

EXPLORING POTENTIAL OF PUBLIC TRANSPORT SYSTEMS TO FACILITATE DEVELOPMENT IN THE SA CONTEXT

S Naudé

HHO Africa Infrastructure Engineers, P O Box 6503, Roggebaai, 8012
Tel : 021 4252870; Email stef@hho.co.za

ABSTRACT

With the implementation of the first phase of the Gautrain and Rea Vaya Bus Rapid Transit (BRT) systems in Gauteng in 2009, and that of Cape Town's MyCiti BRT system in 2010, the major focus related to planning, design and construction aspects have been on the systems' physical and operational characteristics, and their cost implications. The novelty of the first "new generation" public transport system of note to be implemented in SA cities, the fractious interactions with the taxi industry, and concerns with cost escalations have obscured discussions around the potential significant long term impact that these systems could have on the land use and accessibility patterns of our cities. This is of significance given that these inequitable and dysfunctional patterns inherited from apartheid have proved entrenched and largely immune to spatial restructuring initiatives by planning authorities following its formal demise.

This paper will specifically explore the restructuring potential, together with the value enhancement and capture aspects of BRT and rapid rail systems, based on precedent in cities of relevant contexts in South America, i.e. the opportunities for densification/ intensification of land uses along public transport corridors, the extent of value capture possible, private sector development responses, public sector intervention to make e.g. affordable housing opportunities available, and cross-financing opportunities (to help fund capital and/or operational costs). It will explore planning/ land use management authorities' responses to pro-actively engage with potential public transport - land use interaction dynamics within policy frameworks, i.e. how are land value enhancements (increments) best mobilised to fulfil a range of (potentially competing) objectives.

Finally, the paper will explore the potential of public transport as part of a package of critical ingredients in fostering more compact forms of development, specifically in the South African context which present a number of unique challenges, including high levels of inequality, major concerns with public security, increasing trend towards containment in security villages, and private mobility as an aspirational lifestyle choice.

1. INTRODUCTION

This paper explores the potential for positive transport - land use interaction between new generation public transport systems such as Bus Rapid Transit systems and the Gautrain, and the potential for integrated patterns of land uses which investment in such systems could unlock. It also explores more broadly the interaction between transport and land use, and the different impacts that investments in private versus public transport investments could have on urban structure. The policy responses in realising the potential of high-end public transport systems, together with their potential conflicts are highlighted. The potential of such systems to help foster more positive urban structures in the South African context is finally explored.

2. THE BRT CONCEPT

Bus rapid transit (BRT) represents a cost effective response to providing higher order public transport services along dedicated rights of way, cheaper than the rail modes (metro, suburban and light), while being more effective than modes operating in mixed traffic conditions. It has the potential to offer an attractive alternative to private vehicle travelling, hence attracting choice users to the system, and thereby effecting modal shifts.

BRT systems have become a public transport investment of choice in many developed and developing cities. Historically bus systems have been considered to have a negligible impact on urban form and land values, compared to fixed line systems such as rail (metro, suburban, or light rail). Because of the greater capacity of rail and the permanence of its infrastructure, it was deemed to have greater potential to influence land use patterns and urban form. BRT has however bridged the gap by establishing a similar physical presence through its dedicated lanes, which increases its capacity and enables it compete on more equal terms with rail. Its main advantages over rail are its relative cost-effectiveness, and its greater operational flexibility, being able to run in mixed traffic on general lanes (as feeder-distribution services), and along the exclusive lanes (as trunk services) (Cervero & Kang 2009).

3. NOTION OF VALUE CAPTURE

Value capture is a public financing mechanism which attempts to 'capture' all or a part of an increase in land values generated by a new public investment. The increments in land value that would in the absence of such an intervention accrue to the private sector (proximate land owners whose properties increase in value due to the investment), are recouped by the public agency, all or in part. The principle behind value capture is that beneficiation through 'community intervention' rather than the actions of the landowner should be returned to the public in some form of re-investment. In this view, land is in part a public asset, the beneficiation of which should not only accrue to its owner as windfall gains, but shared to betterment of society at large.

This can be done by helping to finance a particular project (either capital investment or subsequent operations), other public projects, or used as general income to the fiscus. Value capture encompasses a wide variety of mechanisms, from a 'passive' approach through an increase in property taxes following an increase in land value, to more pro-active approaches in which the public agency becomes directly involved in land development, either on its own or in partnership with the private sector.

It follows from the above that investment in permanent rights of way (be it roads for general, mainly private transport or public transport infrastructure such as rail or BRT) could have potentially significant impacts on land values. The capturing and application of such generated values is subject to wide-ranging policy debates.

4. TRANSPORT – LAND USE INTERACTION

Urban structure is fundamentally determined by the interaction between transport systems and land use patterns, while accessibility lies at the heart of the dynamic between transport and land use. Nodes of relatively high accessibility are typically served by a number of transport modes via private and public means. Such nodes are characterised by a high intensity, mixed land use profile, including higher order public (civic) and private facilities or amenities. The hierarchy of nodes is typically associated with differential levels of accessibility, i.e. lower order nodes are less accessible than higher order nodes.

Any major new transport investment in a city impacts on accessibility patterns by altering the relative locational advantages of sites throughout an urban area. A site in proximity to such an investment would enjoy improved accessibility, whereas a land parcel further away from the investment could become relatively less accessible.

The type of transport investment is further critical in determining private versus public transport oriented accessibility, e.g. the construction of a new road encourages private motoring, and land use responses (e.g. a regional shopping centre) at sites of improved accessibility (e.g. next to freeway interchanges), are by their nature geared towards private vehicle accommodation. From an urban structure perspective, it is generally assumed that pure road infrastructure investment is associated with more dispersed and uniform patterns of development. This in turn has a negative impact on public transport accessibility, as the conditions to provide viable services are not established, or in fact undermined. A new public transport system, or a revamped existing one, has the potential to change the accessibility contours of a city. The extent to which it does so depends on its capacity (critically, establishing an independent right of way), and its network effects (or coverage). The introduction of a single new linear service could substantially increase the number of people able to travel, or access destinations via stations, along a corridor. It may however have a limited effect on the city-wide accessibility patterns. If additional service lines are added, and they are configured into a network, i.e. with multiple crossings, a major central hub and subsidiary nodes, accessibility patterns are transformed and the potential established for major urban restructuring to take place.

Urban restructuring would take place mainly through :

- (i) the containment of the geographical footprint of the city by increasing the capacity of the range of movement systems to accommodate more people and activities within a given area (effectively increasing the supply of developable land for a given land area), and
- (ii) altering the spatial relationships and dynamics between different land uses, creating the possibility of moving away from zones of uniform and discrete uses (by their nature often spatially extensive); to areas which are more interactive and complementary, i.e. mixed use zones (inherently more spatially intensive)¹.

In order to give effect to these dynamics of urban restructuring, much depends on the pro-active ability or otherwise of municipalities to implement enabling strategies, which could take the following forms :

- land use controls (e.g. defining an urban edge)
- zoning and regulatory restrictions pertaining to densities and designs
- rates policies (e.g. levying tax premiums on under-utilised land), and
- developing strategically located land within the newly accessible corridors (either alone or in partnership with the private sector).

The strategies above are to varying degrees related to the principle of value capture, in particular the latter two strategies.

5. BRT, URBAN FORM AND LAND VALUES

5.1 International Experience

Cervero & Kang (2009) reports that while traditional bus services are perceived to have negligible impact on urban form and land use patterns, because (in contrast to rail systems) they "fail to confer appreciable accessibility benefits", BRT systems have the potential to do so given their qualitatively different operational characteristics, as outlined in Section 1.

The authors note that empirical evidence to inform the debate is limited. A study of the impact of a BRT system in Los Angeles on land values found relatively modest positive impact on commercial land, and some negative impact on residential properties in close proximity to the system (due to nuisance effects). In contrast, "a study of the more substantial BRT system in Bogotá, Colombia, found appreciable land-value benefits. There, multi-family housing units close to Bogotá's TransMilenio BRT rented for more per square meter than units located farther away. There is also some evidence that creating pedestrian-friendly environments near BRT bus stops can further increase land-value benefits."

Cervero & Kang (2009) studied the impact of a new BRT system in Seoul on land use composition and land values. Their research concluded that "in a crowded, congested, and land-constrained city like Seoul, increased accessibility prompted property owners and developers to intensify land uses along BRT corridors, mainly in the form of converting single-family residences to multi-family units, apartments, and mixed-use projects. Moreover, land markets capitalized these accessibility gains, particularly among parcels used for condominiums and higher density residential

uses. Land price premiums in the 5 to 10 percent range were estimated for residences within 300 meters of BRT stops. For retail shops and other non-residential uses, impacts were more varied, ranging from 3 to 26 percent premiums over a smaller impact zone of 150 meters from the nearest BRT stop' (ibid).

The international experience provides evidence that land parcels along a BRT corridor (principally in vicinity of stations) can acquire higher land values over time, and convert to accommodate more intense and varied land uses. Land owners in vicinity of stations stand to benefit, either through an increase in accessibility from other locations to their sites, as well as from these to other urban locations, which enhances the potential for mixed use developments.

5.2 The South African Experience

The Gautrain is arguably the most prestigious public transport project ever undertaken in South Africa. Based on available evidence, there seems to have been a pro-active land use response formulated in advance of the Gautrain becoming operational, while for the BRT systems, evidence is inconclusive.

5.2.1 The Gautrain

The development potential of areas in the vicinity (1 km) of Gautrain stations was considered, and local or urban spatial development frameworks drawn up, with a view to the following (JP du Plessis 2010) :

- 'creating or reinforcing densities;
- promoting ridership (getting people to stations);
- establishing mixed land use around stations, thus with varying travel patterns throughout the day;
- establishing a new urban form that embraces the Gautrain; and
- establishing integrated public transport nodes'.

It was estimated that by the first quarter of 2010, land use applications for more than 2 million m² of commercial developments in Gautrain station precincts were considered. The value of these potential investments over the next decade exceeded the capital cost of the entire Gautrain project (ibid). It would however not be accurate to apportion these investments solely to the Gautrain system itself, as the stations are located in areas which have sound property fundamentals in place, and would in its absence arguably have experienced some investment in any event.

At face value, the prospects of realising transport – land use integration potential along the Gautrain corridor appeared to be very promising. Land use responses are over time likely to lead to an increased market for the Gautrain service, thereby improving its operational viability. It would also conceivably contribute to containing the peripheral spread of the Jhb-Midrand-Pta conurbation, and hence have a positive impact on urban structure (more integrated, higher levels of accessibility). It is however not clear if the public agencies have policies in place to attempt to leverage the future land value enhancements for any particular public purpose other than to foster economic growth.

In a recent assessment of investments at three stations along the Gautrain (Mushongahande et al, 2014), i.e. Rosebank, Midrand and Pretoria, Rosebank was found to be most successful in that a variety of new developments were generated in its immediate vicinity, strengthening a vibrant mixed use node. Critically, a number

of “success factors” needed to be place, notably pre-existing real estate fundamentals, (buoyant property market, highly sought after location), which are then further strengthened by the proximity of the station. These factors are not as evident at the other two stations, which have largely failed to realise the developments envisaged in their local spatial development frameworks.

5.2.2 Cape Town BRT

The BRT system (MyCiTi) in Cape Town, between Atlantis and the CBD via Table View (1st phase) is also breaking new ground in providing road based public transport services along exclusive rights-of-way.

The BRT system in Cape Town has provided an alternative to a relatively contained sub-metropolitan area in Blaauwberg North, served by limited number of gateways to the rest of the metro. By virtue of its enhanced operational characteristics, exclusive rights-of-way and branded imagery, it has succeeded in attracting a number of choice users, leaving their cars at home and taking the MyCiTi bus instead. A number of different types of trips are undertaken on MyCiTi, mainly for work purposes, but also to access places of entertainment outside the area. Anecdotal evidence suggests that property values have increased throughout the greater Table View area since the introduction of the MyCiti service, mainly in the lower to medium priced property band, as those who may otherwise have had to rely on their own vehicles to access external work and other opportunities, now have an acceptable, more cost effective transport alternative in the form of MyCiTi. (Few work opportunities result in large commuter tidal movements out in the mornings, and back into the area in the afternoons). There does however not seemed to have been any additional enhancement in property values along Blaauwberg Road itself, where the trunk service runs (again based on available information). This indicates that the area, served by a network of trunk and feeder services, may have experienced a generalised property value increase in a particular market segment, but not along the trunk route with the highest level of service provision. The perceived value increment of the MyCiTi service to adjoining properties may be too limited to register in their market valuation.

Information from estate agents in Paarden Eiland, the industrial area through which the MyCiti trunk is routed on the periphery of the inner city area, is that there has not been a notable increase in property values since the introduction of the service in 2011. This is historically a much sought after industrial area, due to its proximity to the city centre and the harbour, with good logistics and public transport service provision from established modes. On the basis of available evidence, the addition of another public transport mode has not resulted in increased value add, translating into improved property values.

More data is necessary to verify these trends, which may further change over time.

5.2.3 Century City

Flexible public transport services such as buses and minibus taxi services (operating in mixed traffic) could adapt and establish new routes and networks, especially where larger nodes are established. Where “super-regional nodes” are formed, e.g. in the case of Century City, interesting dynamics become evident. Ostensibly established as a car dominated node as an alternative office, retail and

entertainment node to the CBD, Century City has matured into a mixed use node sizeable enough to generate internal multi-use characteristics, and supported by a full range of public transport services (including rail and now BRT). Initially criticised for its perceived exclusivity, the balance between private and public accessibility may be shifting towards public transport, i.e. access links are becoming increasingly congested for vehicles of all modes operating in mixed traffic, while first the rail station, and soon the BRT station linking via a new route to Table View will provide enhanced public transport access.

The current property dynamics at Century City possibly reflect the changing modal accessibility patterns, as follows : (i) some corporate offices are reconsidering renewing their leases, with one factor cited the increasing levels of congestion experienced during peak periods, and (ii) high and sustained levels of demand for residential properties. The following informants could be important : Firstly, corporates may be impervious to improved levels of public transport service provision, as they are largely interested in private mobility. If this is compromised, middle and senior level managers will have a negative perception of a particular location, and are likely to consider other premises. Secondly, the strongly developed mixed use quality of the area attracts home owners seeking a “live, work and play” type lifestyle. For those whose trips are largely internal, the peak period accessibility of the development becomes less important.

One conclusion could be that investment in public transport services at the expense of private access could undermine the viability of a development along a corridor. (The recent initiatives to replace general traffic lanes with BRT trunk lanes along key arterials in Pretoria’s eastern suburbs are particularly relevant in this regard.) The full range of transport modes, operating at acceptable levels of service, may still be required. It could be argued that by continuing to facilitate private mobility, public transport services are undermined. In reality, the major top grade location decisions (let alone the property development market itself) are still driven by private vehicle accessibility, which is likely to be the case for the foreseeable future. This is particularly relevant in the South Africa context, with the attractiveness of public transport negatively impacted by security concerns. It may be that only high level systems with excellent quality service attributes such as the Gautrain and selected BRT systems begin to shift the playing field marginally less skewed in favour of private mobility from a corporate perspective.

It may be argued that none of the projects contribute to redressing spatial inequalities, in that given its primary market orientation towards the lower-middle to middle income bracket, urban intensification around stations is not likely to benefit those who are most marginalised. This leads to questions regarding appropriate responses to competing policy objectives.

6. VALUE CAPTURE : POLICY OBJECTIVES

The best means of utilising land value enhancements as a result of a public investment can not be prescribed, as there are a number of possible objectives, which are not all mutually compatible at face value. Policy trade-offs appear to be necessary between at least the following :

- facilitate spatial restructuring/ urban containment
- optimise economic growth
- recoup transit capital costs/ improve operational sustainability
- generate income for the general fiscus
- create more equitable accessibility patterns (i.e. improve access to serviced land)

It has been shown that public investment in a new transport system creates land value potential, and it is in the realisation, utilisation and distribution of the generated value that the policy debate around value capturing lies. A key aspect of the debate is around social justice and redistribution. Some commentators argue that if the value generated through an investment in a public facility is not recouped by the public agency, but instead by the private land owners in its vicinity, it represents a form of investment which exacerbates spatial inequalities, especially in a city characterised by a skewed distribution of income.

If redistribution of land values is an important urban policy objective, the 're-invested value captured' would have a very different outcome compared with a policy objective that seeks to maximise a return on investment, to function as a useful income generating mechanism for the general fiscus, or to help recoup capital costs or subsidise operational expenditures.

From a social justice perspective, in the context of a city characterised by an unequal distribution of land values, the spatial ring-fencing of a public investment in a particular location would be viewed as regressive if that location falls within an already privileged area. In the Latin American experience, value capture has in effect become a 'pragmatic cost-recovery mechanism to overcome the chronic shortage of public revenues to finance urban infrastructure', as opposed to 'evolving from the ethical principle of fairness, whereby the increment of land value resulting from community action returns to the community' (Furtado 2000).

Two competing perspectives on the desired policy objectives of value capture are clear from the above : (i) a public agency recoups the increase in land value for the public that otherwise would be reaped by private interests (restoring a previous state of distribution considered acceptable), or (ii) from the perspective that all land value is socially produced (a product of community effort), value capture can only be considered redistributive if its implementation leads to a reduction in inequality (Furtado 2000).

This distinction may be too simplistic in that at the macro city level, the successful implementation of a transport system which has the effect of improving levels of accessibility across the city could balance the distorting effects of land value enhancements which may be higher in relatively wealthier areas. It can reduce

inequitable access by providing a city-wide system public transport system such as BRT with uniform operating characteristics, to be used by rich and poor alike. It could be further argued that a pro-active approach by municipal planners to identify land parcels that could be developed for the lower end spectrum of the housing market along public transport corridors, by putting together public-private financing schemes with an inherent subsidy component (portion of value capture), would be a successful redistribution policy outcome.

7. VALUE CAPTURE STRATEGIES

A number of strategies can be deployed to encourage and intensify developments within urban areas, and/or capture value enhancements as a result of public investments, as follows :

- **Land Value Tax** : Focuses on taxing land itself as opposed to the improvements on the land, which then incentivises development on the land, and in turn optimises the social benefit of the investment. Landowners are encouraged to develop vacant and underused land properly or to make way for others who will. Because LVT deters speculative land holding, undeveloped inner city areas are returned to productive use, reducing the pressure to build on undeveloped sites and so reducing urban sprawl (http://en.wikipedia.org/wiki/Land_value_tax).
- **Tax Increment Financing** is one of the most common forms of value capture finance, and has typically used to finance redevelopment. With TIF, a property's overall tax rate does not change because of the TIF district, but taxes on increases in assessment value are diverted from conventional uses to finance the redevelopment. Redevelopment projects can lead to significant increases in property values if they are transformative for a neighbourhood.' (http://www.transitwiki.org/TransitWiki/index.php?title=Value-capture_finance)
- **Development Impact Fees** (or mitigation fees) are charges assessed to new developments to finance new infrastructure needed for developments or to mitigate some of the negative effects a new development may have on the community. Development impact fees could be assessed regionally, sub-regionally, or locally to fund new transit infrastructure, or could be assessed in areas within walking distance of fixed route transit stations.' (ibid)
- **Joint Development** is development on publicly-owned property in conjunction with a fixed-route transit facility. Some of the proceeds from the joint development project are used to finance the transit facility. This strategy can be especially effective in raising money for transit for several reasons. First, new developments can capture significant funds relatively quickly if a property is developed and sold within a few years of a transit facilities opening. Second, joint-developments can be well-integrated with the transit system, thereby increasing potential ridership. Third, public entities often accumulate property adjacent to transit facility construction for staging and other purposes. By increasing density of these properties and orienting the property to the transit facility, the public can capture value far in excess of any other financing mechanism (ibid).

A key challenge in the South African context is not only that of choosing the optimal mix of strategies, but more fundamentally, resolving firstly the dilemma between increasing the value of property developments in order to optimise value capture, and implementing strategies that will not lead to the displacement of the most socially marginalised sectors of society (as seen for instance in gentrification). Secondly, the fostering of increased public accessibility on transit corridors through high density, mixed use precinct developments require constant and intensive urban and transit management measures to prevent areas from experiencing urban blight as well as from criminal elements establishing footholds. Under these instances, value enhancement from public investments, let alone its capturing, is seriously threatened.

8. CONCLUSIONS

In conclusion, it is clear that the realisation of a range of potentially competing policy objectives through value capture mechanisms is not possible, but that such a multi-faceted policy should strive for an “optimal mix” of desired outcomes. The BRT projects in Johannesburg and Cape Town have since their inception not been geared to capitalise on value capture opportunities, by focusing on getting infrastructure and operational components in place. The capital cost overruns of the BRT project in Cape Town, as well as its operational budget deficits have raised questions regarding its long term sustainability. From the narrow perspective of its own operations, increased viability will be possible if sufficient levels of patronage can be achieved, which in turn are dependent on critical levels of residential densities along the corridors and in particular at nodes, as well as on sufficient degrees of land use mix in its vicinity such that trip destinations within corridors are readily accessible. There is hence a concurrence between the goals of system sustainability and urban restructuring. From a broader urban economic perspective, the general increase in property values in the Table View area indicates (a portion of which could be attributed to the BRT system) a positive return to the City’s fiscus, which should be considered as part of a broader assessment of the system’s sustainability.

Of importance is that public agencies can not rely on market forces alone to effect such structural changes, especially in the South African context. Its cities are still largely characterised by a fragmented and dispersed urban structure, with low densities and substantial separation between land uses. This is in contrast to many big cities where BRT systems have been implemented, such as Curitiba, Bogota and Seoul, which are historically much denser and more mixed. Whereas the preconditions for successful BRT operations are therefore inherent in these cities (notably with forms of housing in which multiple storey units are common), the South African urban geography is more dispersed, which poses a challenge. The proactive capturing of land value benefits generated by a public transport system by the public authorities for the purpose of re-investing in the corridors therefore becomes critical. A trade-off is then required between using the funds generated to (a) help subsidise operational expenditure, and (b) re-invest capital in adjoining land parcels.

From the perspective of optimising multiple policy outcomes, i.e. economic and environmental sustainability, social equity and urban restructuring it can be argued

that investments into the following types of developments in the public transport corridors are most suitable :

- GAP housing developments, which focus on the lower-middle income market, whose mobility and accessibility options can be greatly enhanced by their location in well functioning public transport corridors.
- High quality office and commercial precincts by e.g. focusing on urban design and landscaping aspects, to facilitate the mixed use profile of the corridor.
- Public facilities and amenities such as hospitals, libraries, schools and government offices.

A number of strategies exist to realise value capture potential, such as land value tax, tax increment financing, development impact fees and joint development initiatives, the optimal mix of which needs to be explored.

It may not be possible nor desirable to attempt to establish low end (sub-economic) housing opportunities within BRT corridors. Due to their negative externalities, land values in adjoining areas are likely to fall. From a metro-wide urban structure perspective however, the realisation of densification initiatives in one or a few sectors of the urban land use market will still result in overall containment or compaction. The lower end of the housing market could therefore still benefit due to improved accessibility from less peripheral locations.

The investigation into some of the under-explored aspects of land value enhancement by means of new generation public transport systems in the form of the Gautrain and BRT in this paper has hopefully highlighted that a well functioning public transport system not only has mobility and accessibility benefits, but also potentially wide-ranging urban living and structure benefits. The extent to which these can be realised depends on pro-active leveraging via policy instruments such as value capture linked to targeted public benefit investments, together with the establishment of pro-active urban management measures.

9. REFERENCES

Cervero, R. & Kang C.D. (2009) '*Bus Rapid Transit Impacts on land Uses and Land Values in Seoul, Korea*', UC Berkeley Center for Future Urban Transport, California.

Du Plessis, J.P. (2010) '*Injecting a Rapid Rail Link into a Metropolis*', Paper submitted to Southern African Transport Conference, Pretoria.

Furtado, F. (2000) '*Rethinking Value Capture Policies for Latin America*', International Studies Valuation & Taxation Planning & Urban Form, Lincoln Institute of Land Policy, 12, 3.

Mushngahande R, Cloete C.E. & Venter C.J. '*Impact of the Gautrain on Property Development Around Station Precincts*', Journal of the South African Institution of Civil Engineering, Vol 56, No 1, April 2014.

KEY WORDS

BRT, Value Capture, Transport, Land Use, Urban Structure, Policy Objectives

Notes

While it is not the purpose of this paper to explore the merits of different urban forms, it is common cause that a highly disaggregated, dispersed city is inherently less sustainable and socially more fragmented than a more compact one which displays greater coherence and offers better levels of accessibility. The desired structure and degree of compaction is however debateable, and this author does not ascribe to a position that “compaction at all costs” is either achievable or desirable.