UNDERSTANDING TRANSPORTATION PREREQUISITES TO BE INTEGRATED WITH URBAN DEVELOPMENT IN DEVELOPING COUNTRIES: IRAN AS A CASE

Mohammad Hamed Abdi
Universidad Politécnica de Madrid, Spain
Francisco José Lamíquiz Daudén
Universidad Politécnica de Madrid, Spain

ABSTRACT

Transit Oriented Development (TOD), as an integrated transportation and land use policy and practice, was given attention in recent decades to (re)formulate urban areas worldwide. Amongst different TOD planning dimensions at play in, the transportation design and policies tend to basically form the backbone of TODs, since a multimodal sustainable movement — public transportation (PT) for long trips as well as non-motorized transportation (NMT) for short ones — is on the agenda. Although it is agreed that TOD can provide even greater benefits than in wealthier countries in long term, developing countries (DCs) are characterized with specific transport-related issues such as vexing congestion, inadequate PT infrastructure, financial obstacles, etc., that should be dealt with to deliver successful integrated TOD projects. In this regards, the present study sheds further lights on the transportation prerequisites of transit oriented urban planning in DCs.

First, a systematic review of global literature provided a set of transportation dimensions integrated with urban development. Due to the recent national policies on TOD, Iran was selected as a case and a set of semi-structured interviews was conducted with Iranian urban and transport planners along with government officials in April-June 2019. The results showed that although there are some favorable conditions to TOD developments in Iran e.g., amalgamated transportation and urban development ministries, urban transportation is hindered by pro-car policies such as subsidized fuel price and lack of multi-modal infrastructure in comparison with the best practices in such DCs as Curitiba. The findings have also implications for transportation policymakers, city officials, planners, and interested readers and practitioners in Iran and other DCs interested in TOD.

1. INTRODUCTION

Nowadays, TOD is globally known as an integrating strategy of transportation and land use planning. Initiated by *Peter Calthorpe* (1993), the key idea was based on a movement and urban development linkage, in line with *Smart Growth* and *New Urbanism* in nature (Xu et al., 2017; Dunphy & Porter, 2006) in order to fight against the car dependence issue and its

hostile impacts (Shibley, 1998; Goetz, 2013). Apart from urban development and land use readjustment, transportation initiatives can play an important role in TOD planning, too.

Ideally, a quality PT for long trips should be connected to NMT infrastructures for local short destinations. By this, TOD calls for an easy and reasonable NMT accessibility to transit infrastructures. In addition, the location (i.e., centrality) and design of transit stations are key, so that it should be well integrated into urban textures to attract a higher ridership number. The realization of such transportation principles relies on a set of supportive policies. There is consensus that transport policies can widely steer urban spatial growth in general, and transit supportive patterns in particular, including urban form pattern, public services accessibility, etc. They refer to a set of consistent policies on both transit actors and transit context by which transit ridership are increased and, walking and cycling are facilitated within urban settings. They usually include (1) demand-oriented incentives policies such as tax credit, subsidy for PT (e.g., fares), and (2) supply-oriented plans like regional transportation plan, visioning and policy reform, design policy (e.g., road capacity), and auto equalizers (Abdi, 2019).

Recognized with low-quality PT and, subsequently, the predominance of informal transport, walking and/or cycling, as the main modes of urban transports (United Nations Human Settlements Programme, 2013), DCs have recently made some efforts to revolutionize their planning system by developing the sustainable paradigms of urban transportation such as the integrated transport land use model. It can be illustrated by the cases of Curitiba, and partly Bogotá, in which bus-based rapid transit (i.e., BRT) has been developed in connection with urban planning (land use) strategies (i.e., articulated density, mixed development, pedestrian oriented design).

However, the sustainable models in developing world have remained unknown or initiated recently. Of which, Iran's car-oriented transportation development and policies, coupled with subsequent inclement traffic-caused damages (e.g., pollutions and traffic fatalities) put some pressures on the central government and policymakers to adopt a sustainable trajectory, including public transit development. More recently, Iranian Ministry of Road and Urban Development (MRUD) approved a national guide of TOD. While multimodal quality PT and NMT are the focus of guide, transportation challenges and opportunities associated with the TOD policy and planning remained unclear. In this regard, major transportation prerequisites and mechanisms required for the integration have not been paid attention, so far.

To fill this gap, this study endeavors to scrutinize transportation aspects of TOD planning process in Iran. Both transportation development and transportation policies are discussed in this way. To this end, the study benefits from urban and transportation professionals' point of view through conducting a set of semi-structured interviews. They are supported by reviewing the realities of urban mobility in the Iranian context as follows:

2. URBAN TRANSPORTATION CONTEXT IN IRAN

The data for vehicle in use in Iran show that the motorization and private car use rate is rapidly growing in Iran (OICA, 2015). The heavy trend of vehicle use is faster than most of the developed countries (Shaygan et al., 2017) with 15 percent of annual growth rate (Soltani, 2017). What makes this a threat is the coincidence of motorization growth with the lack of sufficient PT services (Mirmoghtadaee, 2016). Although subway system and bus rapid transit (BRT) have recently been introduced in large cities (e.g., Tehran, Tabriz, Isfahan, Mashhad, Shiraz), the conventional buses are the most common system of formal PT in Iranian cities with different population, ranging from medium- sized to large cities.

Despite encountering a different situation across Iran, the bus operation generally suffers from several challenges in Iranian urban areas. Inadequate bus fleet, deterioration and limited capacity, dearth of a special dedicated lane, rare fixed-time plan at the stations, poor coverage of urban buses excluding low-income urban areas or newly-built areas like new suburban housing projects (e.g., Maskan-e-mehr) are some vexing challenges recorded for urban buses, to name a few. On the contrary, formal PT fares remained very low under a high level of subsidization since the relative poverty allows just low prices, even in comparison to the other developing countries in Latin America (Allen, 2013). As an opportunity, it can spur PT and correct price distortions of the fuels, especially those subsidized for private cars (World Bank, 2005).

The barriers facing PT, bus circulation in particular, have made taxis reasonable choices. They are much faster than buses on the same corridor with no big gap in fare and consequently, people prefer to ride collective taxis, or recently introduced much affordable app-based services such as SNAP. In Tehran, taxis are responsible for about 22 percent of daily urban trips, the most modal share among the others (Transportation and Traffic Organization, 2015). It rises up to 80 percent in some small and medium-sized cities with lack of coverage by other PT systems (Soltani & Falah Manshadi, 2017). In addition, there are other informal services by private cars, moto taxis and minibuses, transferring passengers citywide as illegal taxis with no work permits. They provide additional services at the times of day and prices that their formal counterparts are not willing to do so.

The increasing traffic congestion has resulted in constructing an extensive road infrastructure at the expense of limited space for walking and cycling in most Iranian cities. As a result, the quality pedestrian zones and sidewalk can rarely be found in many urban areas. They are typically narrow, non-continuous pedestrian paths interrupted at intersections, and occupied by parked or in circulation motorcycles, mailbox, and wares, with broken pavements, and unlit at nights. Inside under-construction areas, they were also left unpaved. Considering all these issues, it can be found that urban transportation in Iran follows a way projecting unsustainability in general, although several recent improvements have been on the agenda in part.

3. METHOD

In this research, two well-known means of the qualitative method were applied to data collection: literature review and interview. They are used based on the general objective of the paper formulating a case-study qualitative research in Iran. The literature was reviewed to derive transportation dimensions in the process. As Abdi (2019) detailed, two set of *transportation design* and *transport-oriented plan and policies* were found through a systematic review of TOD literature. The interviews were conducted with TOD actors, involved/interested in Iran's urban policymaking and planning system. A total of 11 TOD professionals including academic bodies, practitioners, and politicians and government officials were queried during April-June 2019.

More than half of the participants were academic specialists since they were the most aware group of the TOD actors from the TOD proposals in Iran. They were mostly from Tehran, the capital city. The authors made some efforts to interview other TOD activists in other groups such as transportation associations and bus organizations, but they were reluctant or left the invitation unanswered.

To conduct analysis, a directed qualitative content analysis was applied using the framework mentioned above. Although rarely applied in the urban studies, this method fits the present study’s aim, since it can discover the latent concepts (i.e., opportunities and challenges) in the interviews’ texts. In this regard, the codes relevant to each dimension were extracted and the perspectives of attendees were comparatively analyzed to draw a general image of transportation prerequisites for TOD planning in Iran. Moreover, a degree of agreement was calculated for all the categories based on the summative degree of agreement between the interviewees. To do this, first, all items (challenges and opportunities) mentioned in the interviews' transcription were summarized, and then the frequency of cited items were summed as the weighted final scores. In addition, the results for Iran were compared with those of DCs already systematically studied at (Abdi & Lamíquiz-Daudén, 2020).

4. RESULTS AND DISCUSSION

In this section, the result of interviews is presented. They are in addition and complement to those reviewed in the section 2. In terms of the realities of urban transportation development, the interview participants were asked to consider the general situation of Iranian cities and avoid exceptions in specific cities. However, it was thus clear that Tehran's urban transportation is highlighted more than the rest as most of participants were from Tehran. With regard to the transport policies, the centralized, top-down nature of policymaking and dominant government-led initiatives in Iran have resulted in a set of central, national transport policies by MRUD and supreme Traffic Council with very few local exceptions.

4.1 Transportation development

Transportation design is referred to the realities of urban movement with regard to the primary measures of TOD success in terms of transportation: increasing transit ridership and active transportation modes (Lierop et al., 2016). The core idea of TOD relies on a multi-modal transportation network, including an efficient public transit system joined to NMT network. Such a network should be accessible and cover multiple destinations. Integrated non-motorized initiatives were also the center of transit-oriented proposals in pioneer developing cities reviewed like Curitiba (e.g., Plano Director Cicloviario) and Bogotá (e.g., Cicloruta, Ciclovia). With regard to their mechanisms applied for PT development, both cities provided reliable high-quality mass transit services in the form of BRT and feeder conventional buses, aiming at covering most of the built-up areas.

Not surprisingly, a handful of transportation challenges were recorded during the interviews against the scant opportunities of improved quality of public transport services in large cities, outer Park and Rides connected to the subway and bus services for preserving the historical centers, and new practice of developing pedestrianized zones in a number of cities. On the challenges side, two transport planners referred to the weak regional integration of transport and urban development in Iran criticizing inefficient site selection of central train stations, which are often located out of the city boundaries. One of them clarified that railway have been developed far away from the cities (urban settlements) due to the separated railway and urban planning efforts in Iranian cities, which have already caused unplanned, informal settlements around the rail lines (e.g., Arak and Mashhad). In this regard, they added that the lack of integration between inter-city and urban transport means has been an aggravating factor. Even the urban-suburban connections within the construction works in the newly founded towns around the major cities, have not been under focus of attention after many years.

Moreover, what made general consensus among the participants was the dearth of multimodal urban transport network, especially around major transit stations. In this sense, an urban planner depicted PT stations as a set of isolated islands because of lack of integration with the complementary infrastructures (i.e., walking and cycling) so that another participant, as a walkability specialist, also believed that lack of efficient non-motorized networks thwarts all other policies and practices concerning sustainable mobility in Iran. There were complaints on the inefficient non-motorized transport infrastructures by other participants as well. The chair of national TOD project cited that “walking and cycling are still not recognized as transport modes in formal transport engineering literature”. Accordingly, one transport planner expressed concern on decreasing rate of bicycling in those cities that it had already been the principal transport mode, such as Yazd and Isfahan.

More importantly, more than half of the participants directly criticized the general low-quality of PT services in Iranian cities. An academic body with expertise in sustainable

transport planning noted that the quality of public transport is not yet acceptable and there is a long way to establish a high-quality system in place. Accordingly, he suggested that instead of performing a trial-and-error process, the experiences of other pioneer countries be adopted for restarting such systems with higher efficiency and lower operation and maintenance costs, rather than the current systems. Although the status quo might be subject to changes, the city-by-city, bus fleet deterioration, lacking scheduled services, and limited vehicle capacity were some cited issues among the relevant challenges for the general situation of Iranian urban settings.

Similar to the findings presented in the interviews, the literature affirmed that the improvement in PT services has not been paid sufficient attention since the results revealed that despite some improvements, the system still suffers from the lack of quality services. In response, Taxi and informal transport could provide services as a paratransit mode, but not essentially connected to the PT. This would be another positive environment for car movement, in the absence of quality PT and NMT infrastructures, which is in clear contrast to the TOD policy. Hence, the result is high fuel consumption and an increase of the externalities (i.e., pollutions) as well as traffic injuries across Iranian cities.

The table below lists all major opportunities and challenges associated with Transportation Development. It also displays the degree of agreement on the issues (as relative importance) and consider their similarity to the other DCs' experiences. Accordingly, it is clear that there is a convergence of the challenges cited for TOD transportation design in Iran and other DCs. Reviewing developing world studies, the global evidence revealed that the regional transit issue in coordination with the land use planning was underestimated in other studied developing-country cities, where urban transit networks are incomplete in terms of connecting to other public and active transport infrastructures. In addition, the inadequate public transit services and low capacity of vehicles, informal transport and poor coverage were criticized, which were similar to what was claimed for Iran in the above discussion.

Item		Frequency	Similarity to other DCs
Opportunities	Recent improvements in PT services	5	*
	Park and Ride strategy	1	
	New practice of developing pedestrianised zones (NMT infrastructures)	3	*
Challenges	Weak regional integration of transport and urban development	2	*
	Dearth of multimodal urban transport network	4	*
	Lack of integration between inter-city and urban transport means	2	

Table 1 – Major opportunities and challenges associated with TOD transportation development in Iran, their frequency of citation by the interviewees and their similarity to other DCs

4.2 Transportation policy

Several TOD professionals believed that while the recent provision of national TOD guideline, the new guideline of urban street deign, and (re)planning to multi-modal, connected regional rail infrastructures would be opportunities for TOD planning, there are rare assistive transportation policies in line with TOD. One of the urban planning experts pinpointed the fact that there have been some short-term transport plans and decisions to alleviate current urban challenges in Iran but with no forward-looking strategies in Iran. He exemplified the BRT project in Tehran and other large cities in which inter-modal connection, land use integration and similar issues have not been yet adjusted. There was a common consensus on the challenge of subsidized, cheap fuel price in Iran by which car ownership is encouraged (Many opposing views, however, claim that in comparison to the indicator of minimum wage for a worker in Iran, purchasing power for the fuel is quite limited in Iran and thus, the price is still not low. Compared to the cases of Saudi Arabia, Venezuela, Canada and France, Iranian workers can purchase less gasoline per month (Hassannia, 2019) . A municipal official desperately noted that this is a problematic national economic and a political issue which cannot be easily dealt with. The data here shows that the average daily gasoline consumption has been 94 million liters during mid-2018 to mid-2019 in Iran (NIOPDC, 2018) of which a share of 58 percent of final oil products consumption goes to the transport sector (IEA, 2018).

Another major challenge was lack of coordination among transportation policies as well as among responsible bodies. The chief of national TOD project cited that a variety of the corresponding entities, laws and regulations handle the urban transport policy and planning in Iran, which has partly caused a kind of discordance in the planning process. Reviewing the structure and responsibilities of the actors we found that Ministry of Interior (MOI), as the main actor, is responsible for urban transportation policymaking and planning along with city councils at local levels. Meanwhile, MRUD handles the whole transportation sectors excluding the urban transport, while prepares urban development plans.

At local scale, even though municipalities under MOI are in charge for almost all the transportation planning and executive plans, parallel sectoral sub-institutions based on the different transport modes (e.g., metro, bus and taxi) do not play the integrated roles (Mirmoghtadaee, 2016). While Urban Transport Plans are mandated to be coordinated with the city comprehensive and detailed plans, there are typically discordances between the strategies.

The table below lists all major items related to transport and built-environment policies and plans and reveal the similarities between Iran and other DCs. As with the short-term policy adopted for developing PT in Iran, what followed in DCs has been development of BRTs with the hope of directing such cities into a trajectory of sustainable development. Together with Iran, pro-road policies and unsupportive national policies and propositions for PT in the transport planning process were associated with barriers to the integrated transport and land use practices in a number of case studies (see Abdi & Lamíquiz-Daudén, 2020). However, the opportunity of setting TOD policy at national level makes Iran a different country among others.

Item		Frequency	Similarity to other DCs
Opportunities	National TOD policy	2	
	urban street deign guideline	1	*
	(re)planning to multi-modal, connected regional rail infrastructures	3	*
Challenges	Subsidised (low) fuel price	4	
	Short-term transport vision and policy	1	*
	Inattention to potentials of NMT in transport policies	2	*
	Less attention given to affordable transport alternatives	1	*
	Lack of supportive transportation policy for TOD planning	4	*
	Uncoordinated transport policies and policymakers	2	*

Table 2 – Major opportunities and challenges associated with TOD transport policies in Iran, their frequency of citation by the interviewees and their similarity to other DCs

All in all, the content analysis of modern Iranian urban policies could confirm that except for little evidence of recent transit-based urban policies, urban development policies generally tend to facilitate car mobility, something that is contradictory to TOD principles, through encouraging sprawled developments (i.e., car-oriented new towns and far-reaching constructions) which lack in PT connections and placing priority on pedestrians. In the same vein, some transportation policies also facilitate car use (e.g., fuel subsidy, minimum parking, car purchase loans, etc.).

5. CONCLUSION

The present study tried to find urban transportation prerequisites, to be integrated with urban development in TOD planning process. To this end, the study went through the the context of urban transportation development in Iranian cities as well as ruling policies and regulations. The interview conduction helped to better understand the latent aspects of urban transportation in Iran, going beyond explicit affecting factors. In reality, the car-oriented urban transportation is recognized with the poor quality of PT, disconnected transportation modes at urban and regional scales, and hindered walking and cycling.

These can be stumbling blocks for successful TOD implementation in Iranian cities. Such environment has been the result of the car-oriented policy design over the past decades of transportation policymaking and planning. In fact, the TOD policies are in its very infancy stage and the problematic nature of unsustainable transportation policies still exists.

However, there have been several TOD-supportive transport policies at national tier in recent years, including PT development with a look towards the integration with urban development. They mainly portray a trend towards more sustainable choices for urban and inter-city mobility including rail development, inter-modal connection, etc.

In spite of the fact that TOD is a highly context-sensitive planning instrument (De Vos et al., 2014; Tan et al., 2014), it is important to confirm that there have been some common challenges in DCs as transnational challenges, such as disparate land-use and transport policy-making, uncoordinated transport governance, financial barriers, and technical and planning capacity, as cited in previous relevant studies (e.g. Cervero, 2013; Cervero and Dai, 2014; Suzuki et al., 2013; Pojani & Stead, 2018; Abdi & Lamíquiz-Daudén, 2020). In this regard, most scholars agree that the TOD practices in DCs are usually hindered by weak regional and multimodal connections. Consequently, PT systems do not have sufficient access to the destinations in metropolitan areas. In a study on DCs' transit and land use integration, Cervero (2013) criticised the lack of perpendicular connectors to transit stops and feeder systems. This has been the case in the specific cases of TOD in Hanoi and Bangkok, for instance, where urban transit networks are incomplete (Christine Bae & Suthiranart, 2003; Nguyen et al., 2019).

Similar to the items found in the content analysis of the interviews, the existing body of literature highlights an inter-national set of transportation physical and policy prerequisites is to be dealt with when TODs are under planning and constructions. In this respect, Iranian policymakers and government officials are highly recommended to give their attention to the provision of quality, interconnected PT systems in parallel with urban development readjustments, such as policies for density and zoning regulation, and parking during TOD policy design and planning. In fact, two spheres of the quality transport (i.e., *Node*) and the quality urban spaces (i.e., *Place*) should meet each other to have successful

transportation environments built upon the sustainable movements: high ridership, and high walkers and cyclists. In addition, besides direct transport policies, other transport-related policy domains like fuel consumption, travel cost by car, financial mechanisms and social attitudes (education) should be more given weight for policymakers.

REFERENCES

ABDI, M. (2019). A systematic review of the dimensions of transit-oriented urban planning and design. Territorios en formación(15), 25-49.

ABDI, M., & LAMÍQUIZ-DAUDÉN, P. (2020). Transit-oriented development in developing countries: A qualitative meta-synthesis of its policy, planning and implementation challenges. International Journal of Sustainable Transportation, 1-27 (in press).

ALLEN, H. (2013). An Integrated Approach to Public Transport, Tehran, Islamic Republic of Iran; Case study prepared for Global Report on Human Settlements 2013. Nairobi: United Nations Human Settlements Programme.

CERVERO, R. (2013). Linking urban transport and land use in developing countries. The Journal of Transport and Land Use, 6(1), 7-24.

CERVERO, R., & DAI, D. (2014). BRT TOD: Leveraging transit oriented development with bus rapid transit investments. Transport Policy, 36, 127-138.

CHRISTINE BAE, C.-H., & SUTHIRANART. (2003). Policy options towards a sustainable urban transportation strategy for Bangkok. International Development Planning Review, 25(1), 31-51.

DE VOS, J., VAN ACKER, V., & WITLOX, F. (2014). The influence of attitudes on Transit-Oriented Development: An explorative analysis. Transport Policy, 35, 326-329.

DUNPHY, R., & PORTER, D. (2006). Manifestations of Development Goals in Transit-Oriented Projects. Journal of the Transportation Research Board, 1977(1), 172-178.

GOETZ, A. (2013). Suburban Sprawl or Urban Centres: Tensions and Contradictions of Smart Growth Approaches in Denver, Colorado. Urban Studies, 50(11), 2178–2195.

HASSANNIA, A. (2019, NOVEMBER 15). Does Gasoline is Cheap in Iran? Retrieved Novermber 16, 2019, from BBC Persian: https://www.bbc.com/persian/iran-features-50435865

IEA. (2018). Statisrics & Data. Retrieved April 28, 2019, from International Energy Agency: https://www.iea.org/statistics/?country=IRAN&year=2016&category=Energy%20consumption&indicator=ShareOilProductsConsBySector&mode=chart&dataTable=BALANCES

LIEROP, D. V., MAAT, K., & EL-GENEIDY, A. (2016). Talking TOD: learning about transit-oriented development in the United States, Canada, and the Netherlands. Journal of Urbanism: International Research on Placemaking and Urban Sustainability, 1-14.

MIRMOGHTADAEE, M. (2016). Challenges of transit oriented development (TOD) in Iran. The need for a paradigm shift. Tema. Journal of Land Use, Mobility and Environment, 35-46.

NGUYEN, M., HA, T., TU, S., & NGUYEN, T. (2019). Impediments to the bus rapid transit implementation in developing countries- a typical evidence from Hanoi. International Journal of Urban Sciences, 1-20.

NIOPDC. (2018). Statistic of Products Consumption. Retrieved April 28, 2019, from National Iranian oil products Distribution Company: https://www.niopdc.ir/fa/products/amar-%D8%A2%D9%85%D8%A7%D8%B1-%D9%85%D8%B5%D8%B1%D9%81-%D9%86%D9%88%D8%B1%D9%88%D8%B2-98

OICA. (2015). Vehicle in Use. Retrieved April 27, 2019, from International Organization of Motor Vehicle Manufacturers: http://www.oica.net/wp-content/uploads//Total_in-use-All-Vehicles.pdf

POJANI, D., & STEAD, D. (2018). Policy design for sustainable urban transport in the global south. Policy Design and Practice, 1(2), 90-102.

SHAYGAN, M., MAMDOOHI, A., & E. MASOUMI, H. (2017). Car Ownership models in Iran: A Review of Methods and Determinants. Transport and Telecommunication, 18(1), 45-59.

SHIBLEY, R. (1998). The Complete New Urbanism and the Partial Practices of Placemaking. Utopian Studies, 80-102.

SOLTANI, A. (2017). Social and urban form determinants of vehicle ownership; evidence from a developing country. Transportation Research Part A, 96, 90-100.

SOLTANI, A., & FALAH MANSHADI, E. (2017). Evaluating Satisfaction From Taxi Organization Based on Citizen and Taxi Drivers (Case study: Shiraz). Urban planning, 7(27), 21-36 (in Persian).

SUZUKI, H., CERVERO, R., & IUCHI, K. (2013). Transforming Cities with Transit: Transit and Land-Use Integration for Sustainable Urban Development. Washington, DC: World Bank.

TAN, W., BERTOLINI, L., & JANSSEN-JANSEN, L. (2014). Identifying and conceptualising context specific barriers to transit-oriented development strategies: the case of the Netherlands. Town Planning Review, 85(5), 639-663.

TRANSPORTATION AND TRAFFIC ORGANIZATION. (2015). The summary of statistic and information of Tehran Transportation. Tehran: Tehran Municipality.

UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME. (2013). Planning and design for sustainable urban mobility: global report on human settlements. Oxon: Routledge.

WORLD BANK. (2005, FEBRUARY 1). Islamic Republic of Iran transportation sector review and strategy. Retrieved August 12, 2019, from http://documents.worldbank.org/curated/en/633871468253273064/pdf/34600010white0cover.pdf

XU, W., GUTHRIE, A., FAN, Y., & LI, Y. (2017). Transit-oriented development in China: Literature review and evaluation of TOD potential across 50 Chinese cities. The Journal of Transport and Land use, 10(1), 743-762.