

INCREMENTAL APPROACH TO PUBLIC TRANSPORT SYSTEM IMPROVEMENTS

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ABSTRACT

South African cities have gone through a prolonged period of under-investment in Public Transport, which led to poor quality of formal, scheduled services and the proliferation of informal, unscheduled and notoriously unsafe services. South Africa is addressing the backlog by investing in large capital Bus Rapid Transit (BRT) projects which have shown to significantly change the image and acceptance of public transport. However, these large scale improvements come with challenges and risks and are implemented at a cost that puts a large burden on developing cities. Despite the quality offered through the roll-out of large-scale projects, it is a slow process, which results in poor public transport service continuing in large parts of the cities not immediately benefiting from improvements.

This paper is used to explore an incremental approach as an alternative, or even complimentary, approach to upgrading urban public transport systems. We conclude that an incremental approach can reduce some of the risks inherent in major interventions; provide the opportunity to gradually implement supporting policies; and provide improvements in a wider area, which would benefit a larger part of the population over a shorter time period. The incremental approach does not preclude substantial improvements in areas with critical needs for large scale interventions.

1. INTRODUCTION

Major improvements are achieved in South Africa's public transport environment, as are displayed through the BRT systems in Cape Town and Johannesburg, as well as the Gautrain, which started operating in 2010. These large scale improvements have shown that public transport in South Africa can offer high levels of quality and be more competitive with the private car than traditionally thought possible. The urgency to improve public transport is fuelled by:

- prolonged under-investment in urban public transport systems over the past three to four decades;
- growth of the informal minibus-taxi industry; and

- concerns regarding the unremitting urban sprawl and the increasing reliance on the private car.

Public transport improvements in the form of the BRT programme were initially necessary to enable the successful delivery of the 2010 FIFA World Cup, but the continuous expansion after the World Cup is also gradually restoring confidence in public transport of day to day users. Despite the need for improved public transport, South Africa should also acknowledge the development state of the country. As public sector budgets are constrained, and demand from all sectors is high, available capital and operating funding should be spent wisely. This does, however, not necessarily mean that improved public transport should not be pursued.

While the major intervention in public transport is welcomed, and the important role that BRT as a technology can play in transforming the system is acknowledged, this paper argues for an alternative, if not at least conjugative, approach to the BRT programme as it is currently being rolled out. The current strategy with implementing BRT is one of a complete overhaul of all components of the system along a few corridors in specific geographic locations at a time, while the need for improved public transport is present in the entire metropolitan area. Hence, this paper is used to explore an incremental approach in which many small steps could be taken, instead of a few extensively planned and costly large jumps, to eventually arrive at the same high quality public transport system that covers the entire metropolitan area.

Chapter 2 is used to explore the theoretical concept of *incrementalism*, which has been introduced in the field of political science. Chapter 3 positions incrementalism in the transport planning arena and is used to discuss the arguments for and against both incrementalism and the leapfrog approach. Chapter 4 is used to discuss the possible implementation of incrementalism in South Africa as alternative to the BRT programme, providing an overview of possible improvements that could be implemented instead of the BRT. Chapter 5 provides an overview of concluding remarks and recommendations.

2. THE THEORY OF INCREMENTALISM

In field of political science, Lindblom introduced incrementalism as planning approach in 1959 and further elaborated it in his work published in 1979 (Allison & Saint-Martin, 2011). Lindblom (1979; 517) defined Incrementalism as "...political change by small steps...", in response to the then contemporary rational-comprehensive planning model which, he argues, consisted of "...too many possible alternatives, too many consequences to be traced through an uncertain future..." (1979; 518). In other words, incrementalism is a strategy that acknowledges that we cannot deal with the all complexities that ought to be addressed in a once-off, rational-comprehensive policy intervention.

He continues by showing that incrementalism allows decision makers to address one issue at a time, which provides the opportunity with each step to evaluate the impact of prior steps and adjust accordingly. Hence incrementalism is an approach that provides flexibility to respond to an uncertain future.

Many criticisms followed the 1959 view on incrementalism. For instance, Weiss and Woodhouse (1992) highlighted four criticisms on the incrementalism theory, which endured:

- it lacks goal orientation, is not ambitious or proactive;
- is excessively conservative;
- has a limited range of applicability; and
- results in a negative stance, or is even hostile, towards analysis.

Manzer (1984) supports the first two criticisms by claiming that decision makers often wait for pressure of events to establish their priorities. Then they fight fires or prescribe cures, dealing with pressing issues and political crises as and when presented. This is in sharp contrast to the proactive policy based decision making in which decisions are taken before the need arises. Goodin and Waldner (1979) also emphasise the risk that decision makers may prematurely halt a potentially successful incremental policy because they are not aware that success will become apparent only after a certain level and duration of effort. Another criticism is that the incremental decision maker is deprived of prompt negative feedback on less successful incremental policies as results are less traceable (Lustick, 1980).

In contrast to the criticism of Manzer, it is argued by Lindblom that the occurrence of small steps does not make incrementalism a slow approach, as many small interventions could be followed-up quickly by another, making it a potentially proactive and progressive. In addition, Weick (1984) further highlights that incrementalism does not have to be random, but that a series of small, incremental wins can move in the same general direction (towards a goal) or all move away from some deplorable condition. Cervero (1998: 407) independently supports this notion, by stating that “small incremental steps matter – provided that they are guided by some general vision of where the region is headed.”

It is further argued that an incremental strategy equates a risk minimising strategy, as with each step there is room for trial and error allowing for flexibility (Lindblom, 1979), while negative feedback related to a leapfrog approach would only occur after significant investment and full publicity.

The discussion provided above shows arguments for and against incrementalism in planning. Therefore incrementalism forms an interesting concept to explore within the transport planning arena in South Africa, where we tend to focus on leapfrogging to a desired end state – the ultimate design – without considering potential transitional improvements. The next chapter will discuss and interpret an incremental and leapfrog approach for transport.

3. INCREMENTALISM AND LEAPFROGGING IN THE TRANSPORT PLANNING ARENA

3.1 Positioning incrementalism and leapfrogging

One example of incrementalism can be found in Curitiba, where the public transport system gradually evolved into what is now known as Bus Rapid Transit (BRT). The BRT in Curitiba, renowned for its high density corridors, is nowadays a BRT textbook example (see amongst others Cervero, 1998; Wright, 2004). However, the development process of more than three decades is seldom acknowledged and other cities tend to copy only the successful “end-state” of Curitiba’s public transport system. It is deduced that this development process did not rock the boat and consisted, to a certain extent, of small incremental steps, responding to technological development and land use changes. Duarte (2011) emphasised that the technological advances in Curitiba’s public transport system were for a large part the result of responses to proposals by rail advocates, which would have been too costly for this developing nation. Cervero (1998: 407) supports this by stating that “*much of the successes in Curitiba...are attributable to the cumulative effects of many modest, low-cost, but fast-turnaround actions.*” Hence, no ultimate design was pursued, but an incremental developmental process was followed, which responded to technological advances and changing user needs.

South African approach to BRT, such as MyCiTi in Cape Town, consists of a comprehensive corridor approach; where public transport will be upgraded to world class standards, one corridor at a time (DoT, 2007). The plan is to upgrade the corridors over the next 15 – 20 years to reach a desired end state, which has largely been defined in terms of current BRT technology, as implemented in cities like Curitiba and Bogota. In Cape Town for example, no intermediate interventions are proposed for areas that are not part of the system, and the system developed is largely perceived as an ultimate design (Cape Town, 2010). At a price tag of approximately R5 billion, the first phase covers only about 15% of the City’s surface and even less of its residents. However, the system is well received and patronage was close to twelve thousand trips per day by the end of 2011, six months after introducing the service (Cape Town, 2012). This includes a reasonable share of former private car users whom were not attracted to the public transport services which the BRT system replaced. This is also highlighted as one of the great benefit of BRT, where the technology, as showed in Cape Town, is ideal for “*...leap-frogging past a car-dependent development path...*” (Wright, 2004: 11).

The key point to note is that both the incremental and the leapfrog approach aim to deliver the same world-class public transport system across the entire city. The two approaches only differ in how this is achieved: the incremental approach is issue-driven and addresses the whole system, while the leapfrog approach comprehensively addresses all issues in one geographic area. Figure 1 present a graphical interpretation of the differences between these approaches, emphasising that both aim for the same end-state at the bottom right corner.

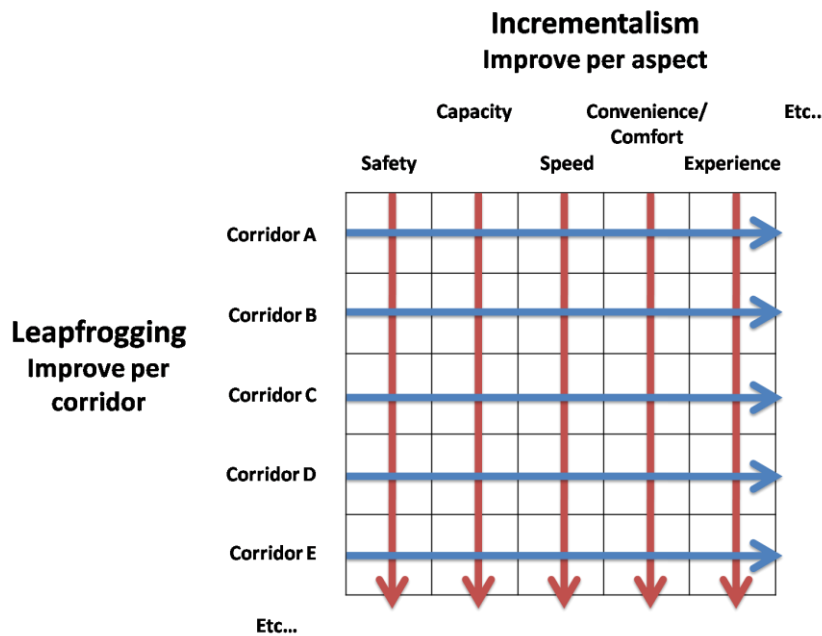


Figure 1: Incremental versus leapfrog approach towards the same goal

While both approaches aim to achieve the same end-state, they are not necessarily equal to this task. The next chapter is used to illustrate that the two approaches are not equal in their effectiveness, but that both have advantages and disadvantages.

3.2 Critical assessment of leapfrogging and incrementalism

The critical assessment attempts to clarify the strengths of each approach in terms of public transport improvement. In the following sections, arguments will be discussed in order to explore and compare both concepts. In general, an advantage of one approach is perceived to be a disadvantage to the other, unless otherwise indicated.

Arguments in favour of incrementalism:

1. Universal improvement

Barriers to users could be address throughout the whole system and are not limited to origins and destinations within a single corridor. This can be improved consistently throughout the metropolitan area.

2. Small interventions do not rock the boat

Small interventions do not disturb delicate balances in society such as relationships between institutional stakeholders and acceptance by local communities (Lindblom, 1979). Minor improvements may support gradual transition from informal minibus taxi industry to formalised public transport network for all.

3. All users would like to see improvement happen today rather than tomorrow

Stepwise improvements display visible progress to existing day-to-day users. Small changes send a signal to all users that public transport is taken seriously. This

helps to retain existing users of the system, while gradually creating a more attractive mode to choice users.

4. Creates a realistic expectation amongst residents

The gradual improvement associated with incrementalism does not set unrealistic expectations that would otherwise be set by a leapfrog approach when one area is improved. Other areas will expect similar improvements.

5. Requires limited investment upfront

Introduction of full-scale, high-quality public transport instantly requires large capital investment, while an incremental approach for improving public transport only requires limited capital funding per step. This acknowledges the developmental state of the country.

6. Builds on strengths in the existing public transport system

Even though the existing system is not ideal, the incremental approach can focus on addressing the most pressing issues while capitalising on those components that function well.

7. Offers flexibility to adapt to uncertain future

Incrementalism allows focusing on one issue at a time, without locking into one ultimate solution. Each improvement would have had unintended impacts that need to be evaluated before identifying the next weakest link. Likewise, the latest technology available for a particular component can be implemented at once across the entire system.

8. Improve the system at the same pace as land use and user needs

The perception of public transport as a mode of travel co-determines its use. This perception is based on experiences with the system, and thus the service quality provided. When the system is suddenly replaced by a new system the user perception could change directly, but land use changes need considerable time to adapt.

9. Supports gradual implementation of supporting TDM policies

Citywide incremental improvement of public transport helps to gradually set the scene to slowly and consistently introduce Travel Demand Management (TDM) measures across the entire city. In contrast, leapfrogging results in the lack of development of the rest of the system, which may provide a stalemate for implementing supporting TDM proposals such as reduced parking requirements, parking prices, road pricing and pedestrianisation.

Arguments in favour of leapfrogging:

1. Considerable impact on perception of public transport
The positive “media value” of major improvement could be considerable once the project is implemented successfully.
2. Window of opportunity for public transport could be short
Availability of funding and political determination that enables change of the system could be limited or bound to a certain timeframe. For instance, funding programmes are sometimes linked to a political term, and incremental approach might not be fully developed before political changes occur. Similarly, support for public transport could be dependent on a political champion with a political expiry date.
3. Gaining insight in market response to ultimate design
In a select area, the leapfrog approach helps to understand market demand associated with the comprehensive improvement of public transport, while this is less clear when improved incrementally.
4. Economy of scope
Some improvements could be implemented simultaneously, saving cost and limiting disturbance for existing users.
5. Direct replacement of inefficient modes could provide benefits for the future
Leapfrogging may replace some of the inefficiencies in the system that would otherwise be retained with incrementalism. When systems have deteriorated, replacement of the full system could be more beneficial.
6. Visible progress
Despite its limited spatial reach, a leapfrog approach provides more visible progress as the ultimate design is achieved in select areas during a shorter time span.

3.3 Overview of the two extremes

Based on the discussion above, it is argued that an incremental planning approach to public transport improvements forms a flexible approach that supports the building of an upward, virtuous spiral where small focused improvements stimulate growth in public transport, which again justifies further improvements. The approach recognises the relative importance of certain aspects that personal security may have over, say punctuality of the service, or that peak capacity may have over better operational hours. The approach thus takes account of the demand side, as the most pressing issues at a time will be addressed consistently throughout the entire metropolitan area. The approach also acknowledges delicate balances in society and creates realistic expectations amongst the existing and potential users.

The leapfrog approach however is a comprehensive approach that attempts to achieve an ultimate design in a limited geographic area. The leapfrog approach assumes that all elements of a system need to be addressed at the same time as if they are equally important to reach the desired effect. It thus does not fully acknowledge the demand side, as most pressing issues in other parts of the city are ignored. It rather, at best, assumes that a positive response to the transport intervention is inevitable and that the necessary demand will be created over time. In doing so, it also create high expectations as each comprehensive improvement will set the norm for other areas. It is also suggested that a leapfrog approach has the potential to capitalise on a short period of favourable political conditions and achieve measurable results in a limited geographic area.

It is noted that there are a number of arguments in favour of both incrementalism and leapfrogging, and that either could be the preferred approach under particular conditions. Each approach should therefore be evaluated on its merits when considering specific public transport improvements. It is also possible that the approaches could be staggered, for instance by first using incrementalism to stabilise the system before major improvement is pursued through leapfrogging.

4. APPLYING INCREMENTALISM

This chapter is used to discuss the application of incrementalism in South Africa. MyCiTi in Cape Town is taken as an example to show how an incremental approach could be pursued with the same capital budget as used for MyCiTi to date. It concludes by providing an overview of success factors that determine the applicability of incrementalism.

4.1 A brief exploration: the incremental alternative to the MyCiTi approach

Despite the success of the roll-out of BRT in a part of Cape Town, the rest of the city will be waiting for subsequent phases to commence in the distant future, and has to hold on to its existing services. Due to poor levels of service, mainly brought about by a lack in public transport capacity, the existing system can barely retain existing users, especially those who become more affluent and can realise their aspirations to acquire a car.

Cape Town selected a leapfrogging approach to BRT due to, amongst others, funding conditions and promulgated national directives. The question remains what Cape Town would have been able to achieve through an incremental approach with a capital budget of R5 billion, and the approximate R1.6 billion annual budgets for the coming years (Treasury, 2011).

As discussed in chapter 4, incrementalism should ideally focus on the most pressing issue experienced by the user. A quick look at the National Household Travel Survey (DoT, 2005) shows that taxi safety and bad driver behaviour was perceived as the biggest

concern amongst metropolitan public transport users in 2003. Other frequently raised problems with public transport in South African cities generally include:

- Cost of transport;
- Personal security, especially on rail in Cape Town;
- Poor reliability and punctuality.

It is therefore asserted that the budget of R5 billion could alternatively have been used to:

- Increased driver training and enforcement in the minibus taxi industry,
- improve security equipment for the bus and rail systems, including on-board and at interchange facilities;
- enable the purchase of rail rolling stock as well as busses to alleviate the critical peak period capacity shortages on routes where severe over-crowding is prevalent, and where loss of rail patronage contributed to demand for MBT services;
- improve the scheduling system of the rail and bus operators, and
- acquire the equipment required to enable integrated ticketing.

The above measures are purely indicative and require comprehensive analysis to determine the prioritisation, sequencing and combination of interventions most appropriate in a particular city. Other system improvements that would follow the critical aspects needed to retain existing users, and critical to attract choice users include:

- rebranding of the then integrated public transport system;
- road improvements to reduce travel time for road-based public transport;
- gradual replacement of both rail and bus fleets to offer higher comfort levels;
- upgrade of facilities to improve user experience.

Figure 2 provides a graphical illustration where interventions follow in an incremental fashion. The improved quality will induce increased ridership as the system become more convenient for both existing and potential users (see Wegener and Fürst, 1999; Litman, 2011). This results in a virtuous cycle, where each quality improvement will increase usage which in turn will justify further investment in public transport. This results in the ability of incrementalism to mature in the same pace as the market, when the interventions have been logically prioritised to address the most critical issue.

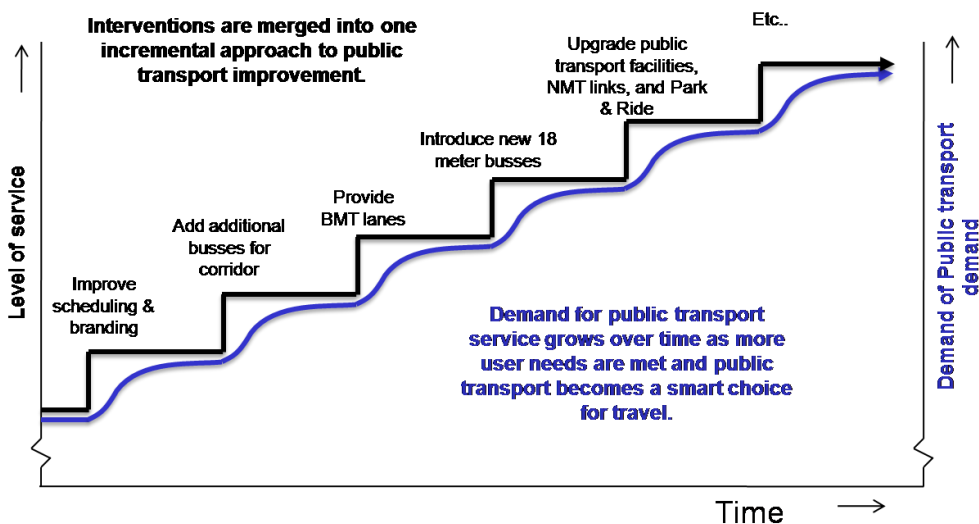


Figure 2: Incremental public transport improvements

4.2 Success factors for incrementalism in South Africa

As discussed, both incrementalism and leapfrogging have their merits as an approach for public transport improvement. Therefore it is argued that the following success factors are crucial to get an incremental approach in place In the South African context:

1. Presence of political understanding, will and commitment. An incremental approach generally outlives political terms of office. Consistency is required in the implementation to achieve measurable results, and political success should not be measures by the number of ribbons cut, but a commitment towards incrementally building towards a desired integrated public transport system that provides for all. Political will and commitment can be achieved through highlighting the benefits involved.
2. Availability of a funding. Funding sources for incremental upgrades should not necessarily only be based on earmarked national grants but should also link to income derived from local sources such as parking, other levies and user charges. The Municipal Land Transport Fund (DoT, 2009) makes provision for such cross subsidisation, which could make a local incremental approach less sensitive to changes in national priorities.
3. Continuous monitoring. Feedback is required during the process to identify the most pressing issues and evaluate earlier improvements. This ensure that further interventions will be selected that are aligned with the most pressing needs. Complaints filed to Transport Information Centres or Transport Departments should be assessed on a regular basis, while additional on-board data collections such as sample surveys should be conducted periodically.

4. Responsibility for public transport. This does not necessarily mean that the municipality should acquire ownership over the whole public transport system, but at least have a set of tools to influence service delivery performance as incremental approach should improve the entire system independent of modes. The National Land Transport Act (Act 5 of 2009) provides for the municipality as planning authority responsible for integrated public transport networks.

5. CONCLUDING REMARKS AND RECOMMENDATIONS

In addition to the established leapfrog approach, the discussion highlights that a wide range of benefits are linked to an incremental approach. This shows that incrementalism could be a suitable approach that should at least be considered in the development of public transport when certain success factors are adhered to. Arguments in favour of incrementalism include the focus on pressing user needs across the entire metropolitan areas and the ability to set realistic expectation amongst the users. In addition, incrementalism helps to gradually implement and mature consistent, citywide TDM policies. This is especially relevant for a developing country where the lack of quality public transport may provide a stalemate for implementing strict TDM measures.

Despite the arguments in favour of an incremental approach, it should be noted that a leapfrog approach that moves directly to a high quality public transport system provides important benefits that should also be appreciated. It can be argued that the most important one is that a leapfrog approach can capitalise on short political support and achieve measureable results in a select geographic area.

Besides the positioning of incrementalism and leapfrogging as the two extremes, a combination of both could also be considered. An incremental approach could form a part of a short and medium term strategy and could pave the way for subsequent leapfrogging. The message is therefore that the automatic choice for the ultimate design should only be selected when alternatives have been appropriately considered. Judge each approach on its merits and allow for appropriate debate about its applicability in the short, medium and long term.

For future research, detailed analysis could be performed to quantify an incremental approach in terms of specific programmes and its socio-economic impact in comparison to a leapfrog approach. This could further help to shape the public transport debate in South African cities and ensure informed decision making that will lead to the efficient use of limited funds.

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