in the colder months, but because of this she worries every afternoon. Private taxis run according to need and do not have a regular schedule. Saraa described how she had no idea each day as to when exactly her children would be arriving home from school, creating daily uncertainty and concern.

Urban policy makers around the globe face the daunting challenge of making 'cities and human settlements inclusive, safe, resilient and sustainable' by 2030[ii] (UN, 2015). The opening vignette depicts the difficulties that families routinely encounter even for simple, local journeys to access school in Ulaanbaatar's *ger* districts, indicating considerable work to be done until the challenge is satisfactorily met. For lower-middle income countries, high rates of urbanisation can be regarded as deeply problematic given a relative scarcity of resources to improve transport infrastructure (Jacobs and Greeves 2003; Gakenheimer and Dimitriou, 2011) or unevenly applied land use policies and planning systems through which to encourage equitably applied mixed-use planning schemes that reduce the need to travel and promote wider accessibility (Kenworthy 2006; Hamiduddin 2018). The result is a familiar pattern of rapidly increasing car ownership, often led by an expanding urban middle class (Zhao 2014), polarising access and mobility between car 'haves' and 'have nots' (Brown & Taylor 2018) and giving rise to increased traffic congestion. As well as reorganising the spatial geography of access and opportunity (Holcombe and Williams 2012), the myriad local problems of intensive private car use include accidents, noise and local air pollution (Gärling and Steg 2007) that afflict all inhabitants. Globally, transportation accounts for 22% of global energy consumption (Newman & Kenworthy 2015), and in advanced economies such as EU member states, represents up to 30% of CO_2 (EU, 2020) – three quarters of which is produced by road transport (*ibid).* Motorisation therefore represents a core issue for urban environmental and social sustainability.

Cities of the global south commonly experience pronounced contrasts in the distribution of different forms of transport infrastructure that affect the mobility and access to opportunities of different resident groups (Hernandez and Titheridge, 2016). The distribution of land use and transport resources has significant implications for social equality and justice in-turn. Hernandez and Titheridge (2016) observe that those living in unplanned or partially planned areas on the urban periphery are often vulnerable to forms of social exclusion because of limited access to transportation to enable access to opportunities and activities in the urban core. Lucas (2019, 2) observes that 'transport inequalities are highly correlated with social disadvantage' and transport disadvantage is often underpinned by the spatial and financial barriers often experienced by poorer inhabitants living in urban peripheral areas (Button and Nijkamp, 1997). More specifically, Church *et al* (2000) identified the following seven transport-related factors that can lead to social exclusion: physical exclusion because of physical obstructions, geographical exclusion because services are too spatially inconvenient, exclusion from facilities because of distance from home, economic exclusion because of unaffordability, time-based exclusion because of scheduling or journey times, fear-based exclusion because of security threats, and space exclusion through the denial of access. In summarising the relationship between transport and social equity, Cordoba *et al* (2014) identify increased mobility as a factor to reduce social exclusion, while Matsuyuki *et al* (2020) note that increased mobility can often be assumed to be a proxy for poverty reduction.

Although cities such as Curitiba, Bogotá and Guangzhou demonstrate that equitable access to public transport can be promoted through early and proactive management of urban growth (Demoraes et al. 2010; Kenworthy 2017), many lower- and middle-income cities have already undergone rapid growth in recent years, without the benefit of extensive prior settlement planning. Ulaanbaatar, Mongolia's capital and largest city has doubled in size from 700,000 inhabitants at the turn of the twenty-first century to approximately 1.5m today (World

Population Review 2020). The bulk of new arrivals have settled into *ger* districts (Long 2017), vast areas that vary considerably in services and generally lack forms of core infrastructure provision including water, sewerage or centrally provided heating services (Plueckhahn 2021). In these districts many residents still reside in *ger* – collapsible felt dwellings that are typically used by Mongolia's many mobile pastoralists (Plueckhahn & Bayartsetseg 2018). Many people also build self-built buildings or hire construction contractors to build such houses, known as *baishin*, often leading to the *ger* districts consisting of a mixture of both forms of housing. Today, the *ger* districts house approximately 60% of Ulaanbaatar's population and constitute roughly 83% of Ulaanbaatar's built form (World Bank 2015, 1). This contributes to a low level of overall density compared to the more formally planned 'apartment areas' of the city that was designed using Soviet planning methods, stemming from socialist urban ideologies (2021) during Mongolia's socialist period. The relative sparsity of spatial form, together with the poor quality of many access roads in the *ger* districts, presents a difficult context within which to localise essential life needs through land use planning and provide affordable and more frequent and accessible public transport services to other parts of the city. At present there is only very limited publicly available data on accessibility and travel across Ulaanbaatar, and even less so in relation to the *ger* districts, meaning a weak evidence base to support urban planning and mobility policies. This paper aims to partly contribute to this shortcoming by comparing travel survey data from a *ger* district study site with data from an adjacent site in an apartment area linked to the core area of the city. The paper then builds a higher resolution picture on the difficulties that *ger* district residents face when travelling within their neighbourhood drawing from ethnography conducted among residents. Within the areas that the research was conducted, *ger* district residents need to navigate limited local travel provision and a poor walking environment on unmade and unlit access roads. For longer trips to other

parts of the city, these factors make for a poor first journey stage from home to available public transport.

As Geurs and van Wee (2004, 127) note, the term 'accessibility' has a number of possible meanings, in relation to land uses, transport systems, time, and individual needs and abilities. The relative and relational nature of accessibility forms the backdrop for the mixed methods approach used in this study. Whilst acknowledging the conceptual slipperiness of the term, we view accessibility using Dalvi and Martin's (1976) definition as 'the ease with which any land-use activity can be reached from a location using a particular transport system', where the transport system in question includes walking as well as motorised forms. The accessibility impacts of land use strategies and the distributional effects of transport interventions designed to improve mobility and societal participation are increasingly viewed by policy makers through the lens of social equity and justice (Litman, 2002 and 2019; Preston and Raje, 2007; Lucas, 2019). As the opening vignette to this paper indicates, travel in the *ger* districts can often be problematic. Reliable, inexpensive, and safe first and last mile access (Boarnet et al. 2017) to the city's strategic bus network is a particular problem for the *ger* district residents who participated in this study. Although car ownership across the ger districts is relatively low, with below 40% of households owning a vehicle (Velez et al. 2016), since the early 2000s, there has been a surge in car ownership (ADB 2009: 28). The latent potential for future motorisation therefore provides a subtext to this paper, and to the key question: *what are the key mobility and access challenges facing* ger *district residents, and what social equity impacts do these have?*

Ulaanbaatar's ger districts

In common with many lower and middle income cities, Ulaanbaatar continues to experience high levels of inward migration from the countryside, as well as internal migration between

urban districts as residents search for opportunities to improve their lives (Plueckhahn and Bayartsetseg 2018). The *ger* districts have played a core role throughout Ulaanbaatar's transformation from a monastic centre to modern-day capital city (Campi 2006). Ulaanbaatar, originally named Urga, began as a mobile city, centring around a Buddhist temple *ger* (Campi 2006, 37). After 1778, the city settled permanently, growing into a trading hub, with stone buildings constructed from the early 1800s (Ibid). During this time and into the early socialist period after 1924, 'ger districts' of fenced land plots containing *gers* remained a centrally important feature of the Mongolian urban form (Plueckhahn 2020, 2-3).

Ulaanbaaatar, meaning 'red hero', as it was known after the socialist period began in 1924, experienced waves of Soviet funded and assisted urban development (Boldbaatar et al. 2014) including the construction of apartments in the 1940s-60s, and a centralised district heating service that began operations in 1959 (Boldbaatar et al. 2014, 140). After the end of socialism in 1990 Ulaanbaatar experienced accelerating urbanisation as rural Mongolians left the vast social changes wrought by economic transformation and dismantling of collectivisation in the countryside and sought employment, educational and better access to health services in the capital. This accelerated urbanisation included increased expansion of *ger* district land plots, which was slowly and increasingly enabled through successive stages of privatisation and land tenure reform that occurred throughout the 1990s and early 2000s. This included an inclusion of a consideration of private property in the Mongolian Constitution in 1992 and the introduction of the 1994 Land Law – both which gave rise to the legal codification of forms of temporary possession, or *ezemshil*, that stemmed from Mongolian pastoralist uses of land (Miller 2017, 11). In 2002 an updated version of the land law was introduced that allowed urban land to be viewed more as a fiscal asset, cemented by the 2004 introduction of the Immovable Property Tax Law, allowing 0.07 hectare of land per family in Ulaanbaatar (Ibid). Given these developments and given the ways in which district (*düüreg*) governors were

initially in charge of providing land rights certificates during the mid-2000s, meant that the desire to grow voting bases incentivised urban sprawl (Ibid). Subsequently, Ulaanbaatar's population surged by almost a quarter in the five years between 2006 and 2011 (Engel 2015), compounding an existing shortage of apartment housing across the city. The ger districts around the centre of the city expanded, expansion that was enabled further through a 2010 amendment to the land law that granted 0.07 hectares of urban land not to families, but to individuals (Miller 2017, 12). This expansion of *ger* district land plots coincided with other political transformations that occurred from the ongoing 'transition' from socialist to postsocialist urbanisation – namely, the shift from Ulaanbaatar's urban form being shaped by sedentarist, 'ideologies' of centralised forms of planning during socialism, to a state reduction in funds following the introduction of a free market economy after 1990 (Sorace 2021, 245). The latter gave rise to shifts away from 'ideology' as a cornerstone of urban planning efforts, to a context whereby neoliberal governmentality has given rise to a reliance on outsourcing urban development and discourses of people being 'expected to take responsibility for their individual futures' (Sorace 2021, 254; Plueckhahn 2020). While relevant to context, and not the sole reason, this political climate has shaped subsequent government responses, or lack thereof, to the vast task of providing equitable infrastructure to an increasingly sprawling city.

Residents in the *ger* districts set up *gers*, which form a reliable, flexible and affordable form of housing that works well as an option for those who wish to build more solidly constructed homes but are unable yet to afford one (Terbish and Rawsthorne 2016). *Ger* districts not only constitute a location for low-income, rural-urban migrants at different stages of urban relocation, they also form attractive and affordable spaces to live for increasing middle-income citizens (Byambadorj et al. 2011). Overall, they lack running water, sewage systems and central heating across many districts (Dore and Nagpal 2006), meaning that one of the key distinctions between Ulaanbaatar's two main built environments, and one of the main determinants of

living experience between the two areas, is highly unequal infrastructural provision (Plueckhahn 2021). However, while apartment areas may contain centrally provided heating, running water and sewerage, the advantages of living in one area over another are not so clear cut and many different kinds of demographics live in both areas (Byambadorj et al 2011). Many people describe advantages to living on an open plot of land in the *ger* districts, including having the opportunity to grow vegetables or run a small business such as auto-repair (Plueckhahn 2020, 9).

The rapid growth of Ulaanbaatar's *ger* districts has created sharp land use distinctions. Apartment area districts contain a dense mix of land uses within which many institutional, educational and cultural activities, job opportunities and services are concentrated. As a consequence, *ger* district inhabitants are prone to be socially excluded due to the limitations of access to essential services, community participation and constrained social networks (Terbish and Rawsthorne 2016).

Mobility and Equity

The sharp imbalance between housing and employment between peripheral and core areas of the city creates strong inward and outward commuting patterns from ger districts into the city. Overall modal share by trip data collected by the Asian Development Bank in 2009 (ADB 2009) indicated a near parity of public transport and walking that account for approximately a third of trips each, followed by one quarter of trips by private car. An independent World Bank study in 2010 obtained a similar modal share profile, with the bus accounting for 34% of trips, followed by walking (30%) and private car (25%), to access work, school, and other activities (World Bank 2010, 34). In the first decade of this century, private car usage and car ownership grew faster than the population (ADB 2009, 28) which could have arisen through increasing prosperity for some, and access to easier credit or cars obtained through complex forms of

barter and interpersonal debt relationships (Plueckhahn 2020, 33). In the absence of substantial highway and public transport infrastructure, the city has experienced rising levels of traffic congestion and average traffic speeds as low as 14kph in 2009 (ADB 2009, 23). Road traffic vehicle emissions have been found to represent approximately 10% of the city's overall air pollution (Galimbyek 2015).

Ger district travel data remains very limited. A 2010 World Bank study (Kamata *et* al, 2010) obtained sample data from three *ger* districts, indicating that much greater travel by bus (58%) for trips, followed by walking (29%) that equated to the overall city average, but private car use (13%) was found to be approximately half of the city average (Kamata *et* al, 2010, 55). The study also noted the longer travel distances from home that many residents had to undertake to reach the closest bus services that typically ran on limited numbers of paved roads. Narrower roads within the *ger* districts are in the form of earthen tracks that are unsuitable for larger vehicles, and do not generally offer the prospect of being upgraded because of sharp corners and excessive gradients. As a result, residents often face long walks, including during the harsh winter months, when temperatures regularly reach -35C and such earthen roads freeze over for weeks at a time with frozen, compacted snow that has turned to black ice (Batima et al. 2005). In a household survey on social exclusion across two ger districts, Terbish and Rawthshorne (2016, 9) report that of the 57% of residents that used buses for the daily work commute, almost half (46%) had to walk between 500m and 1km from home to bus stop, "over difficult terrain, in poor conditions (muddy in summer, icy in winter and hilly) via complicated road networks as footpaths were non-existent". More generally, 80% of respondents described footpaths to transport nodes and water wells as poor, and lacking in street lighting, while onward bus services into the city were often unreliable and scant with 40-50 minute service frequencies not untypical (*Ibid*). Buses (which costs roughly 500 *tögrög* per ticket one way (approximately $0.20 USD) are not comprehensively available in the *ger* districts and minibuses (referred-to

locally as microbuses) and share taxis are available only on selected routes. The situation depicted therefore means that a private vehicle becomes a significant, if costly, asset. However, it is unclear how typical this situation is across other *ger* districts, whether coping strategies such as informal transport services have been developed by residents, and how specific groups are differently affected.

Methods

The overall aim of the research was to identify key travel and accessibility challenges facing ger district residents and consider the social equity implications of these. The research was organised around four specific shortcomings in the literature: (i) travel behaviour in relation to time and space, (ii) neighbourhood access to services and public transport, (iii) perceived barriers to access and mobility, and (iv) experiences of travel among different groups and how these alter travel behaviour. The empirical research was designed to explore these factors in a single case study site, using a mixed-methods data collection approach as set out below.

i. *Research Site*

The empirical research was conducted in part of the Songinohairhan district – one of Ulaanbaatar's four main districts (*düüreg*), approximately 5km west of the city's central activity zone around Suhbaatar Square. The research site comprised a cross section (Fig.1) orientated on a north-south axis that consisted of an 'apartment area' sub-district (*horoo* 12) to the south and the side-by-side ger area sub-districts (*horoos* 31 and 43) to the north.[iii] The north-south axis of the research site combines different built environments commonly found in Ulaanbaatar, from socialist-era apartment developments from the 1950s in the south, through the well-established 'central' and 'mid-area' ger districts, to which several people interviewed arrived to live in the late 1990s, as well as the most recent 'fringe' ger district areas in the north

of the site. A main, arterial road separates the apartment area from the *ger* district, creating a significant physical barrier between the apartment areas and the *ger* districts that residents living in *ger* district need to negotiate. Because of this, this road also formed a natural subdivision of the overall research site for data collection purposes.

INSERT FIGURE 1 HERE

This site was chosen because it also presented additional contradictions found elsewhere in Ulaanbaatar (although it should be noted that Ulaanbaatar's urban districts can be quite different in their qualities and accessibility). The study site ger district is not geographically far from the centre of Ulaanbaatar and it is also close to a main road that passes to the south of the district. However, residents of the *ger* district study site, despite their proximity to the main areas of the city, still experience considerable barriers to public transport access and considerable commuting times either when walking, when travelling in cars or by taxis or bus. In common with other *ger* districts, the barriers are both topographical and infrastructural in nature. The district's many dirt roads are too narrow or steep to accommodate bus services.

The apartment and *ger* district study sites exhibit profound differences in their physical layout and provision for different transport modes. The apartment blocks of *horoo* 12 are in close proximity to the main East-West bus routes along Peace Avenue to the south (Fig.2), as well as local services to other parts of the city. However, provision for the private car is restricted by the limited car parking provided at the edge of each apartment block. The apartment blocks are organised around large community spaces, typically containing recreation facilities,

community facility and some local retail services. Larger retail outlets and restaurants are located on the outside or street-facing sides of apartment buildings.

INSERT FIGURE 2 HERE

By contrast, the study ger districts have little direct public transport provision, with local bus services skirting the southerly perimeter of the ger area on 1st Horoollyn Aryn Zam (street), and trunk routes on Peace Avenue 400m further to the south. The 2km distance between the bottom of the district that meets the road and the mid north of the *ger* district is serviced by share taxis that travel to and from meeting points. The roads these taxis travel on include narrower dirt roads that run throughout the *ger* districts and are susceptible to summer floods and winter ice. However, the generously sized residential fenced land plots, known as *hashaa* (after the word for 'fences) often provide copious private parking for vehicles. Otherwise, small business and shops are largely concentrated around the main access road, close to the main road on the southerly boundary. Local shops serve as main taxi stands where these private taxis collect customers on pre-established routes well known by residents. These taxis are run independently and are not connected to a formal taxi company.

Data Collection

The data collection consisted of two elements that received ethics approval from the researchers' respective institutions. Firstly, a quantitative research phase consisted of a household travel survey that was undertaken in May 2019 across both *ger* district and

apartment area residents to enable comparisons to be drawn. A total of 380 randomly distributed questionnaire surveys were collected, consisting of 128 from apartment area and 252 from the *ger* sub-districts. A phone voucher worth 1500 tögrög or approximately $1 equivalent was used as an incentive to attract passers-by into the survey point – an approach successfully used elsewhere in the city (JICA, 2013). The survey was adapted from a previous study undertaken in Germany (Hamiduddin, 2018) and asked residents to provide information on primary aspects of travel relating to themselves and other household members, questions on travel habits within the sub-district, and barriers to travel experienced specifically by the respondent.

To capture resident experiences of travel within the *ger* districts, the second element of data collection was an anthropological, qualitative phase consisting of participant observation and in-depth interviews undertaken in October 2019. This research attempted to socially map the two districts. Through gathering residential reflections, interviews, and the researcher's own travel on public transport options and walking through the district, they were able to ascertain areas that were older and newer, and the way in which taxi services provided forms of access for residents to meet main transport bus services on the other side of the apartment areas. The researcher visited residents in their homes in multiple areas within the district and conducted shorter interviews with commuters, seeking to understand their priorities and perspectives on the surrounding physical and material landscape, as well as the way they negotiated the area on a daily basis. In order to recruit research participants, the researcher, accompanied by a research assistant, approached people walking in the street and also set up an information booth about the project at a prominent taxi stand. In addition to talking with people in the street and visiting people in their homes on their invitation, the researcher with their permission travelled with commuters in taxis and while walking as they accessed employment or school for their children or grandchildren. The anthropologist also accompanied municipal workers around the

ger district as they visited homes conducting health awareness campaigns around the government-initiated implementation of an alternative to raw-coal for heating, conducting shorter interviews with these residents. All participants signed written consent forms when taking part of this qualitative phase of the project. The researcher aimed to reach a broad cross-section of elderly, middle-aged and younger participants of both genders. The research also conducted ethnographic observation of peoples' use of material environments, the correlation between home location, topography and transport access.

Findings: Apartment and *ger* districts compared

The quantitative travel survey data conducted in both *ger* district and apartment areas produced a number of contrasts in travel behaviour and opportunities. The results of this survey (Table 1) showed that car ownership was found to be at 41% in the *ger* district but markedly higher in the apartment area (56%). Correspondingly, private car commuting was slightly higher among apartment area residents (31%), compared to 26% in the *ger* district. However, the higher density and formal mixed land use planning of the apartment area also seems to have had the effect of localising a greater proportion of work travel, with 22% of residents walking as their main commuting mode, compared to just 11% of *ger* district residents. Conversely, bus-based commuting was markedly lower among apartment area residents (41%) compared with over half of *ger* district residents (53%) who used the bus as the main mode of commuting transport to different areas of the city.

INSERT TABLE 1 HERE

Spatial patterns of commuting and travel

Spatial commuting patterns among both apartment area and *ger* district residents were found to be both highly concentrated to specific areas of the city, and oriented towards specific types of travel (Figs. 3 and 4). The following three geographical clusters of employment can be observed: (i) within the apartment area of *horoo* 12 and predominantly based on walking, influenced by the dense and mixed land use structure there, (ii) the area of the inner city (that houses the majority of commercial buildings and apartment areas) and primarily based on bus commuting (iii) the south of the city, one of the city's prime sites for light industry and warehousing close to the railway line, and also where new apartment areas of the city are being built. The latter likely indicates people seeking work in the construction sector. For the third cluster, commuting is predominantly undertaken by bus or private car.

INSERT FIGURE 3 HERE

INSERT FIGURE 4 HERE

The commuting patterns shown in Figures 3 and 4 show that the central area of the city is of comparatively modest importance for employment and that the planned, mixed-use apartment

area is significant for economic life. The data also indicates a predominance of *ger* district residents travelling outside of their district for work.

Barriers to Access and Travel – Roads and transport possibilities

During the qualitative phase of the project, interlocutors highlighted road conditions as one of their main concerns. The main paved road that arches up northward into the district was the main way *ger* district residents needed to travel to connect to bus services and the city centre. Its presence, combined with its inability to support a bus route due to its narrowness and condition of the road meant that many research participants viewed it as a site of disconnection as well as connectivity and freedom (Dalakouglou and Harvey 2012, 460). The remaining roads in the district are mainly dirt roads of varying width and grade, except for one new sealed road being extended into the district. This was being built during the time of fieldwork in October 2019, and residents speculated that the way it was built meant that it would not be wide enough to accommodate a bus network.

The qualitative research indicated how much road conditions influence transport access and provision between the apartment and *ger* district study areas. A commuter wishing to access the *ger* districts without a private car would need to continue by foot from one of the bus stops on the main road that forms the southern boundary of the district, cross at a pedestrian crossing at a busy main road that has constant streams of traffic and head up a rough dirt track to the taxi stand approximately 100m beyond. The commuter then has the choice of walking the lengthy, steep incline into the *ger* district, or to take a private, shared taxi. There were two choices of taxi-route. Arching northwards in two prongs, one route, taking approximately 4 minutes, goes northwest to a small grocery store that has become a share taxi terminus. The stop (named after the store located next to it) reaches midway north-westwards through the district. The other ‘prong’ taking about 10-12 minutes to travel stems out north-east, extending

much further up into the district up a significantly steeper incline. Due to the inclines needed to be travelled, this taxi service provides a fundamental transport option.

The economic parameters surrounding the provision of the private taxi service shape the nature of this particular form of transport provision. The taxi drivers drive back and forth along the two routes, waiting for enough customers to join before driving back between these points. Waiting until a taxi was full meant that sometimes a taxi driver would just decide it wasn't worth the trip. In off-peak times, such as the middle of the day, this meant that passengers needed to wait in a driver's car until the driver decided to leave or walk instead. The steep hills that formed part of these district meant that during off-peak times, elderly people or pregnant women were left without a viable transport option if they don't have alternative access to a car. Significantly, the taxi journeys themselves, while they are often quite short, are a quite expensive option for many. Both routes cost 500 tögrög per person one way for this short trip (approximately .20c USD) (also the flat rate for a potentially much longer bus journey in the city's bus system). If they were the only potential passenger, a person could offer a taxi driver 2500 tögrög (approximately $1USD) to make up the cost of a full car. However, given that an average daily wage would roughly be 10,000MNT ($3.50 USD) this is an extremely expensive amount for people to pay for such a short (although steep) journey on a regular basis.

Central to the necessity of the taxi routes is the undulating topography and poor road conditions of the district. Walking the length of the north-eastern taxi route, especially in winter, is an extremely arduous and lengthy task. The roads stemming into this area consist of thin dirt roads winding between fenced *hashaa* land plots and buildings, roads that are marked and furrowed after much snowfall and thawing. These roads are increasingly steep closer to north-eastern end point of the district (fig 5):

INSERT FIGURE 5 HERE

Road access and conditions were also reflected in the quantitative travel survey data. Survey respondents were asked about the extent to which they felt that their mobility was restricted by factors, relating to the qualities of their neighbourhood (sub-district). Table 2 shows that apartment area residents were strikingly ambivalent in their overall assessments of the influence of neighbourhood transport, walking conditions and street lighting on their mobility within the neighbourhood. The threat from feral animals, including dogs that are problematic in parts of the city, were found to be less of a problem. By contrast, *ger* district residents registered much high levels of concern overall, with the poor walking environment and the threat from stray animals found to be notable constraints on local travel, and significantly above 'other' personal safety concerns.

INSERT TABLE 2 HERE

A similarly striking division between apartment and *ger* district residents was found in relation to public transport travel to work (Table 3). Approximately two thirds of *ger* district residents reported problems with physical access to, or reliability of, transport services to the extent of it impinging on their or a member of their household's employment, compared to one quarter of apartment area respondents. The heavily disjointed journey that many *ger* district travellers undertake to reach other parts of the city is reflected in the pronounced differences of Table 3.

INSERT TABLE 3 HERE

The taxi solution

During the qualitative phase of the project, several *ger* district residents remarked upon the profitability of being a taxi driver in this *ger* district, given their necessity in the face of a lack of other transport options. The steepness of many of the roads arching away from the main road in the south, and the poor conditions of these roads, meant that one has to know how to drive on them well and safely. These taxi drivers have the accumulated, embodied knowledge to be able to drive quickly, navigating these roads with skill. On several of the taxis, the body of the car was elevated higher on the wheels, allowing more clearance underneath. The taxi drivers, through their technical and business acumen, as well as driving skill, provide an essential service.

The north of the district arched into several undulating hillsides. Up the top of these hill sides, the *hashaa* land plots were newer and more sparsely located (Fig. 6). They were also closer to power pylons that connected power between areas of the city. According to those we interviewed, these were newer *hashaa*, set up by those who had come to the district more recently. They are also located further away from educational, health or municipal services. Walking up the north-eastern sections of the district form a burdensome daily journey for many school children.

INSERT FIGURE 6 HERE

Conversely, those who lived closer to the main road at the other end of the district, and did not need to use taxis to access bus services, were living in what was described as older *hashaa* that had been set up during the late 1990s when land closer to the city was much more freely available. This flatter, more centrally located, land was the first land utilized for *hashaa* in this area. The history of the expansion of these two districts, made along topographical lines (lower areas that had been settled first, followed by higher, hilly areas settled later), had given rise to a transport 'gap' that was being met by the privatised taxi services. Here, topography had become a way in which the material nature of the district had impacted and shaped access and transport discrepancies – discrepancies that had long historical roots (Dalakouglou and Harvey 2012, 460).

Journey Times

In the *ger* district case study area, the quantitative survey data reveals consistent and substantial differences in average self-reported travel-to-work times between bus users (56.7 minutes) and every other main mode of transport used (Table 4). Residents who walked as their main commuting mode experienced the shortest overall travel times – at 26.8 minutes, corresponding to the location of employment within or in close proximity to the district. Car, taxi and informal mode users had consistently similar travel-to-work times of approximately 34 minutes +/- 1 minute, which are closer to the global average commuting time of 41.6 minutes in each direction (Irish Times 2018).

INSERT TABLE 4 HERE

Drawing from the qualitative phase of the project, the following vignette characterises the problems that *ger* district residents often confront with accessing other parts of the city:

Late one afternoon, I (one of the authors) sat talking with municipal workers in the district office. I started preparing to leave at one point, but a unit leader pointed out the window to the main road connecting this particular ger *sub-district (*horoo*) to the city – it was completely congested with traffic. Cars sat closely idling one after the other with glowing head and taillights, the exhaust smoke rising up in the freezing early evening temperatures. We were not going to be able to drive back any time soon, so my research assistant and I sat with the municipal workers and waited into the evening in the* horoo *office for the road to clear.*

The quantitative household survey data also revealed pronounced gender-related differences in the travel experiences of *ger* district residents (Table 5). In particular, female survey respondents more frequently felt that their travel within the neighbourhood was limited by poor transport within the neighbourhood, poor lighting at night and by the threat posed by stray animals. Female respondents also reported greater problems with accessing public transport, where respondents highlighted that this was mainly due to the distance from home to transport stop. These respondents did not express a greater overall level of concern over personal safety on board public transport compared to men. In the qualitative section of the research, female respondents highlighted the difficulties of assisting children to access school (as seen, for example, in the opening vignette to the article).

INSERT TABLE 5 HERE

Summary

This mixed methods research has revealed significant differences in the travel-to-work behaviour of respondents of two neighbouring apartment and *ger* district sub-districts. There

were 25% less car users among *ger* district residents and a correspondingly higher number of public transport users. In turn, access to public transport was problematic for a high proportion of *ger* district residents because of narrow dirt roads that are unsuitable for feeder transport services. The narrow dirt roads within the *ger* districts together with a lack of comprehensive street lighting make for a poor pedestrian environment. The data also shows that female residents are more likely to have their mobility restricted by these shortcomings within the neighbourhood.

Discussion and conclusions

This paper set out to address the following question, *what are the key mobility and access challenges facing* ger *district residents, and what social equity impacts do these have?* The analysis presented from quantitative household travel surveys, as well as qualitative ethnographic participant observation and semi-structured interviews indicates a high overall travel burden experienced by *ger* district residents. The burden is multidimensional. With more than a half of residents using the bus as their main commuting mode, these travellers experience an overall journey time to places of work and education of 55 minutes per direction – a very significant time burden in the context of a comparatively small city. Overall journey times appear to be influenced both by the first journey stage – the walk or share taxi to access public transport – as well as generally slow bus services within the wider city overall. The informal share taxis used by many travellers within the sample *ger* district adds considerably to the financial burden – in many cases doubling the overall cost of a journey. In addition, the research also highlighted problems with journey time reliability caused by acute road traffic congestion and frequent waits for share taxis. Although first journey stage travel distances are often not long, topography, road conditions, extreme winter weather conditions and safety concerns means that walking is often the least preferred or suitable option for many travellers,

particularly women. Comparing apartment area and *ger* district spatial commuting patterns, the quantitative data indicates that a smaller proportion of *ger* district residents work close to home and within their neighbourhood compared with apartment area residents. It appears that a greater proportion of *ger* district residents must travel outside of the neighbourhood to make a living.

Roads highlight one of the main material differences influencing transport access and provision between the apartment and *ger* district study areas. During the qualitative research phase, residents were happy to point out to the researcher that a road stemming away from the main arterial road in the *ger* district was being graded, later to become a sealed road. One interlocutor stated that she was pleased that it was being done and that the main municipal government was overseeing sealing this road. However, they also expressed frustration that this road would not be wide enough to support a bus connection. This was due to the presence of established land plots that already bordered the road, where implementing government initiatives to reclaim land from land holders is a costly and lengthy process and unlikely to occur. The road had only been sealed where the existing dirt road once lay so not to encroach on other's land the bordered the road. Because of these factors, the road grading and sealing would provide easier access for smaller vehicles and cars, but not necessarily become a site of future public transport connectivity that would benefit many. With a lack of clear future expectations of comprehensive improvement, phenomena such as topography, costs, road conditions and traffic became signifiers in themselves, speculative nodal points through which residents attempt to understand and provide commentary on their experiences and surroundings.

Many residents of this particular *ger* district experience a city that often excludes them because of access difficulties, including unlit streets. They are serviced by transport that often fails to be resilient to disruptions or seasonal effects. At a focus group held with 11 district social

workers during the quantitative phase of the project to interpret the findings of the travel survey, the question of car ownership arose. When asked whether they aspired to be car owners and drivers the group erupted in laughter at such a seemingly ridiculous question. 'Yes!' came the emphatic response. The aspiration for personal automobile use might not be possible for all, but inclusive, safe and resilient accessibility by other travel modes would do much to enhance equity of access overall.

With these specificities in mind, the findings from this research indicate some possible avenues for improving access in contexts where infrastructure is grossly unevenly provided, and topography and road conditions present significant specific challenges, within the vast extent of Ulaanbaatar's *ger* districts. Stemming from the complex types of 'situated experiments' (Ong 2011, 2) described in this article, from the strategies and priorities of residents, to privately provided taxi services – the following suggestions may provide ways of assisting access that suits the ways that residents already produce and inhabit the *ger* districts and beyond (Roy 2011, 310):

i. Expand taxi services: by enhancing the ability for existing privately-run taxi services to expand their routes along existing roads – through both coordinated consultation between taxi drivers and local municipal officials. This could include expanded regulatory processes that encourage more homogeneity and consistency of services. One way to make this more worthwhile for taxi drivers is to expand their services into other areas such as providing deliveries. The authors are currently involved in a trial with a taxi union to test the feasibility of delivery services and passenger services to outlying areas of the *ger* district case studies, using a revolving fund to enable cross-subsidy between profitable and less profitable services if necessary.

ii. Improve neighbourhood-level mobility: through urban realm enhancements to prioritise walking and other forms of 'micro-mobility' (Madapur et al. 2020), to permit safe, convenient and continual first/last mile access to all areas. This can include increasing the number of durable footpaths, small footbridges to cross ditches or small waterways, and increased street lighting on these footpaths and roads more generally. Such interventions would benefit a wide range of groups, from household members collecting water, to the elderly and mobility impaired.

iii. Road improvements: this research has noted recent missed opportunities to include public transport services in *ger* district road improvement projects, and how an arterial road serves as a significant barrier, cutting the *ger* district area off from the adjacent apartment area. The splintering effects of the highway infrastructure (Hernandez & Dávila 2016) could be addressed through short term measures including footbridges, overpasses, or underpasses.

iv. Innovative solutions: cable-cars have emerged as a cost-effective solution for connecting unplanned settlements on the steep hillsides surrounding Latin American cities such as Medellín, Colombia (Davila *et al*, 2013; Matsuyuki *et al*, 2020) and La Paz, Bolivia (Garsous *et al*, 2019). This approach could be feasible for Ulaanbaatar which, like Medellín, has grown laterally in a river valley. A key aspect of Medellín's success has been the integration of the 'metrocables' with the main urban metro line (Brand and Davila, 2012), which could also be replicated in Ulaanbaatar with an axial public transport system that has been proposed to serve the core area of the city.

Implementing these measures would be some ways in which to address inequity of access across Ulaanbaatar and to potentially provide long-term alternatives to private car travel. It is interesting to note how the older, inner-city *ger* districts have densified over time, with larger permanent buildings replacing *gers* and small enterprises established in *haasha*, providing local employment and services (ADB, 2009, 10). Some densification is likely to occur in outer *ger* districts over time if household incomes increase (*ibid*). This could both help to create improved provision of local services and better conditions for public and shared local transport services.

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Appendix 1 Figure captions

Figure 1: Case Study Site

Figure 2 Showing part of a ger district with the apartment area behind

Figure 3: Commuting geography by main travel mode: Apartment Area Residents

Figure 4: Commuting geography by main travel mode: Ger District Residents

Figure 5: Ger district showing the dirt roads and land plots demarcated by *hashaa* (fences).

Figure 6: North-eastern, sparsely populated reaches of the district.

Appendix 2 Table captions

Table 1: Summary of commuting data

Table 2: Perceived neighbourhood Travel Barriers (1 = low / 5 = high)

Table 3: Factors Affecting Travel to Work

Table 4: Average reported commute times for ger district residents, by mode

Table 5. Gender differences in the travel experiences of ger district residents

[i] Pseudonyms are used throughout this article.

[ii] UN Sustainable Development Goal 11

[iii] The researchers initially set out to research *horoo* 31 in Songinohairhan District. However, over the course of this research, *horoo* 31 divided into two sub-districts, *horoos* 31 and 43. To keep the research project consistent across the qualitative and quantitative phases of the research, authors conducted research in both *horoos* 31 and 43. Despite the administrative subdivision, transport needs and usage of residents remained consistent throughout the research phase.