CHALLENGES TO DELIVERING CHANGE OVERNIGHT: BUS REFORM IN ULAANBAATAR

Jean Paul Velez
The World Bank
1818 H St NW, Washington, DC 20433
Tel: 202 473-5550 Email: jvelez@wordbank.org

Yang Chen
The World Bank
1818 H St NW, Washington, DC 20433
Tel: 202 458-8618 Email: ychen3@wordbank.org

Khaliun Bat Orig
The World Bank
1818 H St NW, Washington, DC 20433
Email: kbatorig@wordbank.org

Arturo Ardila Gomez
The World Bank
1818 H St NW, Washington, DC 20433
Tel: 202 473-5861 Email: aardilagomez@wordbank.org

Word count: 6,844 words text + 2 tables/figures x 250 words (each) = 7,344 words

Submitted on August 1, 2016

ABSTRACT

This paper discusses the challenges to efficient public transport service provision in Ulaanbaatar, Mongolia, and the planning and implementation of the recent 'Smart Bus' reforms, to reflect on current public transport reform practices in cities in developing economies. Faced with deteriorating transport conditions, and lacking resources to move forward with desired mass public transport infrastructure investments, Ulaanbaatar opted to use the introduction of new technologies and regulatory reforms to catalyze improvements in service quality, financial management, and broader sector management. Based on two years of research and technical assistance efforts carried out by the World Bank in Ulaanbaatar, the general context of transport in Ulaanbaatar, the motivations and ultimate design of the reforms, and their early outcomes are presented.

Keywords: Developing countries, public transport reforms, concessions, ITS.

INTRODUCTION

Ulaanbaatar, the capital of Mongolia, is home to 1.4 million people, accounting for 47% of the total national population (*1*). It is the national epicenter for government, industrial, financial, and cultural activities. From 2010 to 2014, Mongolia enjoyed a significant mining boom, leading to an annual average GDP growth rate of 11.1% (*2*). During this period Ulaanbaatar became a prominent international hub for investors, and the banking and construction sectors thrived. Migration from rural areas to the capital city saw an important increase during those years. More people and more activities led in turn to an important increase in transport demand in the city, which in 2014 amounted to 3.4 million trips per day (*3*). However, transport infrastructure and services in Ulaanbaatar were limited, and most citizens endured long commute times, congestion, and transport-induced air quality problems.

In recent years, both the National Government of Mongolia (NGM) and the Municipal Government of Ulaanbaatar (MGUB) had explored various infrastructure projects to improve transport conditions in the city, most notably plans of building a metro system and a BRT system. However, by the fall of 2014, economic growth had slowed down considerably, and neither project had taken off the ground; meanwhile, transport conditions in the city continued to deteriorate, and citizens' complaints were growing louder. As a result, the MGUB decided to implement a series of reforms to improve the quality of bus services in the city. These reforms combined the introduction of an integrated fare collection system and other intelligent transport systems (ITS) tools, with strategic regulatory reforms, to catalyze improvements in service quality, financial management, and broader sector management. The reforms were put in place in July 2015; six months later, in December 2105, the reforms had failed to deliver any of the desired outcomes.

This paper illustrates the case of Ulaanbaatar and the 'Smart Bus' reforms to reflect on the challenges faced by many cities in developing economies where public resources are limited, but the needs to improve transport conditions are pressing. Changes in regulations and other 'soft' measures might be a tempting alternative to deliver improvements at a limited cost; however, just as in the case of 'hard' infrastructure projects, soft initiatives cannot be improvised and ought to be supported by comprehensive planning processes. In Ulaanbaatar, as in many other cities in developing economies, political expediency drove the planning and implementation of the reforms, often disregarding known sector best practices.

Following this Introduction, the paper offers sections on the general transport conditions in Ulaanbaatar, and a closer look at the public transport system, to then discuss the planning and ongoing implementation of the Smart Bus reforms, and finally concluding remarks reflecting on the observed outcomes.

URBAN TRANSPORT IN ULAANBAATAR

The city and its transport infrastructure

Ulaanbaatar had been developed in low urban density patterns, averaging only 3,419 people per square kilometer (*4*). In the central areas of the city, urban forms seemed to derive from Mongolia's soviet-style legacy of city planning. Large-size blocks served as the structural element, buildings showed limited heights (4-5 stories on average, 10-12 stories for the highest buildings), and generous open space allocations were distributed widely in the form of frontages or inner-block courtyards. In the more peripheral areas of the city, the observed pattern was a patchwork of plots divided by fences, and occupied with detached single-unit homes ranging from traditional gers (or yurt, a portable, round tent covered with skins or felt used as a dwelling by nomads in the steppes of Central Asia) to more permanently built structures. Low-income citizens populated many of these areas, living in gers (thus the name 'ger area', used as proxy for low-income neighborhood) and lacking basic infrastructure and services (paved streets, sidewalks, parks, streetlights, water and sanitation, schools, and hospitals).

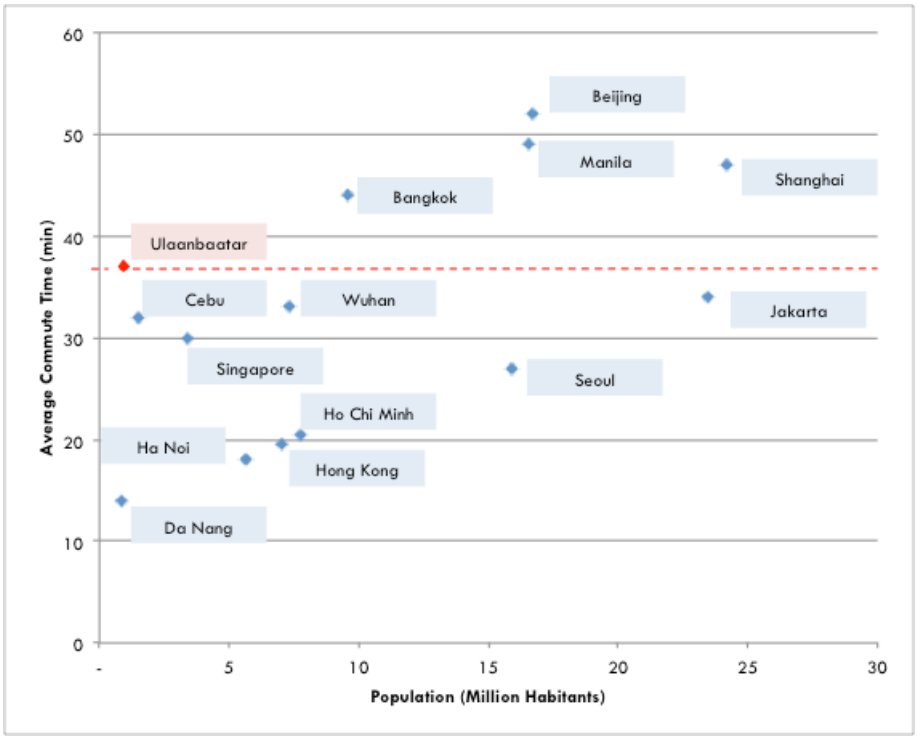
From a land-use perspective, at a city wide level, Ulaanbaatar showcased a highly segregated monocentric structure. The city's central business district (CBD), located at the very core of the central area, agglomerated the large majority of government agencies, businesses, trade and services

organizations, cultural institutions and universities. The city did not have any other significant activity centers in other areas of the city. As such, on a regular workday, in the morning most people traveled to the CBD, and in the afternoon most people headed back to their homes from the CBD – this dynamic placed an immense amount of pressure on that very confined area of the city and the transport infrastructure that served it. At the neighborhood scale, land use segregation was also widespread. Neighborhoods in the soviet-style central area featured a clear functional division of land-uses, with government, office, commerce, and residential uses distributed in isolated block sets, and with very restricted mixed-use areas. The ger areas were in their vast majority residential areas, and were poorly equipped with services or activities. In fact, people living in the gers often had to travel to the central area to go to work, school, see a doctor, or conduct other basic activities.

The road network was the city's the main transport infrastructure; however, the road network showcased an unbalanced road hierarchy and was poorly maintained. The road network consisted of 630 km in total, including 132 km of primary roads (21%), 140 km of secondary roads (22%), and 358 km of local access roads (57%) (*5*). These figured revealed that, compared to best practices, Ulaanbaatar's road network lacked secondary roads providing inter-district connectivity. The city's two distinct urban form patterns also had an impact on the road network. In the central area, there was a structured network of paved streets, marked by a clear grid with a noticeable hierarchy. However, the road density was limited by the central area's large block pattern, with very few roads serving inter-district, while dead end tertiary roads only provided access into the blocks but added very little connectivity. In the ger areas road quality was very poor, as only 10% of streets were paved, and the landscape consisted of steep hills and other complex terrains (6). Moreover, very few roads reached out to the rapidly growing edges of the city, and secondary roads were almost inexistent – instead, for broad stretches of land, the street network was simply a haphazard patchwork of unpaved tertiary roads and makeshift paths.

The local transport experience

In 2014, the average commute time in Ulaanbaatar was approximately 37 minutes, which was relatively long under most comparative measures. A review of average commute times of peer cities in East Asia showed that Ulaanbaatar's average commute took longer than most cities in the sample, and was only surpassed by the average commute times of cities like Bangkok, Manila, or Beijing (see FIGURE 13. Peer city analysis: On top, average commute time vs. population; below, average commute time vs. built-up urban area (*7*).). Ulaanbaatar's average commute was also comparatively longer than expected given the size of its population or its built-up urban area to the extent that it exceeded the average commute of cities like Seoul or Jakarta, with 17 or 25 times the population of Ulaanbaatar, and 4 or 6 times its built-up urban area.



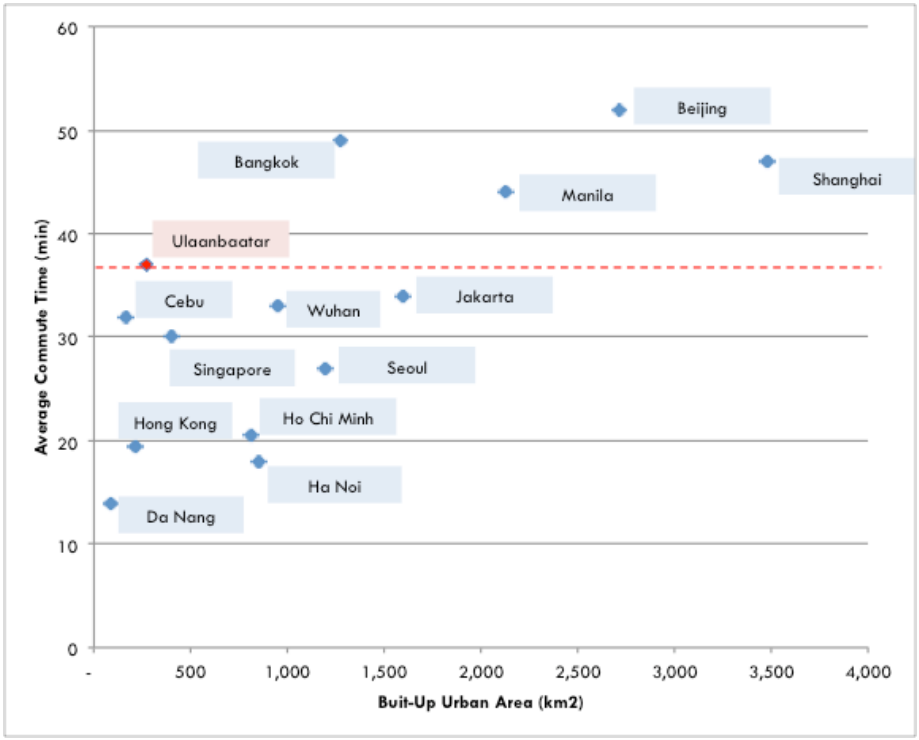


FIGURE 1. Peer city analysis: On top, average commute time vs. population; below, average commute time vs. built-up urban area (*7*).

The modal distribution of commute trips, from highest to lowest share, was: public transport 34%, walking 31%, private cars 23%, taxis 9%, and others 3% (*3*). Public transport and walking seemed to be favored due to their affordability – public transport fares were relatively cheap (MGT 500, US$ 0.25), and walking logically had no fare at all. However, neither public transport nor walking allowed for

efficient traveling about the city. In the case of public transport, just getting to a bus stop in the vast ger areas often required long cumbersome walks; typically people were forced to transfer at least once from one bus route to another to reach their destinations; and buses were often delayed in congested roads in the central city. In the case of walking, the city's low density and segregated land uses meant that origins are destinations were simply too far apart for walking to be efficient, particularly so in Mongolia's cold weather; in the gers, terrains were difficult to manage, and roads lack any provisions for pedestrians; and in the central area, the large block structure forced long and cumbersome walking paths, while its limited pedestrian facilities were often overtaken by parked cars.

Meanwhile, boosted by years of rapid economic growth, the vehicle fleet in Ulaanbaatar had doubled from 2004 to 2014, reaching 378 vehicles per 1,000 people (*3*). Compared to peer cities in East Asia, Ulaanbaatar's motorization level was only surpassed by cities where motorbikes were the prominent form of transport such as Jakarta, Hanoi, or Ho Chi Minh City (see FIGURE 24). A more striking notion was the fact that Ulaanbaatar's motorization level exceeded that of cities like Beijing, Bangkok, Shanghai or Singapore, which enjoyed considerably higher levels of GDP per capita.

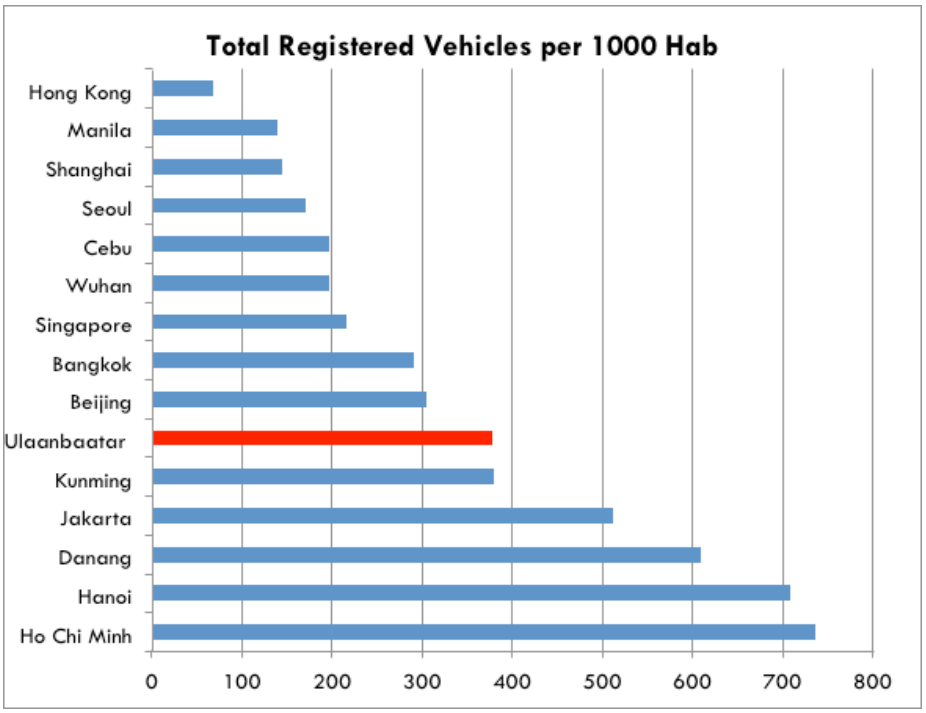


FIGURE 2. Peer city analysis: Motorization levels (*7*).

Private cars have been allowed to take over most of the city's road space and sidewalks without much regard for their impact on other mode's efficiency. City officials estimated that while public transport vehicles only represented 1% of the city's entire vehicle fleet, they serviced 65% of the city's motorized trips. However, private cars occupied the large majority of the city's streets, and left public transport vehicles a disproportionally small amount of space given the number of people that they moved, often becoming the main obstacle to efficient public transport operations. A similar phenomenon took place on many sidewalks and frontages in the central area, which were commonly invaded by parked vehicles, making walking troublesome, and often forcing pedestrians to walk on the streets and expose themselves to vehicle traffic.

PUBLIC TRANSPORT

General System Structure

Ulaanbaatar's public transport system consisted primarily of buses, trolleybuses, and microbuses. A total of 1,155 buses and trolleybuses serviced 79 core routes along the city's main corridors and highest demand areas (*8*). In turn, 386 microbuses serviced 49 complementary sub routes of lower demand. These different routes and services were integrated with one another at the different bus stops distributed throughout the city. There was a flat fare of MNT 500 (US$ 0.27) charged to adults for most services, and a fare of MNT 200 (US$ 0.11) for children. Students, people with disabilities, law enforcement personnel, and the elderly, amounting to approximately 40% of the ridership, paid no fare, as they were fully subsidized by the NGM (*8*).

The public transport system as a whole was regulated by the Transport Department of the Capital City (TDCC), whose responsibilities included the licensing of bus operating companies, the planning and awarding of routes, the supervision of operations, and the establishment and revision of fares, among others. There were 21 different licensed companies providing public transport services. The three largest companies, controlling the majority of the market, were Bus 1 (the state-owned company), ErdenTrans, and Tenuunogoo. Under the existing regulatory framework, each company was expected to operate strictly on the routes and schedules assigned to them by TDCC. However, granted that there was significant overlap between many routes in high demand areas of the central city, TDCC had established a monthly passenger quota system to protect the financial viability of all companies and prevent any type of harmful competition. Each company's quota was assigned on the basis of the different routes that the company operated, and TDCC's projection of their monthly based on historical data. To enforce company quotas, TDCC gave a corresponding number of physical tickets to each company, which the companies have to each passenger when they paid for their fare – if the company ran out of tickets for any given month, it was expected to stop operating until the start of the following month.

Public Transport Service

The outcomes, however, were far from ideal. For starters, the city's sprawling growth pattern and segregated land uses posed an important challenge to the provision of high quality public transport. The ger areas, which were mostly residential areas, stretched out through vast swaths of land far away from the main activity centers in the central city. Running bus routes all the way out to the different gers was indeed very costly, and much more so at headways associated with high quality services. The city's low density also meant that public transport riders were scattered and difficult to gather in an efficient manner, making potential bus fare revenues complicated to amass or insufficient to justify operations.

These elements transpired into a far from profitable proposition for any bus company, and, thus, bus service quality was lacking. Many inhabited areas in the far peripheries of the city were simply not covered by public transport services. Meanwhile, ger areas closer to the central city were only covered by a few scattered routes (meaning that local residents had to travel long distances just to get to a bus stop) and providing infrequent services (meaning that people had fewer opportunities to make desired trips, and had to wait long times on average to catch a bus). The situation was worsened by the lack of information about bus routes and schedules at bus stops out in the ger areas, which in effect lead to even longer wait times and overall low service quality due to unreliability.

In the main corridors of the central area, and particularly near the CBD, the elements affecting the quality of public transport service were different. As detailed earlier, the large block structure and lack of secondary roads forced most traffic onto very few roads, and given Ulaanbaatar's high number of private cars, congestion mounted up quickly. The absence of facilities providing priority to public transport further complicated the situation. Due to their size, buses were less nimble than cars navigating in and out of traffic flows on congested roads. As such, coming out of bus stops (typically located in a bus bay) buses were forced to spend additional time waiting and maneuvering back into the main flow, increasing significantly the effective dwell time of the stop. Compiled over the length of the any route, longer dwell times amounted to longer travel times for public transport users, and less productive and costlier services for the operators.

However, part of the congestion and delays faced by buses in the central city were created by the bus system setup itself. Over the years, the city's monocentric structure and segregated land uses had

given way to a radial bus route network, structured to provide access from different peripheral areas of the city to the CBD. As such, given the limited number of roads servicing inter-district traffic flows, many bus routes overlapped with one another on key roads in the central area. For instance, 26 different bus routes (serviced by a total of 350 buses) came together and ran next to one another for very long stretches along Peace Avenue (*8*). Similarly, 19 different routes (serviced by a total of 220 buses) overlapped along Chinggis Avenue.

Route overlapping surely added congestion to what were already very congested roads, making bus speeds even slower and travel times longer. It also meant that for lengthy sections of each route buses would be competing for ridership for buses from other routes. The quota system had been put in place precisely to mitigate any harmful type of competition by ensuring an equitable split of the revenues. However, TDCC had very limited resources at its disposal to ensure that bus companies abided by the quota system. There was no clear system of fines or penalties associated with allowing passengers in a bus without an official ticket, or for running buses altogether once the company's ticket quota has been exhausted.

The bus system's radial structure also forced people to transfer at least once for trips with origins and destinations not located near the CBD. Such trips were unnecessarily longer due to their inefficient route, the prevalent congestion in the central areas, and the time required to transfer. Furthermore, there was no transfer discount policy in effect, so every transfer required paying one additional full-fare – i.e., each transfer doubled the monetary cost of the trip. TDCC estimated that at least 30% of public transport users needed to make one route transfer to complete their trips –other sources indicated that that figure could probably be higher (*8*). This higher cost, product of the route and fare structure, was surely placing an unfair burden onto many citizens, and could had been deterring countless people from travelling altogether.

The bus company perspective

Bus companies were in a dire financial situation, and reported total industry losses of MNT 17 billion (US$ 9 million) per year. At the root of this situation was the piecemeal approach by which bus routes had been planned and allocated to different companies over the years. As a result, the system functioned in a very fragmented fashion and wasted away potential synergies. Revenues from high demand corridors were split between too many companies, and there was no mechanism in place to leverage those funds in support of lower demand routes in the periphery of the city.

To compensate, bus companies opted to cut some corners to protect their bottom line. For instance, instead of paying their drivers and fare collectors a formal salary, bus companies allowed the driver-collectors tandem to keep all daily revenues minus a daily 'rent' to be paid to the company. If revenues were higher than the rent, the tandem got to keep the difference; if the revenues were lower than the rent, the tandem had to pay the company the difference out of their own pocket. This approach transferred all the demand risk to the driver-collector tandem, incentivizing their focus on revenues rather than quality of service provision. The consequences of this set up to public transport users and citizens in general were palpable. Buses often disregarded their routes and schedules to make up additional revenues in high demand corridors and hours of the day. As such, on top of the 'legal' overlapping of bus routes in high demand corridors, it was common to find additional buses operating those routes 'illegally' and competing for passengers with the corridor's assigned services. Meanwhile, low demand routes and schedules were not even properly fulfilled.

Bus companies also found ways to cut costs in vehicle and fuel purchases. Out of all formal buses in the city, TDCC estimated that 38% had 7 to 10 years of operation, and 40% had 10 years or more. A large majority of these buses had been bought from Korean bus companies after they reached the Korean limit of 7 years of operation – the limit in Ulaanbaatar is 12 years. Further, TDCC also reported that often the MGUB purchased these buses from the Korean bus companies directly, and then sold them to bus companies in Ulaanbaatar offering cheap financing mechanisms. Bus companies also purchased fuel from the MGUB through similar cheap financing mechanisms. These financing schemes basically functioned as channels for the MGUB to subsidize bus companies, with the added feature that bus companies often

did not even pay back to the city their loans in full; instead, debts were commonly pardoned when 'new' buses were purchased or bus fare negotiations arose.

These benefits came on top of the MNT 53 billion (US$ 29 million) in annual transfers from the NGM to the bus companies, by way of TDCC, to repay for the subsidized travel of students, elderly, and people with disabilities. However, TDCC had no effective mechanism to know the exact number of subsidized passengers that rode on each route any given day, week or month. Instead, the total subsidy amount was calculated under the assumption that every person in Ulaanbaatar that qualified for subsidized travel made two public transport trips every day, and then that figure was distributed proportionally between bus companies according to the routes and services that they operated. TDCC paid out these subsidized travel compensations to bus companies once a month. While TDCC considered very probable that the subsidy allocations exceeded the proper compensation for actual rides carried out by the target populations, no corrective measures were in place. As such, these transfers acted as one additional source of government support for bus companies to meet their bottom line.

THE ONGOING REFORM EFFORT

Impetus for the Reforms

By 2014, two mass transit systems had been considered for Ulaanbaatar. The first was a metro line running from east to west along Peace Avenue. A prefeasibility analysis had been completed with support from the Japan International Cooperation Agency (JICA), but a feasibility analysis and detailed designs were required for the project to progress. JICA and the NGM had discussed a potential $50 million loan to carry out these studies, but those discussions seemed to be stalled at the time. The second project was a BRT system. Since the metro would run along Peace Avenue, the first BRT lines would be north-south lines to establish a mass transit network. The BRT system had been developed in partnership with the Asian Development Bank (ADB), and more detailed feasibility studies had already been completed. On August 2012, the ADB board approved a $59.9 million loan to complete the designs and build Ulaanbaatar's the first BRT line; however, in August 2014, more than two years later, the Parliament had not yet granted approval to this loan, leaving the BRT project in limbo.

Both the metro and the BRT initiatives appeared to be stuck between the interests of the MGUB and the NGM. The MGUB supported both projects eagerly and wanted to move forward in their development as soon as possible, as public pressure to improve transport conditions in the city was mounting. The NGM, however, did not want to take on any additional debt at a time when the economy was slowing down and public resources were scarce again, and thus, it did not follow up on JICA's metro efforts and put on hold the approval of the ADB loan for the BRT. The MGUB figured it needed to find a way to move forward without the support of the NGM, and found inspiration in some of the components and reforms suggested for the BRT.

The Smart Bus Reforms

The ADB recommended that the BRT implemented a suite of intelligent transport systems (ITS) to deliver a distinct higher quality service vis-à-vis the existing public transport services in Ulaanbaatar. The first element was an automated fare collection system to provide a fast cashless payment method for passengers, also able to store and communicate information to deliver additional benefits to passengers and provide valuable information to TDCC. The second element was a bus management system, combining computer-aided dispatching and automatic vehicle location systems (CAD/AVL) to enhance transport operations in real time, as well as improve broader planning and management of the bus fleet. Finally, the third element was a passenger information system, building on the AVL to provide real time information to passengers through message boards, websites, cellphone apps, etc., about buses' arrival and departure times, as well as trip planning tools.

TDCC considered that those three ITS elements, which came to be referred to as the 'Smart Bus' systems, could be applied to regular bus services in the city to deliver improvements in service quality, enhance companies' financial management practices, and bring more clarity to the distribution of

government subsidies. TDCC believed that main challenge to the implementation of Smart Bus systems lied in their procurement and operational cost, since there were no public funds available from the NGM or the MGUB to pay for them. Accordingly, the MGUB and TDCC figured that their only alternative was to bid out to the private sector a concession for both the procurement and the operation of the Smart Bus systems. Unfortunately, the urgency to improve public transport services for citizens, perhaps invigorated by the potential political gains that such improvements could deliver, transpired in a rather hurried planning, structuring, and awarding of the concession.

The UB City and Data Card Consortium LLC (UBDCC), the winning bidder, was the only bidder for the concession. Korea Smart Card Co., a world leader in automated payment systems for transport services, controlled a majority stake in UBDCC; the MGUB held a minority stake in UBDCC. The concession contract was signed in September 2014, mandating that the suite of Smart Bus systems was fully implemented 240 days later. UBDCC's initial investment was estimated to be about $13 million, which would be recovered by obtaining a 10% of the total fare collection during a period of 4 years and 8 months after the systems' implementation, or until UBDCC recovered their investment. However, the concession contract seemed to lack detail in the scope of the activities and obligations that the delivery and operation of the Smart Bus systems entailed. TDCC appeared to trust that UBDCC, by way of the broad range of international expertise within Korea Smart Card Co., would be able to 'fill in the blanks' to interpret TDCC's vision for the Smart Bus systems.

In order to maximize the impact of implementing the Smart Bus systems, TDCC also decided to undertake a series of parallel reforms to Ulaanbaatar's bus system. The first reform was a major redesign of the city's bus route network, moving away from the former radial structure, to more of a hub and spoke structure with main lines running along high demand corridors, and complementary access routes feeding on to those. 60% of the old bus routes would change with the main objective of minimizing travel times for most users. The new route network also reduced route overlapping on Peace Avenue and other key corridors, while increasing bus service coverage out in the ger areas.

Another key reform was the creation of a new regulatory framework for bus operations. The inception of the automated fare collection system implied that a large portion of daily revenues would be cashless; instead, they would be amassed directly by UBDCC's clearing house. As such, the new regulation stipulated that cash revenues would also be collected on a daily basis by UBDCC – i.e. buses would still accept cash payments, but at the end of the day UBDCC representatives would collect all the cash revenue from the bus companies. In addition, the remuneration of bus companies would no longer be directly tied to demand. The new regulation stipulated that remunerations would be based on the total revenue generated by the bus system as whole and the total number of hours of public transport services provided: each bus company would be allocated a proportional amount of the daily revenues given the hours of service provided; and each company's 'hours of service' would be determined with the help of the new AVL equipment, with different effective 'time deductions' charged for violations to a series of performance measures related to the strict following of the routes, schedules and service plans assigned by TDCC to each company.

Implementation and early outcomes

TDCC decided that both the Smart Bus systems and the complementary reforms would be launched together. The Smart City systems were activated on July 29, 2015, marking the official start of the operational phase of the concession with UBDCC. The new route network and sector regulations were introduced on August 15, 2015. As such, in a period of two weeks, in a process that basically amounted to one 'big bang', the whole public transport system, as seen from both the perspective of the user and the perspective of the bus companies, had radically changed.

One of the first struggles with the new system was that the new hub and spoke route structure made people transfer routes more often than under the old radial structure. The operational coordination for transfers to be carried out efficiently had not yet been achieved, so people had to wait long stretches of time to get on their second or third buses. Moreover, since there was no special fare provision for transferring, people were forced to pay double or triple the amount that they were used to pay for a trip.

This is to say that under the new system, commute times became considerably longer and more expensive at the same once. Over time, citizens' frustrations grew louder and louder, as manifested in press articles and in the city's public complaint hotline. By November 2015, TDCC had already implemented a system whereby passengers using the new smart card received two free transfers within a 30-minute window of alighting their first bus. Smart card penetration, however, was only 40%, as opposed to 80% expected by TDCC after three full months of implementation. Also, still struggling with operational coordination issues, TDCC decided to bring back 40% of the old routes and modified many of the new ones to reduce transfers.

Bus companies also grew rapidly displeased with the new system. After a few months of operation, they began to argue that the new AVL/CAD was not properly documenting the hours of service provided, while piling on undeserved penalties – meaning, that they believed they were being remunerated less than what they deserved. They also claimed that subsidized passengers, such as students, the elderly, and people with disabilities, were not being properly accounted for, further affecting their eventual remuneration. Finally, it was now up to bus companies to compensate bus drivers and fare collectors, instead of the other way around. To cut costs, the majority of fare collectors were laid off with exception of few serving on the higher demand routes. Yet, even then bus companies claimed that they were incurring on important losses to abide by the service plans. When the idea that transfers would become free began to be discussed, bus companies' protests grew ever more vocal, and on October 7, 2015 they went on strike. Following the negotiations, the MGUB agreed to pay out a monthly subsidy to every bus company to ensure that they could cover their operating costs – i.e. the MGUB would pay the difference between each company's monthly revenues, including subsidy allocations to it by the NGM for subsidized passengers, and the company's gross operating costs for the month.

By December 2015, it was evident that UBDCC was not fulfilling all of its duties under the concession agreement, or, at the very least, TDCC's expectations of how the Smart Bus systems were to complement the operational and regulatory reforms already implemented. UBDCC had been collecting 10% of all public transport revenues in the city for months as service fee. And, surely, every single bus in the city had been equipped with an on-board unit that validated smart cards, generated GPS data for the AVL, and communicated directions from the control center to the driver. Yet, it was true also that the AVL/CAD was not facilitating operational coordination, and UBDCC had not staffed the control center with technical experts. It was also true that the AVL worked poorly in the peripheral areas of the city where cellphone coverage was weak and many trips seemed to go undocumented. Similarly, many features for the broader management of the bus system and to provide information to passengers had not been developed at all.

By December 2015, both users and bus companies had also learned how to game the system. Since fare collectors had been let go, the driver had become responsible for monitoring fare payments – i.e., verify that every passenger tapped in with a smart card or deposited the right amount of cash in the security box. Drivers, however, still needed to place their primary focus on the road, and many forms evasion grew rampant, including: (i) not paying at all (directly walking in); (ii) incomplete cash payments (quickly dropping an insufficient cash amount in the box); and (iii) the use of 'empty' smart cards intended for students, the elderly, and people with disabilities by regular adults. With regards to bus companies, TDCC and UBDCC began to grow suspicious that they were tampering with the cash boxes before turning in revenues at the end of the day. In addition, given that AVL information was not yet reliable, TDCC had to trust that bus companies were fulfilling the service plans even if the AVL did not report that was the case – that meant, paying out daily remunerations and the monthly subsidies to match all operating costs.

TDCC and the MGUB had 'played their hand' and found themselves in a very weak position to deliver the changes they had envisioned. On the one hand, they were locked in a concession agreement that did not offer mechanisms to pressure UBDCC to implement the full suite of Smart Bus systems. UBDCC was already collecting its portion of the revenues and was irresponsive to requests by TDCC to speed up the development of new tools or the improvement of the existing ones. Bus companies, on the other hand, remained frustrated by the reforms, as many of them believed that the reforms had ran

profitable businesses into the ground; either way, the MGUB had already committed to ensuring cost recovery for every company even though TDCC did not have the proper tools to supervise service delivery and quality.

Meanwhile, congestion, pollution, and road safety incidents kept increasing in Ulaanbaatar. Moving about the city, be it by public transport, car, or walking, had only become more inefficient. Elections loomed in horizon in July 2016, the outcome for those in power at the MGUB unclear.

CONCLUSIONS

It is commonly accepted that there tend to be less bureaucratic and procedural barriers to planning and implementing large transport infrastructure projects or significant regulatory reforms in cities in developing economies vis-à-vis cities in more advanced economies. As such, the less restrictive context of cities in developing economies offers an opportunity for dynamic city leaders to try to bring about change in short periods of time and hopefully reap the benefits of that change at the ensuing elections. The case of the Smart Bus reforms in Ulaanbaatar demonstrates that change, however, does not happen overnight, and that there are high risks associated with trying to deliver change hastily and without the support of a thorough planning process.

Consideration of the growing literature on integrated transport and land use planning would had suggested that running high quality and profitable (or, at the very least, cost efficient) public transport services in Ulaanbaatar was already a tough proposition prior to the reforms (*9, 10*). Some of the roots of the problems lied in the city's built forms, and the structure and condition of its road network. Another critical element was that cars had taken over most of the city's road space and there were very few special facilities for public transport vehicles; as a result, the growing levels of congestion made public transport service provision even less efficient. These elements were not going to change with the implementation of the reforms, and there was no consideration of how they stood in the way of the reforms delivering on their goals.

There was surely a high degree of wishful thinking behind the reforms, and little consideration of important lessons from reform efforts in other developing countries. For instance, in many cities in Latin America, traditional bus companies have mobilized their influences to postpone and derail public transport reforms and preserve the status quo (*11*). In Ulaanbaatar, the bus companies were used to seeing high profits on the basis of exploiting drivers and fare collectors, and the formal and *de facto* subsidies awarded to them. While the reforms aimed to align bus companies' economic incentives with the provision of better services, by December 2015 bus companies had already seized on the opportunities created by the lack of technical analysis and outreach conducted prior to reforms to gain new subsidies and an increase in the number of routes.

Similarly, in contexts of scarce economic resources and limited institutional capacity, the desire to outsource complex technical tasks to the private sector can be understood. However, most successful experiences in this field combined private sector investment and expertise with strong government guidance and supervision (*11, 12*). In Ulaanbaatar, the concession contract gave no effective oversight tools to TDCC or the MGUB over UBDCC. The selection of UBDCC, specifically, as the winning bidder also raised some questions. While Korea Smart Card Co had extensive expertise in automated fare collection systems, their experience designing and operating AVL/CAD systems was not as clear. It was not surprising then that in Ulaanbaatar the automated fare collection system was ready to go on the July 29, 2015 launch date and it had functioned without hiccups ever since, while six months later the AVL/CAD and other complementary tools were not functioning well or simply had not been completed yet. Bundling fare collection, AVL/CAD, and passenger information systems in one single concession seemed like the wrong approach altogether, at a time when the industry was moving towards modularization of these different elements (*13, 14*).

Finally, the rollout of the reforms in one big bang disregarded many other cases around the world where big bus reforms were implemented in one big sweep and failed miserably because of it (*15*). The lesson learned was to implement these type of reforms gradually, perhaps piloting the changes in a few strategic areas, or on a few bus routes, to identify the problems and fix them, before moving on to

citywide implementation. That type of gradual rollout could have helped TDCC and the MGUB avoid many of the problems they were still facing six months after the launch date of the reforms.

Surely sound planning takes time and requires resources, while the priority for the MGUB seemed to be to deliver 'something' promptly, cash the returns at the ballot box, and deal with the consequences later – only this time around, the consequences seemed to had caught up to them much earlier than planned.

REFERENCES

1. Ulaanbaatar City Statistics Office, "Table 1: Population" (2016). Retrieved from http://ubstat.mn/StatTable=11. Last accessed July 2016.
2. World Bank, "Data: Mongolia: Annual GDP Growth" (2016). Retrieved from http://data.worldbank.org/country/mongolia. Last accessed July 2016.
3. Capital City Master Planning Agency, *Ulaanbaatar 2020 Master Plan and Development Approaches for 2030: Technical Summary*. Ulaanbaatar, 2014, pp. 24.
4. World Bank, *East Asia's Changing Urban Landscape: Measuring a Decade of Spatial Growth*. Urban Development Series. World Bank, Washington, DC, 2015, pp.104.
5. Capital City Master Planning Agency, *Ulaanbaatar 2020 Master Plan and Development Approaches for 2030.* Ulaanbaatar, 2014.
6. Kamata, T., J. Reichert, T. Tsevegmid, Y. Kim and B. Sedgewick. *Managing Urban Expansion in Mongolia, Best Practices in Scenario-Based Urban Planning*.
7. World Bank, "Urban Transport Analysis Tool (UT-DAT)". Retrieved from http://www.worldbank.org/en/topic/transport/publication/urban-transport-data-analysis-tool-ut-dat1. Last accessed July 2016.
8. Transport Department of the Capital City, "The Current State of Urban Transportation Sector". Retrieved from https://prezi.com/mwehm-7ilzka/transportation-department. Last accessed July 2016.
9. R.Cervero, "Linking urban transport and land use in developing countries", *Journal of Transportation and Land Use*, Vol. 6 No. 1, 2013, pp. 7–24.
10. Hiroaki, S., R. Cervero, and K. Iuchi, *Transforming Cities with Transit: Transit and Land-Use Integration for Sustainable Urban Development.* World Bank, Washington, DC, 2013.
11. A. Ardila, "How Public Transportation's Past Is Haunting Its Future in Bogotá, Colombia", Transportation Research Record: Journal of the Transportation Research Board, No. 2038, Transportation Research Board of the National Academies, Washington, D.C., 2007, pp. 9–15.
12. A. Estache and A. Gomez-Lobo, "Limits to Competition in Urban Bus Services in Developing Countries", *Transport Reviews*, Vol. 25, No. 2, pp. 139-158.
13. Transport for London, "iBus Contract Extension", Support Paper for Board Consideration, February 4, 2015, Item 11. Retrieved from http://content.tfl.gov.uk/board-20150204-part-1-item-11-ibus-contract-ext.pdf. Last accesed July 2016.
14. Pulido, D. and D. Canales, "Real-Time Passenger Information: Getting It Right", *Connections*, Note No. 27, World Bank, November 2015. Retrieved from http://pubdocs.worldbank.org/en/750371447968212509/ConnectionsNote27-1607516-Web-00000002.pdf. Last accessed July 2016.
15. A. Gomez-Lobo and J. Briones, "Incentive Structure in Transit Concession Contracts: The Case of Santiago, Chile, and London, England", The Clean Air Institute, Washington, DC, 2013. Retrieved at http://ppp.worldbank.org/public-private-partnership/library/incentive-structure-transit-concession-contracts-case-santiago-chile-and-london-england. Last accessed July 2016.