CURITIBA: OVER-HYPED OR APTLY DESCRIBED?

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Background

Curitiba is the capital of Paranà, one of Brazil's wealthiest states. With an area of 431km^2 and a population of 1.8 million, it ranks only seventh among Brazil's most populous cities (Dera, 1995).

Curitiba is internationally known for its history of environmentally friendly practices, world-renowned planning efforts and unique problem solving strategies. This paper will focus on their innovative transportation system.

Challenges

One of the fastest growing cities in a nation experiencing massive rural-urban migration, Curitiba grew from 300 000 citizens in 1950 to 2.1 million in 1990 (Wheeler & Beatley, 2004). The city draws new residents to its universities, hospitals, industries, recreation, culture, commerce, and business activity (Dera, 1995). Curitiba has evolved from a traditional agricultural society to a more commercial and industrial city. Brazil's industrial period began only around 1930, and like many developing countries, its rapid change has lead to problems with unemployment, squatter settlements, traffic, over-crowding and environmental decay (Moore, 2007). Curitiba has grown by 5-7 % every year in recent decades; this results in almost doubling the population every 10 years (Moore, 2007).

Curitiba is doing well compared to other Brazilian cities: it has significantly less pollution, a slightly lower crime rate and a more

educated populace. It has the highest standard of living and the lowest unemployment rate in all of Brazil, in fact its poverty and income levels are comparable to those of developed countries (Moore, 2007; Wheeler & Beatley, 2004). Elsewhere in Brazil, as the gap between the rich and the poor widens, the less-fortunate find themselves living in shanty towns full of poverty and crime. Some academics are concerned Curitiba will be a victim of its own success as Brazil's population is forecasted to grow by 40 million in the next 10 years. Others are not worried, as extreme population growth has been characteristic of Curitiba since the 1950s and adversity only inspires more creativity from city administrators (Moore, 2007).

While Curitiba is wealthy compared to its Brazilian counterparts, 10% of citizens still live in the city's 209 squatter settlements, and many of the country's typical problems apply (Dera, 1995). Brazil has faced its share of struggles, with an economic policy characterized as random and illogical, and out of control inflation rates throughout the twentieth century (Moore, 2007). It is against these odds, that Curitiba has managed to achieve great success.

Jaime Lerner

Curitiba's city plan and public transport system have been presented as the work of one man, Jaime Lerner. He was the head of the Curitiba Research and Urban Planning Institute (IPPUC)'s Physical Planning Department, and later served as director of the IPPUC. Interestingly, the IPPUC was independent of the city planning department and supported by the military, which aspired to create an example of intelligent leadership and effective design (Moore, 2007). During this time, Lerner determined that the only way to ensure the city's Master Plan was implemented properly was to enter politics himself. He was appointed mayor by the military dictatorship, and served terms from 1971-1975 and 1979-1983, as consecutive terms are not allowed in Brazil. For his third term from 1988-1992, he was elected via the country's new democracy (Dera, 1995; Mees, 2010).

Many cities are capable of devising an excellent Master Plan, however most struggle with implementation. One of Curitiba's

greatest strengths was that their mayor had been instrumental in developing their plan and was passionate about seeing it come into fruition. Lerner lived by his motto of "thinking small and cheap"; which allowed him to come up with far-reaching and imaginative ideas (Dera, 1995, p. 31).

Lerner managed to make great gains through small incremental projects. One of his first accomplishments was in 1972 when he transformed the central business district (CBD)'s busiest street into the first three blocks of "Flower Street", where cars are disallowed entirely. He laid down sidewalks in place of the road and planted

Figure 1. Flower Street in Curitiba. From http://www.inf.ufpr.br

flower gardens in place of asphalt, with the assistance of armed police. This transformation was completed in one single weekend, before anyone had time to oppose it. Initially business owners and patrons were angry and threatened to sue. Lerner promised if they were still unhappy in six months, the street would return to its original state. On the contrary, businesses noticed increased traffic and sales in their stores just days later. Not too long after, many local merchants located on other streets were requesting that the roads in front of their shops become pedestrian-only (Dera, 1995; Moore, 2007).

Eventually, seventeen blocks of “Flower Street” were designated foot traffic only. Lerner earned the respect of the citizens with this successful project and was given the liberty of trying out other ideas (Dera, 1995). The streets that have been converted to pedestrian use reduce pollution and foster a sense of community (Wheeler & Beatley, 2004).

Some say Curitiba is the most famous city in the planning world, as it has long been the subject of global attention. Lerner has been recognized by the United Nations Education, Scientific, and Cultural Organization; the United Nations Environmental Program; and the International Institute for the Conservation of Energy. Although he is the most renowned of Curitiba’s leaders, many authors warn that he is just one entity in a long line of great mayors and IPPUC employees who influenced Curitiba (Moore, 2007).

Transportation

Most modern cities have been developed with the needs of the automobile as a priority, affecting the location of housing, commerce and industry; the design of the urban environment; and the city’s social fabric. In Curitiba, however, the government chose to prioritize public transportation over private, work with the environment instead of against it; and choose appropriate rather than high-technology solutions (Wheeler & Beatley, 2004). The city’s bus system is easy and efficient to use, with frequent connections, clear signage, low operating costs, and high reliability (Moore, 2007).

Although many cities in Brazil were building expensive subway systems in the 1970s, Lerner determined that busways made the most sense for Curitiba and opened the first express line in 1974 (Dera, 1995). Stretching 20km from north to south, it had, what was at that time, the world’s only exclusive lanes for buses. Only two weeks after implementation, the city had to double the buses on this corridor to meet the service demand. Traveling by bus was now much more desirable, faster and efficient than traveling by car. By 1994, the system was transporting over one million riders per day; an equivalent subway system would be 300 times the price. From 1970 –

2000, the bus system accounted for 70 – 80 % of citizens' daily trips. The city consumes 25 % less fuel than other cities in Brazil (Moore, 2007).

When the first express line was created, streets in Curitiba were normally about 30m wide. The busway required a widening to 60m. This was impossible, as the city was unable to expropriate the necessary land and refused to destroy historical buildings. Lerner devised a new, imaginative plan, in which three existing streets would be used in a trinary road system. The centre street would consist of two dedicated bus lanes in the middle, separated by barriers from a small lane for slow traffic on either side. One block away on both sides of the centre street, would be one-way lanes for high volume car traffic. The land between the centre street and the one-way lanes consisted of high-density apartment buildings, of which the bottom two levels were for local stores only. A large population of residents could thus have easy access to services they needed, the automobile transportation corridors and the high-frequency transit system. Land was not allocated for commercial use along the high volume one-way lanes, so traffic could flow easily without cars stopping. It is obvious land development and public transit plans were coordinated. Public transportation was often extended to areas in which the government wanted to encourage development (Dera, 1995).

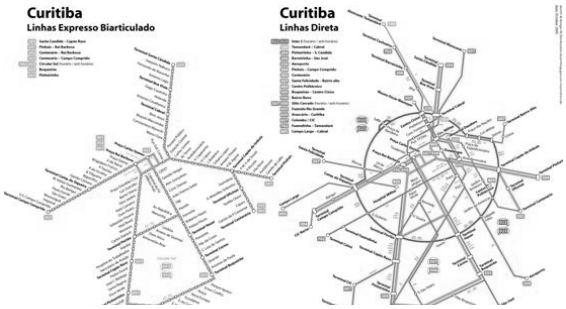

Figure 2. Curitiba's transportation axes and supplementary routes. From http://www.curitiba.info/

In 1979, the Integrated Transport Network (ITN) expanded to include five main transportation axes, or bus corridors, plus branch lines. In this expertly planned network, there are many types of routes to serve many different functions. The city began allowing transfers within the

ITN at no extra cost. Passengers can transfer between feeder routes and express routes through stations, similar to a train or metro (Mees, 2010). The high level of integration is possible because the city agency, URBS, controls bus service. This involves collecting fares, setting routes and timetables, and paying the private franchises that operate the buses. A franchise system has been left in place to avoid conflict with the previous oligopoly of nine firms. They are paid by kilometer traveled (Mees, 2010).

The temptation to invent convoluted and complicated routes is strong for bus planners, since buses have the flexibility to go anywhere there is a surface to drive on. Curitiba, however, has demonstrated the efficiency of designing routes as if they were for trains, with simple, direct paths. Each corridor is provided with a single service and closely spaced lines are avoided. The Toronto Transit Commission praises this style stating that, 'parallel routes … split the potential demand (resulting) in many routes competing for the same passengers and no route attracting enough demand to warrant a higher frequency service'. When a number of routes converge on a single corridor, the same principle can be applied. While in theory, 20 bus routes running hourly down a joint corridor means a service every three minutes, in practice it means confused patrons. A single line running every five minutes uses fewer resources and provides better service. This is the 'trunk and feeder' model used in Curitiba. The main section is operated as a single line, using higher-capacity vehicles, while the outer sections are feeders with smaller vehicles bringing passengers to the main line (Mees, 2010).

By 1991, much of the ITN was operating at capacity and direct line buses were introduced. They travel the same route as the express line, but make fewer stops. These buses can only be boarded via distinctive cylindrical 'boarding tubes', where platforms at the same height as the bus floor and ticket sales performed at the tube's entrance reduce boarding time to 75% of the traditional method. Remarkably, 28% of the people who travel on the direct line bus are those who used to use a private automobile (Dera, 1995).

In 1992, bi-articulated buses were introduced. These buses hold up to 270 passengers, which is three times the amount of a normal bus. This helps cut greenhouse gas emissions. Curitiba also has a specially designed bus with a different carrying capacity for each individual type of route (Dera, 1995).

Figure 3. Boarding tubes with loading platforms. From http://www.mariavazphoto.com/

Transportation Design in Coordination with Land-use planning

In the early 1960s, Curitiba was experiencing major problems with downtown traffic congestion. City officials examined two different solutions: widening the streets or building an expressway bridge over the CBD. Neither of these plans were adopted because of monetary constraints, and instead the government funded a master plan to consider the big picture and find new solutions (Moore, 2007).

The city first decided to put an end to radial growth, and expand linearly. The transportation system was devised to fit this model. It was decided that public transportation axes would be installed, and new development would occur along these lines. In the downtown, only development that enhanced service availability or cultural preservation was permitted. A 40 square kilometer industrial area was allocated, called the CIC, to attract foreign investment. It was specifically located in the southwest of the city, an area chosen for its suitability. Eventually 415 companies located there and now provide

jobs for locals. When developing the CIC, they were sure to include housing, recreation, green space and transit availability. After the plan was adopted in 1966, IPPUC was formed to monitor its progress and make necessary changes. They performed a Master Plan review in 1969, 1972 and 1975, after which point they began reviewing annually (Dera, 1995).

Figure 4. High-density along a transportation corridor. From http://www.gtkp.com

Most cities examined by Mees have adapted public transit to the existing urban form. Curitiba has instead shaped their city to fit the transport system, building places suitable for transit from the beginning. For example, its dense high-rise corridors follow the express line routes on arterial roads, and feeder and cross-suburban links connect these corridors to the lower density neighbourhoods. They have made the task of providing public transit easier, by discouraging scattered fringe development, clustering high-density housing, concentrating major travel destinations, and designing neighbourhoods to foster walking and cycling (Mees, 2010).

Zoning was coordinated with transportation routes in the city, as high-density buildings are allowed only in the downtown or along the transportation axes. The axes run north, south, southeast, east and west, coming together in the CBD, where residential density approaches 170 units/ha (Moore, 2007). The development along these corridors is mixed use, containing residential, commercial and office

buildings. Lower density is located in the areas between axes (Mees, 2010).

Buildings located along mass transportation corridors can have a floor space area of up to six times the building's footprint, or 100 units/hectare. Developments along other high frequency transit routes are permitted up to four times the building's footprint. The further away from public transportation routes you are, the smaller the allowable density of a site.

Figure 5. "Wall" of density. From http://amy-mcabendroth.blogspot.com/

Incredibly, from 1970 – 1992, the residential density along the axes increased by 855%. There is not much mid-rise in the city, and tall buildings give way to lower density development almost immediately as you leave the transit corridors. When facing one of the corridors, you can see on the horizon a "wall" of buildings (Dera, 1995, p. 8).

In Curitiba, health, education and recreation facilities are distributed among different neighbourhoods to spread wealth and improve accessibility. The government has created nine decentralized, secondary mixed-use centres. They exist along transportation axes and stimulate development with the presence of small town halls; art, culture and sport facilities; businesses; libraries and internet availability (Moore, 2007). The city also has strict urban growth boundaries and is surrounded by parks and agricultural areas to

prevent indefinite expansion into the countryside. Commute times are reduced by locating residences near employment opportunities, for example in the CIC.

The Master Plan is basically a map showing all the zones of the city, and their corresponding by-law dictating acceptable uses. The zones are each given certain densities, and most allow mixed use. A hierarchy of roads exists, which dictates their function based on their location and level of importance. The five arteries that form the transportation axes constitute the top level of the hierarchy. Priority links then connect other traffic to these structural arteries. Collector streets have neighbourhood convenience uses along them and allow all traffic forms. Connector streets link the arteries to the CIC. When dealing with the transportation system, the city's vision, form, environment, industry and social programs, were all carefully considered (Dera, 1995).

A Source of Inspiration

Curitiba has captured the imagination of planners worldwide, inspiring similar systems in places as diverse as Bogata, New Delhi, and Los Angeles. Bogata's Transmilenio has tried to replicate Curitiba's success by integrating transportation with all other aspects of the city's Master Plan. They acknowledge that merely providing busway infrastructure is not enough. Even free market academics note that Curitiba's strong transportation performance demonstrates that an excellent busway requires strong and capable government regulation (Mees, 2010).

In her Master's Thesis, Dera (1995) argues that all cities can learn from Curitiba. She calls Curitiba "a developed city within a developing country" (p.1) and promotes it as a model for others to emulate. Dera (1995) quotes Lerner as saying, "Any city, large or small, can be a Curitiba" (p.1). She suggests that the best lessons learned from Curitiba are the importance of:

- establishing a coherent Master Plan;
- integrating urban elements;
- considering the city as a whole;

- establishing a constructive, intentional growth pattern;
- preventing growth that is not integrated with the rest of the city;
- creating clear physical boundaries;
- prioritizing public transportation and pedestrian activity;
- actively discouraging private automobile use; and
- recognizing and supporting the economic structure of the city.

Dera emphasizes creativity as essential to the planning process. Problems can be transformed into opportunities, and financial issues can be viewed as a unique challenge. Choosing "small and cheap" over high-tech solutions has worked for Curitiba and their solutions address multiple problems. The city promotes action-oriented policy, where results are immediately visible and establish feelings of civic pride. It streamlines the planning process in acknowledging that even with extensive study, projects always involve unknowns that must be ironed out once infrastructure is in place. Citizens must be involved and truly understand the government's goals (Dera, 1995).

Criticisms

Self promotion and Secrecy

Mees (2010) notes that Curitiba expertly promotes itself. Most authors are content to echo the praise, with the exception of Clara Irazabal of the University of Southern California. She criticizes the top-down and technocratic nature of planning in Curitiba, which persisted even once democracy was restored in 1985. She alleges that their franchise system was rife with secrecy and companies overcharging and hiding revenue. She notes the lack of a full multi-modal fare system and efficient network planning due to separate companies serving separate territories. Robert Roquaio, the first democratically elected mayor, fixed this problem by replacing the franchise system with a more accountable sub-contracting system, which he felt was necessary for legal and ethical purposes. He had intended to use competitive tendering and partial nationalization to end the oligopoly, but Lerner won a third term as mayor in 1989, and

reversed Requiao's decisions. The current sub-contracting system remains (Mees, 2010).

Mees (2010) found that reliable information on mode share and bus use is hard to find in Brazil due to census limitations. Mees acknowledged that busway ridership grew substantially as the network was expanded, but because it replaced other services, much of the growth represented existing bus riders using the new services instead. It is commonly stated that 75% of the population rides public transit to work, however the source for this estimate is unclear. Mees (2010) indicates that the URBS website gives that figure as the mode share for 1965 and more recent information is unavailable.

Mees (2010) contends that even if this estimate is accurate, Curitiba is not reporting true ridership values, as they count only the urban core and not the greater metropolitan area. Indeed suburban routes account for 19% of ridership, but the suburban population is not added to the per capita figures. Mees (2010) states that when including these suburban riders, the number of trips per year per capita is 153, and not the figure of 188 that Curitiba advertises. In comparison, within the City of Toronto, 184 transit trips per capita were made in 2007 (Mees, 2010).

Mees (2010) also says that it is unfair to compare Curitiba with other Brazilian cities because Curitiba's residents are wealthier and fewer live in slums. Slum dwellers in other Brazilian cities cannot afford to take the bus, and as a result less people ride transit. Recent reports out of Curitiba show that car culture is beginning to compete with public transportation, as indicated by a 20% bus patronage decline from 1997 to 2004, as reported by URBS.

Information about Curitiba's planning practices is limited for those outside of Brazil. Most information takes the form of vague and general articles written in admiration of the city (Dera, 1995). As an example of Curitiba's marketing efforts, it is interesting to note that the City of Halifax had approximately the same amount of green space/capita in 1995, however it was barely mentioned in city planning guides or the area's tourism campaigns. On the other hand,

Curitiba is sure to promote its greenspace ratio, and use it as a testament of its environmentally friendly attitudes (Dera, 1995). Irazabál (2005) states that even with the installment of the CIC, industrial agencies have been permitted to locate elsewhere, in environmentally fragile areas.

Curitiba's ITN has experienced difficulties with success in the last decade. Even with the special high capacity buses, congestion is a growing problem, particularly where busway corridors converge in the CBD. Curitiba, like Ottawa, has perhaps reached capacity with Bus Rapid Transit (BRT), and a railway may be necessary for its busiest routes. Beginning in 2000, Curitiban officials began to investigate the merits of developing a subway or monorail system to replace the existing buses (Moore, 2007). This idea may be a difficult sell, as Curitiba is world famous for its BRT success (Mees, 2010).

Lack of Democracy

Lerner implemented his ideas in an expert-driven, top-down approach. He prefers to take action and then later prove to citizens he did the right thing instead of gaining approval first. He carried out projects in secrecy. He implemented "Flower Street" without the permission of local business owners and completed the transformation was done surreptitiously during the night (Dera, 1995). A quote from Curitibian planner Sylvia Benato, illustrates this point, "the people don't know what they want, so, we do what we know is best. The people then come and celebrate" (Moore, 2007, p.79). Some theorists would disagree with this heavy-handed approach, and it is not consistent with public participation models from developed countries. For example, in Ontario, Bill 51 sets strict requirements for municipalities involving the public in their planning process. This 2007 amendment to the Planning Act mandates that citizens must be consulted and respected when creating official plans and new policies. Residents must have access to any applications for development within their municipality (Ministry of Municipal Affairs and Housing, 2007). A lot of research is devoted to understanding how planners can better engage the public and receive more input so they know they are acting in the public interest (Lehtonen, n.d.).

For his first two terms as mayor, Lerner was not democratically elected. Many researchers doubt that sustainability can be achieved in a state lacking democracy. Very few people are involved in decision-making, and they do not write intensive policy documents. They avoid quantitative analysis, and instead experiment by immediately implementing strategies (Moore, 2007).

Author's Conclusion

Although it is reasonable to be cynical of some of Curitiba's claims of achievement, I have read enough information from enough sources to believe that high praise is warranted. Even if Curitiba has only accomplished half of what they are credited with, this is still far more than most cities in the world, in particular most cities in the developing world. Not all their reports of greatness come from within, and even their greatest cynics grudgingly pay some respect (Mees, 2010).

What is most exciting about Curitiba is the innovation in their work. The city pioneered nearly all their solutions, and they have been truly unique in developing new ideas that have sparked similar programs all over the world. Nowhere is this more obvious than with their BRT, as cities like Bogota Columbia; Guayaquil, Equador; Guatemala City, Guatemala; Los Angeles, USA; Panama City, Panama; Cebu City, Philippines; and Kuala Lumpur, Malaysia have all been inspired to create their own rapid bus systems. If Curitiba has achieved nothing else but provide an incentive to discuss and debate public transportation options, it is still a great contribution to society. They have clearly inspired other cities to improve their own transit.

I do not see the need to convert to LRT as a failure, rather an accomplishment that their BRT is popular it can no longer service demand. Mees does concede that although Curitiba's ITN does not live up to the most exaggerated stories of its greatness, it is still well-patronized and efficient, especially in comparison to other systems in Latin American cities (Mees, 2010).

In response to allegations that there is not much information about the system outside of Brazil, Demery responds that this is because it is published in Portuguese. Demery suggests that perhaps researchers who admonish Curitiba for not writing in English could invest the time and energy to have documents translated or perhaps make an effort to learn other languages so they comprehend information from a wide range of cultures and countries (2004).

Many see the lack of a democratic process as a great asset to Curitiba. Successive governments controlled by the military allowed the city to initiate and continue long-term projects. In other parts of North America, there are many political parties with differing viewpoints and the government is replaced every four years. Often, projects are begun by one administration, only to be completely abandoned by the next, a new group of leaders starting afresh. Luckily, the IPPUC in Curitiba is semi-autonomous and has great control over city planning; as a result the city experiences some continuity (Hunt, 1994).

Moore (2007) had to travel to Curitiba before he would believe in such a paternalistic administration. After visiting the city, he revised his thinking and determined that sustainability can be achieved without democracy. In fact, the lack of democracy was what permitted Lerner to create the sustainable city. Particularly relevant is the array of political privileges awarded to elected representatives in Brazil; it is a far more authoritarian system than in North America. The country has been this way since the Portuguese colonization, and citizens, for the most part, appear to accept the idea that experts are doing what is best on their behalf. This streamlines the process, in comparison to the delays caused by bureaucracy in North America (Moore, 2007). McKibben (1995) found that the city had few residents skeptical of the local government.

Authors who compare Curitiba to cities like Toronto should use caution. The country of Brazil has a Gross Domestic Product of $6 300 (US) per capita and spends $949 (US) per capita per year on their citizens. In contrast, Canada, where Toronto is located, has a Gross Domestic Product of $21 700 (US) per capita and spends $4 568 per capita per year on citizens. In Brazil, 25% of citizens live with a wage

of less than $1 (US) per day (Demery, 2004). Toronto does not have the poverty, extensive areas of slum dwellings and exponential population growth that Curitiba has.

Curitiba has also been compared to Halifax, which is equally unfair. Although it is true their green space ratios are similar, I believe Curitiba should be commended for boasting about their parkland. Halifax, in fact, should do more to promote themselves and their environmentally friendly areas. It is unreasonable to criticize Curitiba for speaking out about environmental preservation, just because Halifax is unjustifiably quiet about their own efforts. I conclude that with all Curitiba has managed while working with the limited resources available; the accolades they are given are well deserved.

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