Reviving the Soul in Seoul: Seoul's Experience in Demolishing Road Infrastructure and Improving Public Transport

A Joint Case Study by GIZ and KOTI

Case Studies in Sustainable Urban Transport #6
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1. Introduction

Cities in the developing world are facing numerous urban issues and one of them is provision of transport to all the citizens in the city. As income levels increase in cities people tend to shift to personal motorised transport and increase the burden on the existing road capacity. This often results in a choked road, especially during peak hours.

To accommodate the increasing vehicular growth, city officials often provide more space for the vehicles through road expansion projects such as road widening and, where space is scarce, a flyover is built. The initial result of these projects may please the implementors, however on a longer run, the situation again returns to the earlier state wherein the congestion prevails and, in many cases, there is also a spillover on to the neighbouring areas and arterials. Thus, the vicious cycle of provision for automobile in a city begins.

Many cities are yet to be convinced that the congestion problems persisting in their cities cannot be solved by building more road infrastructure. Many of the developed cities in North America have followed this approach and only resulted in creating cities that are widespread and cities that consume immense area of land.

Some cities in the East that have earlier followed the unsuccessful path of the western cities have realised that the provision of further urban road leads to nowhere and have started to “demolish” the existing elevated road constructions and concentrate on other measures to combat the urban transport problems.

This case study document is an attempt to bring forward to the conventional approach to address congestion problems, the consequences involved in following the conventional path, explain the experience of Seoul (South Korea) in demolishing an existing elevated highway and the approach that Seoul took in tackling the urban transport problem.
2. Conventional approach: Predict and Provide

The “predict and provide” approach is the cornerstone for many conventional road planners and engineers. Models and calculations for future growth in motorisation are “predicted” and necessary road infrastructure is “provided” to meet the future growth. Many of the developed European cities have proven that this approach is no longer successful. The conventional approach is a supply-oriented way forward. This approach also undermines the value of resources such as fossil fuels, land availability and requires huge sums of investment from the government which is transferred, often, also to the people who do not use the product, such as non-motorists.

Unfortunately, many local governments still follow the conventional approach in addressing the transport crisis in the cities. These cities continue to build roads and invest massive amounts of resources into such projects. This results in cities with reduced liveability, reduced safety for their citizens and an unprofitable public transport industry.
3. Consequence of Predict and Provide: Induced Demand

(Source: GIZ Technical Document “Demystifying Induced Travel Demand” by Roger Gorham, for more information refer to the document available from http://www.sutp.org)

The consequence of excessive investments in road infrastructure leading to increased personal mobility, reduced access to destinations and increased travel times is technically termed as “Induced Demand.”

Induced travel demand is about time; specifically, it is about how people respond when the amount of time it takes for them to go from one place to another is reduced. Traditional transportation demand analysis assumes that speed improvements simply result in a reduction in the time people spend traveling. “If I can travel faster than before, then I’ll simply get to my destination sooner, and reduce the amount of time I spend traveling.” In traditional economic analysis, this “reduction” in travel time is assumed to be a benefit to all travellers, linked to the value that travelers places on the amount of time spent traveling. That value can be measured using Stated or Revealed Preference techniques of conjoint analysis.

In reality, however, people’s reactions to a reduction in the time needed to travel from point A to point B may be substantially more complex. To be sure, some travellers might reduce the amount of time they spend traveling, but others might choose to travel farther, that is, to different destinations, or more often. They might change the proportion of trips they make by different modes, depending on how speed improvements affect the various modes differently. Over time, they might even choose to locate themselves differently in an urban area. “If I can travel faster than before, then I can get to a destination slightly farther away in the same amount of time, or I can make more trips to the grocery store in the same amount of time, or I can live or work somewhere else.” Similarly, production managers in industry might change the way they value the trade-off between transport and warehousing, or in the longer run, might make changes in where they site their production or distribution facilities, in response to particular or generalised travel time changes. In aggregate, the details of the workings of induced demand can be complex, and valuation controversial, but at its core, it is a straightforward concept: people respond to changes in travel time by changing their behaviour.

Figure 2
Bangkok tried to build its way out of traffic jams and still is stuck with heavy traffic jams. Source: Karl Fjellstrom
4. Priming the public transport and flushing the flyovers

4.1 The problem

Seoul is one of the faster growing cities in the world. The population of Seoul increased considerably between 1960 and 2002. The metropolitan area had 22 million residents in 2002 (Pucher et. al., 2005). The increase in the population and the better living conditions and economy in Korea has increased the ownership of personal automobiles. Between 1970 and 2002, the per capita income of South Korea rose from USD 311 to 12 531 (Pucher et al., 2005). This rapid economic growth enabled people to change their lifestyles rapidly and promoted car ownership. In 1970, there were only 2 cars for every 1 000 persons in Korea, while in 2003 the car ownership rose to 215 for every 1 000 people (Pucher et al., 2003).

This rapid growth in personal vehicles brought forward various issues such as traffic congestion and air pollution (Hwang, 2001). The roads connecting the suburban parts to the city were especially clogged. The arterial roads had speeds of only 20 km/h overall and the central business districts (CBD) had only 17 km/h (Kwon, 2004).

The city administration of Seoul realised that they had to tackle the increasing crisis. The administration had two main options: either to invest in road infrastructure and expand the supply or to manage the demand by investing in alternative transport. However the city government, with a new mayor in charge, made another choice of reclaiming the road space occupied by an elevated road by tearing down the road and reviving the river covered by it.

This section of the document will explain the process of Seoul’s transformation by demolishing the elevated highway and improving its public transport system. The section will also document the results obtained after the transformation.

4.2 Restoring the river covered by asphalt

Figure 3
Chenggyecheon River in 1965.
Source: Seoul Metropolitan Council (kindly provided through Cornie Huizenga)
While many cities in the region are addressing the urban transport crisis by investing immense amounts of money into road construction, especially elevated roads, Seoul has initiated a “new paradigm”. Following the footsteps of Latin American city leaders like Jaime Lerner of Curitiba and Enrique Peñalosa of Bogotá, the then Mayor of Seoul and current Korea’s President Mr. Myung-Bak Lee initiated a project in 2003 that would restore a river covered by an elevated expressway (Cho, 2010; Cervero et al., 2009).
The Chenggyecheon River that once passed through the heart of Seoul was covered in mid-60’s to provide space for the increasing automobile traffic. By 1978, the river was completely covered by a road and an elevated expressway. Until the day the expressway was dismantled, an estimated volume of 168 556 vehicles were catered by the highway and the elevated expressway (65 810 going down the road and 102 747 going up the elevated road). In spite of its utility, the Mayor’s vision to create a Seoul that was for people rather than for cars triggered the demolition of the expressway and the elevated road (Park, n.d.).

Being the main and only responsible agency, the Seoul Metropolitan Government took on its shoulders the entire responsibility (fiscal and personnel) in restoring the Chenggyecheon River. The restoration was also given importance in a cultural context as 600-year old Korean artifacts were revived with the river.
The citizens of Seoul were also informed of the safety issues that would persist due to the elevated expressway. City officials discovered that the foundations of the elevated road were corroded and beyond repair. Due to the sewer and the drain flowing below the elevated road, there was an accumulation of gases such as carbon monoxide, methane and other underground gases, and the corrosion of the foundation was thus accelerating. In addition to these safety hazards, there was a high contamination of heavy metals. All these factors provided a strong case to increase the safety of the citizens by removing the elevated expressway.

The demolition of the expressway and the reconstruction was completed and opened to the public by 2005. There was constant monitoring of the outcomes of the project. Studies conducted by the Seoul Development Institute (SDI) show that the restoration of the river has reduced the surrounding temperature by 3.6°C (Donga, 2005), which was earlier caused by the heat island effect. In terms of traffic, there was a 2.3% reduction in the vehicles entering downtown Seoul while there was a 1.4% increase in the bus users and 4.3% increase in the subway ridership (Wikipedia, 2011; Shin and Lee, 2006). The improvement in the bus system will be discussed in the next section of this document.
4.3 Public transport improvement

As it was mentioned before, other than demolishing an elevated expressway, Seoul has also invested in renovating its public transport system as a means to provide alternative transport solutions for its citizens. The improved public transport system, also known as the Seoul Bus Rapid Transit (BRT) system, includes regular and special service buses that run on exclusive median lanes. More than 400 different bus routes were rationalised, where bus routes were colour-coded in the new system. The colour coding of the buses enable the citizens to easily identify the routes the buses operate on. The colour codes are as follows (Pucher et al., 2005; Calimonte, 2011):

**Blue buses**: Long routed buses that connect the outer suburbs of the city to the city centre;

**Green buses**: Local service buses that are feeders to the metro system and the express bus stops;

**Red buses**: These buses connect the newly planned satellite cities to the city centre;

**Yellow buses**: These are buses that provide local services in the metropolitan area.

In order to manage the operation of the above mentioned services, Seoul has invested in a Bus Management System (BMS) and an Intelligent Transport Systems (ITS). The buses are equipped with Global Positioning System (GPS) that enable the control centre to pin point the bus’s location and provide information on the arrival of the bus to the passengers. The control centre is also able to measure the speed of the buses, thereby enabling the control centre to optimise the arrival and departure of the buses, depending on the demand on a route. This system ensures better service delivery to the passengers.

Seoul had already invested, in the past, in extensive suburban rail and a metro rail system. The city government felt that it was necessary to utilise the rail infrastructure to the fullest. In order to do so, the city government invested in integrating the bus system with the rail system. The integration was both physical, by providing feeder services—the green buses—and through fare integration. The new fare structure is based on the distance travelled and with free transfers between the metro and bus and vice versa. The city government introduced a multipurpose smart card system called “T-money”. The new smart card enables the users to pay for the transport fares and also use the card for various other utility services. Frequent users of the transport system have now access to a monthly ticket, which offers discounts to them.
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Figure 10
A Junction before the bus reform in Seoul.
Source: Kim, 2009

Figure 11
The same junction transformed after the bus reform in Seoul.
Source: Kim, 2009
Initially after the restructuring of the bus reforms, there was an initial disagreement from the users. This disagreement arose from the lack of adequate information about the bus routes, the fare increase and driver behaviour. The administration took immediate action to reduce the dissatisfaction, starting with the driver behaviour. Driver training schemes were implemented to improve the behaviour and immediate results were observed. Over time, the customer satisfaction increased and one reason was the increase in bus speeds. On many corridors, bus speeds doubled. An interesting fact is that the car speeds have also improved after implementing the median bus lanes. It is found that the buses on the median lanes carry 6 times more people than the other lanes in the corridor.

It is found that the average daily ridership on the buses has increased from 4.6 million in 2003 to 4.9 million in 2009. Also, during the same period, the total subsidy for bus and subway operations has dropped by USD 421 million. This fall in subsidy is due to the increase in ridership and system efficiency (Calimente, 2011, http://regardingplace.com/?p=11085).
5. Ways to address the urban transport issue: Lessons from Seoul

From Seoul’s experience, developing cities can learn some important lessons in promoting sustainable transport.

Firstly, transform cities to be people friendly. Cities are the centres of activity, when such activity is social and human centred the liveability in cities increases. The scales of the buildings, the location of various activities like shopping, working, and recreation need to be clustered. This kind of mixed development increases access to the destinations and reduces motorisation. Creating public parks instead of excessive car parking promotes a sensible use of land. As in the example of Seoul, the elevated expressway was dismantled to create a public space, a water stream, where people can come for recreation and spend time with their loved ones. The new public place is a haven for children to play far from the moving vehicles and smoke filled roads. In an ecological sense, public spaces give a chance for the city to promote its environmental stewardship by having various flora species in the new public space.

Studies reveal that the ecosystem along the Cheonggyecheon has improved greatly. The number of fish species increased from 4 to 25, while the bird species increase from 6 to 36. The insect species also increased from 15 to 192.

The air quality along the project site has also improved. Particulate pollution dropped from 74 to 48 micrograms per cubic meter and, as previously stated, the temperature in the project site has also reduced 3.6 degrees.

The second factor that can be learnt from Seoul’s experience is that a bus system is a crucial means of transport for a city. As it was mentioned earlier, Seoul has invested a lot in its suburban rail and metro system. Seoul could have invested more money into a rail-based transport; instead the city government invested in prioritising its bus system. The city officials acknowledge that bus-based transport will cost less money; at the same cost of providing a fraction of coverage on a metro, a bus-based system will have much larger coverage at a high quality of service.

The city invested in having state-of-the-art technology for bus information and guidance. Median bus lanes were exclusively provided for the system. More than 400 bus routes were restructured and classified into 4 simple colour coded buses. Initially, passengers were befuddled with the new system in the city. Immediately, the city government realised the need for information. Campaigns informing people on the bus routes were helpful. Though the satisfaction of the passengers was initially low, it rose within a few months of operation.

After launching the new bus system, the bus speeds almost doubled in many areas and the cars were also moving at a faster pace, as the buses did not interfere. The buses on the median lanes were carrying 6 times more people than the vehicles on mixed traffic lanes.

Thirdly, a strong political will is required. All this transformation was possible when Seoul shifted its focus from providing roads to demolishing them. In other words, the visionary goal of then Mayor and current President Mr. Lee, in creating a city for people rather than for cars is the key to transformation. Many cities with strong political will showed that it is possible for any city to get out of the clutches of automobile dependency and embrace people centred life.

Some other leaders who demonstrated political will are: Mr. Jaime Lerner from Curitiba, Mr. Enrique Peñalosa of Bogota, and Mr. Ken Livingston, London.

Even in the developing world, leaders like Mr. Narendra Modi, Chief Minister of Gujrat, India, has proven that it is possible even for Indian cities to have a world-class transport system by commissioning the bus rapid transit system in Ahmedabad which won the Sustainable Transport Award in 2010.
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