

## **Workshop 8: Beyond the Farebox: Sustainable Funding of Public Transport by Better Understanding Service Values**

### ***The role of personal norms in the choice of mode for commuting***

Augustus Ababio-Donkor, Wafaa Saleh and Achille Fonzone

The role of MINDSPACE (mnemonics for Messenger, Incentives, Norms, default, salience, priming, affect, commitment and ego) in consumer decision making have been emphasised by behavioural scientist. Several researchers have investigated the role of the various elements of MINDSPACE in consumer behaviour. However, limited number of studies have investigated the role personal norms in the decision to use public transport instead of private car as a means of transport. This study draws upon the theories of behavioural economics particularly “MINDSPACE” and the hypothesis that personal norms significantly influences decisions to use public means of transport instead of private means of transport. To test this hypothesis, we investigate the following questions; 1) what is the association between norm and car ownership? 2) what is the relationship between norm and travel mode choice? To answer these questions, we analyse 500 randomly selected samples collected in the Scottish city of Edinburgh for a PhD study seeking to investigate the impact of elements of MINDSPACE on travel mode choice.

Factors extracted using ML analysis and varimax rotation produced two factors (personal norms and social norms) from ten-item measurement scale developed for measuring norms. These two factors are used as latent variables for mode choice model. Kruskal-Wallis test was used to test the correlation between correspondent items of personal norms and social norms (measured on a 5-point Likert scale) and mode choice (classified into Non-motorised transport NMT, Car and Public transport PT). The test found significant correlation between respondents' scores on personal norms and mode choice.

Additionally, SEM model was tested with personal norms and social norms (created from the ten attitudinal items) and other explanatory variables found in literature to influence mode choice such income, household size and trip purpose. In the model tested (CMIN/DF=1.552; RMSEA=0.036; CFI=0.980; SRMR=0.040 and PClose=0.907), significant path was found from income, household size and trip purpose to car ownership ( $p < 0.01$ ). Personal norm was found to directly and indirectly influence mode choice ( $p < 0.01$ ). The indirect path is via car-ownership. However, contrary to the findings in existing literature, the direct path from income to mode choice was found not significant, instead income was found to have indirect effect on mode choice via car-ownership.

The results provide an explanation on how personal norms may influence choice of mode for commuting and the decision on purchasing car. It also indicates that perception and attitudes have impact on decision making. This finding is consistent with Bamberg et al. (2007), that personal norms influence the intention to use public transportation. It further supports Avineri (2012) and Aczél and Markovits-somogyi (2013), suggestion that “MINDSPACE” could explain transport decision making. From the results, any public campaign targeted at reshaping individual norms may deliver travel behaviour change.

### ***Opportunities and Challenges of Applying Land Value Capture for Funding Greater Jakarta's Transport Infrastructure***

Harun Al-Rasyid Lubis, Ibnu Syabri and Freddy Fashridjal

As the world's second largest metropolitan, Greater Jakarta is in need to improve its urban transit system to help solve the long-withstanding issue of traffic congestion. Recently, the government is investing in mass rapid transit (MRT) and light rapid transit (LRT) networks. Initially, the infrastructure investment was planned to be funded through public funding and overseas loans. However, to expand more rail network this has led to financial constraints as fiscal revenue is very limited and fare-box only covers a small part of the operating cost.

Therefore, a sustainable fund and financing scheme is crucial to keep the rail plan and its future operation sustainable.

A globally-proven practice i.e. land value capture (LVC), a funding mechanism that extracts land value uplifts from increased connectivity was sought to be implemented as part of Transit Oriented Development (TOD) agenda. The increase of land values resulting from TOD then would also lead to a higher property tax are potential to be captured, though not easily done. It may then generate additional fiscal revenue and or earmarked to be used for funding rail infrastructure. Indonesia's Ministry of Agrarian Affairs and Spatial

Planning or Agraria dan Tata Ruang (ATR) has recently issued a regulation for TOD which is to be used as a guidance tool for local governments along with a proxy LVC tool. However, the tools provided are relatively limited compared to the existing practices overseas. The guidance does state the leading institution in managing TOD, however, the roles of landowners are not clearly specified. For example, one location is to be handled by the MRT operating company while others are by the Commuter Line and local transportation agency, though they do not own the land nearby. As a result, as there still a lack of a standard business process, implementation is very slow and could be halted too.

In the Railway Act, the central and or local government also responsible to provide public service obligation (PSO) and infrastructure maintenance and operation (IMO) for rail operation. Having adequate funding for consistent service quality, the operating company will be able to gain enough fare revenue for paying track access charge (TAC) to either central or the local government.

The concept of LVC is still new to Indonesian authorities as there is no dedicated taxation system. This paper aims to provide a sustainable business model that uses LVC for funding the MRT and LRT network. There are four main stakeholders in this model: the landowners, the local government as the leading institution, private developers and transport operating companies. The local government design TOD delineation around transport nodes, supported by site plans and guidance from ATR. The private developers share the profit from the land value uplifts with the local government, along with taxes and retributions.

### ***The politics of the Chilean public transport subsidy act and its amendments***

[Julio Briones and Daniel Brieba](#)

Since the beginning of its operation in 2007, the financial results of Transantiago, the integrated public transport system of Santiago de Chile, showed a growing deficit. In order to correct this situation, in 2009 the Chilean Congress approved a public transport subsidy act. This act delivers resources not only to Santiago but to all Chilean regions. Thus, the approval of this act was a radical change in the public transport policy carried out until that moment when, practically, all the public transport services did not receive any type of subsidy. A few years later, this act was modified twice in 2013 and 2015. Although the original 2009 act established the delivery of resources until 2022, these modifications increased the subsidy and delivered new regulatory tools to the Ministry of Transport. It is important to note that both the original act and the two subsequent amendments were made under different presidential administrations and legislatures.

This experience raises several questions, but there are two that particularly draw our attention: Why has this act changed so many times in such a short time if it originally solved the problem of Transantiago financing until 2022? and How have the successive amendments responded to the problems that have been observed during the implementation of the subsidy policy? This paper seeks to answer these questions, and from this, propose some more general lessons that may be useful for scholars and policy makers of public transport in other countries. We answer these questions, applying a model that explain the life cycle of public policies. Specifically, each of the stages of this cycle is studied by answering more specific questions about how the problem of public transportation financing entered into the legislative agenda of the government, how government authorities, bureaucrats and legislators participated in the design process and contributed to shape this policy, and how the experience of the implementation was showing new problems that made necessary further changes in the act.

This experience of a drastic change in transport policy and its subsequent modifications offers an excellent opportunity to analyse and understand the different stages of the life cycle of public policy. The study of this process of change shows contradictions and inconsistencies proper to real-life problems. Thus, this work shows us that the technocratic ideal of reaching an optimal solution to the problem of financing public transport is a mere illusion, being suboptimal solutions the best alternatives that we can aspire.

### ***Valuing configurations of Bus Rapid Transit***

[René Borsje and Wijnand Veeneman](#)

Accessibility and an attractive, healthy and sustainable environment are issues high on the agenda of local and regional governments. One of the instruments used to fulfil their policy ambitions is offering public transport. Bus systems have been developing in the last decade as high-quality alternative for expensive rail systems. This paper builds on current literature and adds to the current a focus on combinations of characteristics regarding bus systems going beyond the traditional, focusing on an empirical analysis. The

paper presents a stated preference regarding BRT configurations and their characteristics; what combinations of characteristics are valued above others.

BRT comes in many configurations. In designing a bus service, various choices can be made concerning running ways, stations, rolling stock, intelligent transport systems, ticketing, branding and time table characteristics. Insights in what design and system performance aspects are valued by passengers and civilians can be relevant for system design, marketing communication, developing incentive and penalty regimes and so on.

A conjoint analysis will be performed to find out what attributes or features are valued above others in order to understand the decision-making process when choosing a transport mode for commuting or recreational purposes. The selection of attributes to include is based on a comprehensive international literature review and prior research. Examples of these attributes are high service levels, branding, vehicle accessibility and reliability. In total 1,200 Dutch civilians will be questioned in order to measure their preferences.

The article wants to contribute to a shift in the literature from defining BRT systems, and the running controversy in the literature on tram and light rail versus bus and higher quality bus services, to a focus on understanding the key design factors driving success once the choice for bus has been made.

This paper will be the second in a series of articles that analyses the effectiveness of BRT systems and governing mechanisms to create public value. The paper proposes the analysis and the outcomes in a Dutch context. Next steps would include international comparisons for a broader empirical base.

### ***Beyond farebox: Financing railway via betterment levies***

[Elif Can Cengiz and Huseyin Murat Celik](#)

Cities are the centre of economic activity and vitality. This economic activeness makes them an attraction point for a huge number of people to move in. Due to economic and social reasons most of the people are willing to live in metropolitan areas. This agglomeration of people led to uncontrolled expansion and unplanned development of cities. It has long been recognized cities are established around all kinds of public infrastructure. A community cannot survive without certain infrastructure needs are met. After 20th century transportation became one of the most important public infrastructures. Road based transportation systems are losing their importance when compared to railway systems; since railway systems have better ridership figures with better quality of service provisions. But most of the cities do not prefer to invest on railways because they have high capital investment cost and low turnovers. There are very few railway systems in the world that make profit only with some specific enforcements. The general opinion for railways is that they never make profit and need governmental subsidies. If railway projects are implemented without specific enforcements they are dead investments, only farebox incomes would not be sufficient to cover even the operation cost of the system. But literature proves that any kind of public infrastructure have appositve effect of urban land values. Especially transportation systems like railway that have high ridership figures are obviously affecting land value in cities.

In this study as a developing country Turkey is chosen. The most populated city of the country is İstanbul which have largest railway network and planning further extensions. Two case studies are selected from İstanbul one case is an area with railway in operation, this area is used calculating the impact of railway on housing values by using hedonic price model. The second case study area does not have a railway in operation on the contrary in construction phase. Findings in the first case is used to estimate the after-rail price of the surrounding housing prices in the second case area. This value increase is utilized by property owners only without proper internalization methodology. The aim of this study is to develop a model to calculate the estimated value increase after a railway project in İstanbul and then collect some part of this increased value from landowners and use it for funding railway projects in the city. The main purpose of this study is to develop a financing model for railway investments in a developing country to maintain the railway investments' sustainability via using their positive impacts on urban land values.

### ***The road pricing regime analyzed within "The Nordic Model"-framework.***

[Olav Hauge and Niels-Henrik Topp](#)

Here, we discuss and perform an economic analysis known as "The Nordic Model" with toll funding and road pricing regulations. It gave us the first established toll rings in Europe (Bergen 1986, Oslo 1990 and Trondheim 1991). Politicians and road authorities in Stockholm launched a road price regime in 2006 similar to peak load price analysis presented in Herbert Mohring's Transportation Economics (Mohring 1976). After a six months test period, road pricing became political feasible with a majority vote in favour of it in a popular

referendum in 2006. Voters' approval in Stockholm made road pricing political feasible and in Norway, Trondheim (2010), Kristiansand (2013), Bergen (2016) and Oslo (2017) introduced road price regulations (later adjusted as an environmental element).

In a working paper about the Stockholm road price effects in 2014, Jonas Eliasson presents findings (Eliasson 2014). One striking effect of a road price regime is efficiency urban road use change for private car users and public transport services. A low road price reduces road use > 20 %, unexpected the dense congestion. We explain it in a physical flow model as experienced road users pay the road price and speed up transport flow leaving streets empty in the hours Stockholm.

In Bergen, in 1986 a large political majority voted in the first toll ring system in Europe. Political resistance ahead evaporated with a discount system, several environmental effects, funding public transport services and improved lanes for pedestrians and bicyclists (see TØI-report 2009 [Aas, Minken and Samstad 2009]). An extended urban road system gave commuters extra capacity. We discuss how new or extra urban road and public transport service capacity funded by toll rings or road price funded tunnels, bridges and above surface urban road infrastructure to create a double effect. Exclusive lanes speeded up public transport, and extra capacity changed commuting spilt in favour of public transport and freed area for alternative use of urban areas.

We add Duranton & Turner's The Fundamental Law of Road Congestion: Evidence from US cities published in 2011 (Duranton & Turner's 2011). They conclude that increased provision of roads is unlikely to relieve congestion, a Braess'paradox conclusion (Braess 1968) with finding similar to Eliasson (Eliasson 2014). We discuss exclusion of private car use, city centre redesign and the Copenhagen 50:50 split of street capacity between private car users and cyclists.

We conclude this way: Within "The Nordic Model" framework, we might expect Bergen, Oslo and Trondheim to be the first to introduce toll road regulation in Europe and give the public sector additional revenues. Toll funds 50 % of road infrastructure investments and changes the private-public sector split. Public sector regulates more of private individual's activity, changes significantly commuting in rush hours, generates more revenues, private and public transport services get more efficient with speedier transport, and reduced emissions. It frees existing public transport services capacity. It might extend public services and stimulate private car use alternatives.

### **Public policy framework supporting "Mobility-as-a-service" implementation**

Renata Lajas and Rosário Macário

The continuous growth of world population and rising urbanization poses several challenges inside urban mobility systems. At the same time Digitalization megatrend is reshaping lives worldwide, and "Ownership" is shifting to "Usership". Data is seen as the new "oil" of the XXI century, where "Open Data" availability becomes vital. Based on the existent diversity of transport services, "MaaS" emerges as a potential mobility disruption.

Inspired in Finland's "MaaS" ecosystem concerning primarily the policy process implemented, this paper aims to propose a "Mobility as a Service (MaaS) Public Policy Framework" with a two-stage approach. First structuring the "MaaS" concept, based on the reinterpretation of an extensive literature review from which stems out the core features and its relations that shape the "MaaS" concept. Secondly, by each "building block" of the "MaaS" concept, a public policy framework is proposed with the identification of policy instruments and indicative group of stakeholders responsible, by each urban mobility management decision level.

This paper is divided in six sections: the first and second focus on main goals, context and methodology. The third one covers the theoretical framework in the areas of "MaaS", "Public Policy" and "Urban Mobility levels of decision". The "MaaS System" in Finland was considered as an inspirational case-study for the proposal development, which corresponds to the fourth section. The fifth section covers the structuring of "MaaS" concept and the proposal of a "Public Policy framework". The conclusions represent the sixth section.

The authors argue that is fundamental to understand the nature of decisions which are intimately connected with the Urban Mobility system, to design and implement a coherent and effective policy framework. Therefore, the policy tools chosen to materialize policy decisions regarding "MaaS" should first consider the identification of the founding pillars of the "MaaS" concept, guiding the process of policy design accordingly.

If "MaaS" is considered a Mobility Management tool, supported by a coherent public policy framework,

besides allowing a value proposal and its articulation with supply and demand, ensuring all means of information and transaction between the two market sides, it will enable the feeding of monitoring functions that the authority intends to wield, which can have an important impact on the implementation of sustainable mobility policy goals and constitutes an opportunity to redefine public transport and its financing

***How much would you like to pay for light rail near you? Willingness-to-pay and service values of public transport investment in Gold Coast, Australia***

[Abraham Leung](#), [Matthew Burke](#), [Barbara T.H. Yen](#) and [Corinne Mulley](#)

Government funding for public transport is at times limited, contested, and is increasingly politicised at Federal, State and local level of governments in Australia. However, with rapid population growth and traffic congestion, there is an urgent need to improve public transport in Australian cities. Value capture (VC) is being (re)discovered as a possible way to help fund public transport infrastructure. There are however strong concerns from the community at large - with a perception that VC is "just another tax". However, property value uplift near stations is evidenced by a plethora of studies, typically done by revealed preference hedonic modelling or geographic regression. Service values of public transport to property owners are currently not well understood. This paper adopted less used stated preference methods to enhance understanding of residential property owner's willingness to pay (WTP) under different VC schemes (such as distance tiered betterment area levy), so as the barriers and opportunities of capturing property value uplift from public transport projects.

Using the case study area of a potential public transport corridor at the western part of Gold Coast's urbanised strip, we conducted surveys targeting 1) expert stakeholders (government officials, transport operators, public transport/property advocacies) and 2) property owners in the community. The findings of both groups are compared, revealing a significant disparity between transport practitioners and the community at large. VC is found less accepted at community level, but with mixed levels of WTP regarding distance-tiered or non-geographic schemes. The value of public transport services, benefits, and rationale of VC are less well understood by the wider community. We recommend policy makers who are contemplating VC need to balance operational considerations as well as equity. New taxes can be politically difficult to implement. For successful VC implementation, better linking service values and the burden of payment based on the potential gain from public transport accessibility improvements are necessary.

***Strategies on promoting rural bus: Case of Chongqing***

[Shoujie Li](#), [Chenqian Zhang](#) and [Tao Yu](#)

The study of rural bus, unlike its counterpart operating within urban areas, was not paid enough attention by policy makers as well as researchers. With fast economic development in China, ownership of motorised vehicles keeps rising in urban areas as well as in rural areas. However, there are still some rural residents who cannot afford to buy vehicles or are not capable to drive on road especially for those senior residents, which makes it compulsory for rural bus to exist as the only mode of public transport in rural areas. In this paper some strategies in Chongqing are proposed to promote rural bus mode as it is the only public transport mode on which residents in rural areas rely. Based on data collected in Chongqing, China, subsidy models were built to derive appropriate amounts of subsidies for rural bus operators and drivers. The paper provides valuable insights for making public transport policies to promote rural bus in other rural areas.

***Methodological perspectives to account passengers as intangible assets in a public transport company's balance sheet***

[Mathetha Mokonyama](#) and [Zane Mheyamwa](#)

Public transport operating companies, especially state subsidised services, are often regarded as technically insolvent or financially unsustainable because their book value of liabilities exceeds that of assets. This is because the value generated from passengers is mainly limited to fare revenue. However, the value of a public transport user transcends a basic financial transaction and could include such things as improved liveability of a place, enhanced social capital, and increased property values, which can be traded.

The paper explores various methodological approaches to account for passengers as intangible assets in the balance sheet of a public transport operating company, in line with the International Accounting Standard definition of an intangible asset. The strengths and limitations of each approach are provided, and comparisons are made with accounting practices in industries that are reliant on intangible assets such as

entertainment and sports. The paper also makes recommendations for both the practice of financial accounting and transport research on the valuation of passengers as assets.

***Measuring social equity/exclusion in public transportation: Case study of Batna district***  
Housseem Mouffouk, Farès Boubakour, Ramdane Lounansa, Keltoum Bibimoune and Barkou Mazouz

The current research presents the results of a research project financed by CREAD (Center of Research on Applied Economics for Development), the project was about measuring the social sustainability in public transport system in the district of Batna.

To do so, the researchers used five (5) indicators:

- The spatial coverage of public transportation systems;
- The Temporal coverage of public transportation systems;
- The adequacy of the applied prices in public transportation systems;
- The extent to which individuals are feeling safe while using public transportation systems;
- The integration of individuals with hardships.

The case study was conducted in 31 municipalities out of 61, where 476 questionnaires have been administered to users of public transportation users, 8 interviews with responsible of the public transportation system and 16 interviews with transporters.

The results have shown that there is a significant social exclusion in public transport systems in the district of Batna in all the aforementioned indicators.

The researchers converted the digital results into graphical representations using QGIS (Geographical Information System) in order to create a map presenting the social equity/exclusion in the district of Batna. The results have been backed up with a simulation of results where 16 sub-indicators have been used to build a model.

The principle of the model is that when an interviewee answers some questions based on the 16 indicators, we can tell if he/she is excluded or not from the transportation system.

***Private Participation in Mass Transit in Bangkok: Experiences and Way Forwards***  
Sumet Ongkittikul and Kittiya Yisthanichakul

The mega-cities in developing countries face challenges in coping with the urbanization that create massive congestion. Only solution of such situation would be the mass transit system that can be replaced the private automobile usages. However, the mass transit investment requires huge investment, where the developing countries are struggled to finance such projects. Thus, there are needs for private sector investment in forms of public private partnership (PPP) projects as a means to reduce public debt burdens.

Thailand had used a PPP framework to develop its mass transit system in its capital city, Bangkok. The first mass transit PPP projects in Bangkok is the Bangkok Transit System (BTS) or known as the Skytrain that was started the construction in 1992 and entered into service in 1999. This project was developed fully by private sector investment. The experiences of this project were fruitful in several aspects including traffic demand risk, financing package, and system extension. Later on, two mass transit lines were constructed and operated using the same principle of the PPP framework, with the modification of the contractual and financial arrangement due to experiences in previous projects. However, the financial models for two lines are different from the BTS project. These two mass transit lines' financial models are that the government invested in the infrastructure and the PPP contracts were for the electrical and mechanical system including operating and maintenance. Currently, two-extension and three new lines are under construction.

Although the progress of mass transit in Bangkok is considerable in recent years, the complexity of planning and operation of both current and future mass transit lines is still an issue. The complication of the mass transit system in terms of planning and coordination in Bangkok is that both the local government (Bangkok Metropolitan Administration, BMA) and the central government agency (Mass Rapid Transit Authority Thailand, MRTA), are developing the mass transit projects. Furthermore, the mass transit lines developed by MRTA tended to follow the PPP framework for each individual line, which created the situation that the mass transit lines' fare cannot be integrated due to each line had its own concession terms. Thus, as more mass

transit lines developed, the fare for passenger using two or more mass transit lines will have to pay incredibly high price, which in turn hampered the usage of the mass transit system.

This paper will review the past experiences of the mass transit projects in Bangkok. The difference PPP contractual arrangements of mass transit projects, not only the existing projects, but also the planned ones, will be compared and analyzed. Furthermore, the paper will analyse the effect of the PPP concessions on the mass transit fare if the concessions are awarded individually without the financial incentive to create the integrated fare system. Finally, the paper will propose the PPP model that can accommodate the integrated fare system that can utilize the mass transit investment more fully.

### ***Temporal analysis of fare evasion in Transantiago - socio-political view***

Keiko Porath and Patricia Galilea

Although fare evasion is a common problem in transport systems worldwide, level of fare evasion experimented in Transantiago was 28.5% for April - June 2018 (Programa Nacional de Fiscalización, 2018) being about six to seven times higher than international average of 4.2% (Guarda et al., 2016).

Even though past measures have been able to lower fare evasion, they have not been able to bring this phenomenon to a sustainable level. This suggests that fare evasion is not only a problem that can be solved at technical level, but that it should be studied in a multidisciplinary manner focusing on social, political and cultural components. This study aims to identify socio-political variables and factors related to the state of social Anomie, in order to identify how the lack of social control and diminished institutional or social trust may affect levels of fare evasion experimented.

In this paper a longitudinal econometric analysis is done using data from May 2010 to May 2018, modelled through an ARIMA autoregressive model to determine the impact of transport system variables (bus fare, ticket inspection, number of paid zones and quality), macroeconomic variables (unemployment and informal employment) and socio-political variables (approval of Transantiago, Government approval, mention of scandals in the press and general trust/ confidence experimented at social level).

Socio-political variables are included under the assumption that a negative perception on these variables may hinder users' willingness to pay for the service provided, such as a decrease in approval of Government or Transantiago. Also, mention of scandals in the press was included because the editorial line of the media forms public opinion about social, political and economic institution. Thus, the more scandals mentioned in the press greater may be users' discontent, lowering their willingness to pay. Trust/ confidence towards political and economic institutions and the ruling class was included as a double variable: on the one hand trust is directly linked to users willingness to pay, on the other hand, trust is a variable that indirectly measures social anomie (state where society is not able to force social control on individuals, thus generating a state where social norms are not followed).

The results obtained confirm the existence of a positive autoregressive effect, suggesting a contagious effect in users' behaviour. According to our model, the level of inspection reduces fare evasion while bus fare increases this rate. New findings of this study include the introduction of government approval and the confidence/ trust towards political and economic institutions and the ruling class as variables with a contrary effect towards fare evasion: a decrease in government approval and confidence/ trust increases fare evasion.

The latter suggests that fare evasion is a social phenomenon that should not only be intervened on a technical level and it ought to be studied in greater depth by other disciplines. Future lines of research should examine determining factors of perceived quality and confidence/ trust affecting Transantiago, in order to establish how to reduce fare evasion when there is a permanent increase of distrust in society.

### ***Innovative ways of sustainable financing urban public transport***

Sergi Sauri, Mateu Turró and Domingo Peñalver

Under the complex financial situation of urban public transport (UPT), decision-makers are confronted with the opposite pressures of guaranteeing high service quality and of doing so without endangering public finances. Reducing expenditure might create a snowball effect, with poorer service expelling users, with lower demand levels leading to less revenues and forcing further service reductions, and so on. On the other hand, it is difficult to pass the cost of improved service to the users, as higher tariffs may also affect demand. Decision-makers are therefore bound to find strategies that reduce the amount of public money devoted to

subsidising UPT while providing the right supply of collective transport services. While there are obviously no magic solutions to solve the problem, there are some innovative ways of financing urban public transport that could contribute to improve the present situation.

Borrowing options may be useful to obtain more flexibility to adapt the actual financial requirements of infrastructure provision to the estimated benefits stemming from UPT services. In this sense, public-private partnerships may provide additional added value as PPP arrangements, besides distribute in the long term the impact of UPT payments, can increase system efficiency potentially. Land-value capture mechanisms may also be a feasible option for UPT funding, though acceptability is still a key factor for its implementation. Green taxation solutions, earmarked for UPT financing through pollution or congestion charges, for example, have proven their capacity to generate additional resources for the whole UPT system. There are other mechanisms and strategies that can be implemented to obtain extraordinary funds from beneficiaries of transport facilities even though their overall contribution to deficit reduction might not be very substantial. This paper describes the different instruments available for financing UPT and how these instruments can work together optimally for UPT project and provides context-specific recommendations on how to apply these innovative approaches.

### ***How can we sustain urban railways? From the perspective of relationship between operator and local government and creating shared value***

Yeonjung Song, Kenichi Shoji and Tatsuki Enomoto

With the rapid growth of urban area due to economic growth, the way to plan and manage public transport service and infrastructure have been always significant issues in transport studies. Discussion on how to evaluate and understand benefits from public transport properly is also considered to be necessary, however, those studies mostly focus on cost and benefit analysis, value capture, beneficial externalities and road pricing. Meanwhile, after a big wave of privatisation and deregulation in many countries, although it is no longer unusual to find private operators in public transport service in urban area which was meant to encourage innovation in the market, most of their activity seem to be focused on producing and providing transport service rather than utilising their strategic freedom as a private enterprise.

While numerous studies have contributed to establishing sustainable public transport system so far, many public transport studies are mainly likely to consider design of transport service and transport market represented as passengers (users) and seem to overlook other players in the market – local area and government, as well as confining the private operators to a simple role as producer and provider of transport service. Moreover, given that railway is a public transport having socially significant status and benefits more than improved convenience like value capture from public transport have been lively discussed in recent days, it is necessary to focus on wider scope beyond design and transport market to reconsider policy of public transport service in wider perspective. Thus, we aim to extend the scope of the discussion to the value of the local area along with a railway route which is beyond improved convenience and land price, and the relationship between private operators as strategic player and local government, thereby providing implication on a business model to sustain market of urban railway. We examine recent case of Japanese private railway companies which have been diversified for a long time while facing with new phase of strategy and focus on the cooperation of private operators and local government to have a same goal, enhancing the value of the local area which is accomplished by developing local area through strategic activities other than railway operation. In particular, we spotlight how operators and local governments – are struggling for cooperation to achieve same goals in the field because of differences in philosophy and ideas between them. We deploy discussions in line with our previous paper on Thredbo 15, emphasising improved customers' benefit to sustain railway service and diversification to capture customers' benefit. We discuss the operators' strategies to enhance the value of the local area based on the idea of creating shared value. Finally, we also consider implication to enable the operators and local government to achieve the goal by exploiting each other's merits through Japanese case, and policy scheme and its meaning to encourage the operators to participate in various strategic activities other than transport service which can contribute to increase of the value of the local area along with rail routes.

### ***Antidotes to Baumol's disease: comparing bus operating cost growth in the US and the UK***

Anson Stewart, Nicole Badstuber, Jinhua Zhao, Frederick Salvucci and Nigel Wilson

The growth in costs to operate bus services often outpaces inflation, a tendency that creates recurrent budget difficulties for public transport authorities. Morales Sarriera et al. (2018) use the US National Transit Database to diagnose growing unit costs for bus service in the US. They find that between 1997 and 2014, the compound annual growth rate of operating cost per vehicle revenue mile was 1.2 percentage points higher



than inflation. They attribute some of the growth in real costs to Baumol's disease, which is inherent to sectors with lower than prevailing productivity growth (Baumol and Bowen, 1965). The results of Morales Sarriera et al. suggest other factors, including union bargaining power and decreasing commercial speeds, are also at play. We plan to extend their analysis in three ways. First, we will discuss the implications of changes in commercial speeds. Second, we will explore alternative formulations of unit cost, including normalizing by measures of service consumed (e.g. passenger miles travelled) in addition to mileage produced. Ridership trends may be attributable largely to evolving transport modes and changes in metropolitan economies, which are exogenous to narrow definitions of operational productivity. Nonetheless, to the extent that slower speeds reflect higher ridership or wider economic growth enabled by regional accessibility, demand-sensitive metrics may be appropriate as complementary measures of the value of public transport service. Third, we will assess operational cost growth in London, where private operators compete for tenders, and the rest of Great Britain, where bus services are deregulated. Preliminary results suggest that from 2004 to 2016, the compound annual growth rate of operating cost per vehicle revenue mile in England outside of London was 1.5 percentage points higher than inflation. This overall cost growth rate is similar to the US result. An initial estimate of the Baumol variable is much lower for the English case, suggesting that productivity may not lag as much in the UK bus industry and that other factors (including commercial speed) may play a larger role in cost growth, as compared to the US case. If unit cost is defined on a passenger-mile travelled basis, cost growth is substantially lower. We plan to build on these preliminary and partial results by preparing similar updated figures for the US, London, and the rest of Great Britain. This three-way comparison, and differences in unit costs depending on whether a passenger-mile basis is used, may have important implications for how the benefits of public transport are framed and discussed in budgetary decision-making.

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### ***Challenges for Implementing the LVC Concept for Funding Urban Mass Transportation Infrastructure Investment. Case Study: Jakarta and Surabaya***

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A decade since 1998, political and economic reforms began in Indonesia, infrastructure investment has increased to attract private investment, accommodate economic growth (ref), and overcome the economic crisis. This paper provides empirical evidence that infrastructure has important effects on urban expansion, land price development, and land development. With a series of links already established, it is important to examine whether recent infrastructure development can help cities grow towards a sustainable future. Although the pace of infrastructure development has been accelerated, there are several challenges related to current infrastructure development practices in Indonesia. The main problem faced is that the source of funding for infrastructure provision is still limited. On the one hand, the increasingly decentralized fiscal relationship between the centre-region provides great freedom for cities to mobilize resources through various mechanisms that greatly expand extra-budgetary income. But on the other hand, financing problems have emerged, driven by debt-laden regional governments after the global financial crisis.

This paper specifically also discusses the concept of capturing land value in relation to financing urban public transportation infrastructure, i.e. Light-Rail Transit and Mass Rapid Transit, in two major cities of Indonesia, namely Jakarta and Surabaya. A number of studies suggest linking the development of land transportation infrastructure with an increase in property values that say that additional increases in the value of this property must be taxed by the government. But for Indonesia, this raises three interrelated questions: first, what type of investment does the local government do and how is this compared to what is envisaged in the concept of taking land value? Second, how can this property value increase be identified and measured? Third, how much knowledge do local authorities have about this LVC concept and what is the mechanism like? The preliminary findings of this study reveal that local governments in Jakarta, Surabaya and Bandung have a number of challenges in adopting the concept of value capture, including the low value of infrastructure developed, measurement of the increase in value and limited knowledge of concepts by stakeholders.