

Innovative value capture based rail transit financing: an opportunity for emerging transit cities of India

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Abstract: Emerging cities of the 21st century are attempting to build rail transit as a key driver to maintain their city's competitiveness and help catalyze livable and sustainable development opportunities around station areas. Indian cities are doing this in a big way with about 50 cities embracing urban metro rail transit systems. The rail projects are approved politically but need financing to build such highly capital-intensive rail transit systems. The use of value capture (VC) mechanisms is gaining momentum across cities worldwide as a solution to transit funding and financing. The first cities in India are now deploying various VC based financing mechanisms. This paper therefore aims to review the experiences of VC based innovative financing practices in selected Indian cities. The research summarizes the key issues and lessons learned from these experiences to help define the way forward. The paper finally concludes that VC practices in India are still at an embryonic stage but the results are encouraging with huge untapped potential to co-create rail transit centered sustainable growth. Moreover, the review findings and lessons learned will help enhance the understanding of the challenges in emerging transit cities of developing countries.

Keywords: unlocking land values, value capture, transit cities, Indian cities, land use, rail transit funding, metro rail, urban rail, active VC mechanisms, passive VC mechanisms

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1. Introduction

Most emerging cities of the 21st century in developing countries are poised for accelerated growth and have the kind of densities that are ideal for transit systems. Many are thus contemplating rail transit-driven sustainable urban mobility solutions as one of the key drivers to address a range of urbanization challenges. There is a growing recognition among cities across developed and developing nations that urban rail transit system is a key driver to maintain any city's economic competitive-

ness and helps catalyze livable and sustainable communities around station areas^[1]. Transit Oriented Development (TOD) options are designed globally to integrate rail with built environment, energy, economy and other transportation services in a way that addresses sustainable city development goals^[2].

There is a second urban rail revolution trending across the world. Newman *et al.*^[3,4] noted that the 'trend back to rail' is perhaps to be expected in relatively dense cities and countries in Europe, the Middle-East and Asia. However, perhaps the more surprising trends have been in the US, Canada and

Australia, where traditional car-dependent cities that were once only considered suitable for bus transit in their suburbs are now seeing a future based around rail^[3-5].

Indian cities, following the global trend, are now rapidly embracing urban metro rail transit systems in a big way. For example, in India, the current urban rail (metro) is operational in 7 Indian cities, with another 9 cities currently constructing metros and a further 14 cities with rail transit in the planning stage. A further 16 cities have rail transit under initiation and eight regional rail corridors from Delhi are also being planned^[5-7].

As these urban rail projects are highly capital intensive projects, most city governments cannot provide the funding for such transit systems and largely depend on grants from state or central governments or on borrowings to create new urban infrastructure with limited success^[8]. This is a problem worldwide leading to the question of “how can urban rail transit systems be funded and financed?”^[9]

Innovative financing mechanisms to build such projects and sustain them are being sought around the world. A new approach to financing urban rail infrastructure is needed as there has been a dramatic turnaround in rail’s fortunes globally as well as an increased awareness of its value to 21st century cities’ sustainability goals^[3].

In this context, monetization of urban land values through induced and activated land use change is gaining attention worldwide as a new revenue generation source. Through capturing the increased value in urban land due to improved accessibility from building rail transit infrastructure, cities are now discovering a new way to improve their capacity to find the finance for building the infrastructure. Facilitating rail transit based infrastructure investments through value capture is relatively new^[10]. It is not new to recognize the value of integrating transport and land use but the need to integrate these two with financing is relatively new, and is conceptually more challenging^[2,3,11-13]. Studies in US and Australian cities indicate that proximity to transit often increases property values enough to offset all of the transit system capital costs captured through a portion of their incremental value^[12,14]. This has led many cities across the world, including Indian cities like Mumbai, Hyderabad, Ahmedabad and Bangalore, to attempt tapping urban land values as an alternate sources of revenue but with varied experience^[15].

This paper therefore reviews the Indian city practices of innovative financing mechanisms that have been implemented. They are examined from the perspective of their potential and their challenges. This paper further analyzes the key issues and lessons learned, after which it concludes with recommended ways forward. The lessons captured will provide a guiding platform for future VC based financing of emerging transit systems in developing countries.

2. Traditional Financing Practices for Urban Rail Transit

Traditionally, property tax and government owned land assets are creating an economic base for many city local governments. In India, typically, the general revenue sources for city local government include charges such as property taxes, amenities fees, scrutiny fees, subdivision fees, development charges, building permit fees, betterment charges, grants — water supply, sewerage, housing, and deposits — security deposits (building permissions/tender), as well as government grants and loans. These revenues are now grossly inadequate even to maintain the existing infrastructure, let alone have any funds left for creating new infrastructure. There is a big, growing gap between supply and demand, leading to delays in construction or in short, inadequate increments of network^[15].

Turning to the private sector for financing can only work with urban rail if there is a necessary return. Most rail systems, even the profitable ones in Japan and Hong Kong, cannot make such a return from the fare box. The only way to enable sufficient return is if the private sector can make a profit out of land around stations. A confluence of all these factors has prompted an urgent need to look for innovative funding and financing mechanisms through unlocking land values to build such projects and enable them to be sustained.

3. VC Through Unlocking Land Values for Urban Rail Transit

The main idea behind value capture is that urban rail will increase land values when it is built; this must be beyond what would happen anyway due to rising incomes and other economic activity. These increases in land values can be captured directly by the private sector or by various government mechanisms and put into a Transit Fund that can then be used to fund and raise finance for building and operating the rail system. Thus it can involve private sector financing (for

building, owning and operating) as well as government sources of funding and financing, which in all cases will require a mechanism to capture the value created as a first step in unlocking the finance.

Many studies have established the relationship between urban rail services, accessibility, and residential and commercial property values that are able to provide the basis for mechanisms that can capture some of this value as an alternative funding. Capturing the value in an acceptable, transparent and equitable way involves multiple methods and complex mechanisms. In fact, there is no one-size solution that fits all needs in financing a new rail project through VC. The applicability of a specific VC mechanism may or may not be applicable in another project due to a number of factors such as location, legislation, project type, willingness-to-pay, ease of adaptation, administration, duplicability and many more; these are all areas that need to be looked into on a case-by-case basis^[5].

The most important way to categorize VC is into passive and active VC mechanisms. Active VC revenue sources are mostly revenue flows from active intervention such as buying property or creating a special levy on the station precinct whereas passive VC revenue flows are more asset value dependent so funds come from tax based revenue flows without intervention to actively pursue the value directly^[6].

Active VC mechanisms can be collected directly by the consortium building the system or can be collected by government into a fund used to pay the consortium chosen to build the transit and land development. The revenue can be generated from government owned property or from private land where owners are brought into a profit sharing agreement with the consortium that has been chosen to build the system; all land owners will benefit from the transit accessibility-driven increased land values. The revenues can be accrued if governments either sell their land holdings or sell the development rights to the land holdings. In case of deep cut subway transit projects, the newly created underground space holdings around transit station area can yield more revenues through shopping or business activities as revealed in the case of subway projects of Hong Kong, SAR China, Japan and London. The public transport financing practiced by Mass Transit Railway Corporation (MTR) in Hong Kong SAR, China and the Japan Railway Construction Agency (JRCA), a public corporation of Japan Railway are good examples of this active and developmental based approach. Hong Kong's MTR co-developed the

sites along the transit corridors and above the transit station rather than selling those sites. In 1993, the corporation financed about 22% of operating cost of their transit system through property rental income. Similarly, the greater Tokyo's private railways have practiced transit value capture through development on an even grander scale, building massive new towns along rail-served corridors and cashing in on construction, retail and household service opportunities created by these investments^[6,16].

Other active VC mechanisms can include betterment tax, benefit area levies, infrastructure levies, parking levies, special assessment districts, developer contributions, density bonuses or sale of air rights. In Australia, the Gold Coast Transport Levy, which is collected across the whole of the Gold Coast municipal area, was used to help fund and operate a new light rail. The Transport Levy was able to provide the ongoing costs of operation and was used to induce state and federal capital for building the system. A Public-Private Partnership (PPP) model was made feasible based on such active intervention to create a fund to be used for raising the finances^[6,17-19].

Passive VC mechanisms are mostly on private land where the revenue flow is focused through ad valorem tax instruments, namely capital gains tax, stamp duty tax, land tax, GST on land sales and any other land-based taxes. These will rise due to the increased accessibility from the urban rail service and will flow into various levels of government. It is scientifically estimated the increased flow of funding can be hypothecated into a Transit Fund and used to attract financing from banks involving various combinations of the private sector and government. Passive VC mechanisms still require government actions but not directly in the marketplace; they can therefore be more politically acceptable but only if the government can afford to raise the loans. They do require Treasury Departments to hypothecate revenues and this may impact on credit ratings^[6,17-19].

Both active and passive value capture can enable more significant private involvement in the urban rail projects. If private financing is being used it is possible to involve private consortia in a PPP where not only do they bid to build, own and operate the rail system but they can also do entrepreneurial land development as part of their bid^[20]. Thus a combination of active and passive mechanisms could all be used to create a government Transit Fund or to enable a chosen consortium to raise the funds themselves from

land development and operational income or a combination of the two mechanisms to raise the finance^[6].

Some of the land based VC mechanisms used to generate public revenue in developing and developed nations context are briefly highlighted below^[15,21]:

- In Bogotá, betterment fees and contribution de valorización, had together contributed US\$1.0 billion from 1997–2007, and US\$1.1 billion has been planned for 2008–2015. This fund was used to finance improvement programmes for a city street and bridges. Beginning in 1997, municipalities were authorized to capture 30 to 50 per cent of the land value increments resulting directly from public investments in infrastructure or indirectly through planning and regulatory changes.
- In Cape Town, the sale of Victoria and Albert Waterfront property by Transnet generated US\$1.0 billion in 2006 and was used to recapitalize Transnet and support its investment in core transportation infrastructure.
- Hong Kong's Mass Transit Railway Corporation co-developed the sites along their transit corridors and above their transit stations rather than selling those sites. In 1993, the corporation financed about 22% of the operating cost of their transit system through property rental income. MTR Hong Kong derives a major proportion of its revenue from land through lease/sale of property with grant of densification and development rights.
- France has established a public transport funding system known as "Versement Transport (VT)". It is a specific tax paid by public or private companies that have more than 9 workers located within an area covering 10,000 inhabitant's that benefit from the transit. This levy cross-subsidies either operational costs or new transport infrastructure.
- In Copenhagen the appreciated land value resulting from a metro rail line of 22 km has been unlocked through direct payments (10 per cent), real estate taxes (10 per cent), and operating profits from the metro (30 per cent)
- In the metropolitan region of Sydney, a betterment levy of 30 per cent was imposed on specified rural lands and the proceeds from the levy were earmarked for financing city improvements.
- In many cities in the United States, development impact fees are an important instrument

for unlocking land value and are used to generate revenues for funding or recouping the costs of capital works or extensions of existing infrastructure attributable to new development.

- In Munich, use of a revenue model for land based VC is imposed on urban developers. If a developer is interested in obtaining the license to construct a neighborhood, first he has to obtain the land value from a real estate experts' panel. After the land has been rezoned and has started with construction, the land value will increase. The difference between those two values is a measure that local government organizations may claim, till two-thirds of this change, as a source to provide public infrastructure.

Table 1 summarizes various VC mechanisms as compiled by McIntosh *et al.*^[6,17] from various academic studies, and relevant secondary sources.

For India, a series of studies have been done to examine these mechanisms. For example, in Ahmedabad^[22] a research study reviewed the implemented metro rail transit systems since 1965 across 141 cities worldwide to see the popularity of VC implementation mechanisms. The study found that only 38 cities out of 141 cities reviewed have formally applied various land based VC mechanisms to raise non-fare box revenues. About 65% of those cases are from developing countries. Figure 1 shows the proportions of popularly used VC instruments across these 38 cities, including both passive and active VC mechanisms.

From the above various literature reviews, it is evident that there is no one VC solution that fits all as a predefined VC prescription but the use of joint development that directly funds a transit system out of the increased value in the land is by far the biggest mechanism. The underlying success factor is that stakeholders are willing to pay provided they are convinced about the value proposition. Prior to the implementation of the VC mechanisms listed, each mechanism should therefore be required to be evaluated against an existing policy evaluation framework and local conditions^[6].

4. Land Based VC Experiences in Indian Cities

Indian cities are building metro rail transit systems as a multi-functional solution to a range of rapid urbanization challenges and mobility issues. The rail projects are approved politically but are in need of financing. Though it is a drive initiated by the Government of

Table 1. Compilation of VC mechanisms implementation from academic studies, and related websites (adapted from McIntosh *et al.*)^[6,17]

	VC mechanism	Implementation & Transit	Comments
Passive Government Property	Sale of surplus property/development rights/air rights	<ul style="list-style-type: none"> • Hong Kong SAR, China (Metro) • Washington, D.C., USA (Metro) • Sydney, Australia (Heavy Rail) 	These VC instruments can be used when vacant public land or government property is available and got transit proximity asset value increase.
	Sale of naming rights to stations	<ul style="list-style-type: none"> • New York, USA • Philadelphia, USA 	
Active Government Property	Direct development of government property	<ul style="list-style-type: none"> • Hong Kong SAR, China (Metro) 	These are more induced VC mechanisms and maximize the returns on the government land or property available and also own the asset value.
	Joint development	<ul style="list-style-type: none"> • Hong Kong SAR, China (Metro) • Tokyo, Japan (Metro) • London, UK (Metro) 	
	Returns on public parking fee	<ul style="list-style-type: none"> • Portland, USA (Street car/LRT) 	
	Government property leasing	<ul style="list-style-type: none"> • Philadelphia, USA 	
Passive Non-Government Property	Tax increment financing	<ul style="list-style-type: none"> • Widely used in USA, UK & Australia 	Primarily focused on additional portion accrued due to increase in land values to the existing ad valorem taxes
	State transfer duty/sales tax	<ul style="list-style-type: none"> • Atlanta, USA (Heavy Rail) • Dallas, USA (LRT) 	
	State land/property tax	<ul style="list-style-type: none"> • Dallas, USA (LRT) • Portland, USA (Street car/LRT) 	
	Local government taxes	<ul style="list-style-type: none"> • Portland, USA (Street car/LRT) 	
Active Non-Governmental Property	Special assessment districts	<ul style="list-style-type: none"> • London UK (Metro) • Seattle, USA (Streetcar/LRT) • Portland, USA (Streetcar/LRT) 	These are integrated transit and land use development oriented VC mechanisms.
	Special area rates/service charges	<ul style="list-style-type: none"> • Atlanta, USA (Heavy Rail) • Dallas, USA (LRT) 	
	Infrastructure tax hypothecation	<ul style="list-style-type: none"> • London UK (Metro) • Portland, USA (Streetcar) 	
	Developer contributions	<ul style="list-style-type: none"> • Popular practice 	
	Density bonuses	<ul style="list-style-type: none"> • New York, USA (Metro) • Curitiba, Brazil 	
	Local parking levy	<ul style="list-style-type: none"> • San Francisco, USA 	

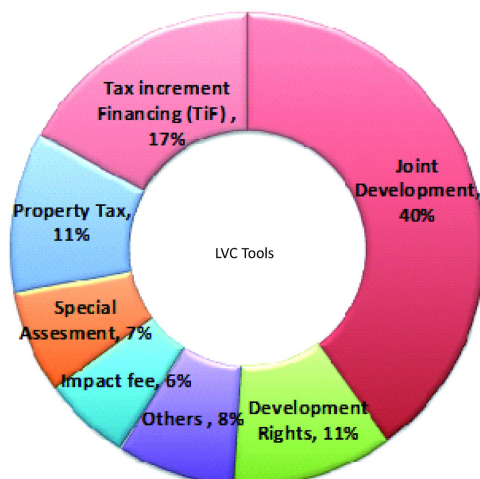


Figure 1. Proportions of popularly used land based VC mechanisms worldwide (adapted from Vivek *et al.*)^[22].

India, providing such capital infrastructure investments for burgeoning cities is a major financial challenge. According to the 12th Five Year Plan (2012–2017) draft Working Group report, it is estimated that Indian cities require investments to the tune of about

US\$58 billion. Therefore, many of them are heavily dependent on Central government subsidies and grants to build such systems. Recognizing the significance of raising finances, the Government of India envisaged through the National Urban Transport Policy (NUTP) of India, 2006 and further emphasized in the draft 12th Five Year Plan (2012–2017) of India, the need to raise finances through innovative alternate financing mechanisms. These principally include development of land and a land value capture mechanism with a focus on non-fare box revenues. The data in Figure 2 illustrate the share of non-fare box revenues generated as a percentage of total operating revenues across selected metro transit projects globally^[22].

Most new tram or train projects in the 19th century used land development as the direct basis for building their transit systems. Ahluwalia and Mohanty^[23] show that this was also the case in India. A number of developing countries are now following this course as part of the mix for capital financing of urban infrastructure projects. In the Asia region, Singapore, Hong Kong and Tokyo have all funded mass transit

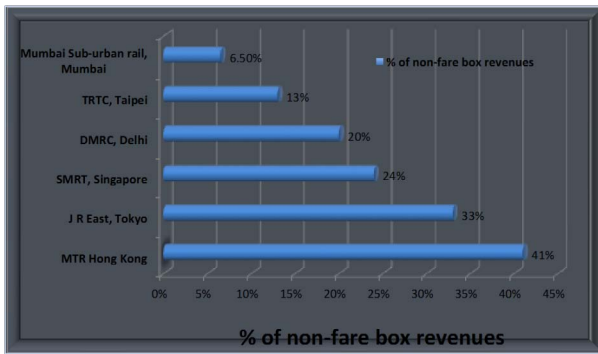


Figure 2. Percentage of non-fare box revenues earned by selected metros^[22]. Source: PWC Analysis Annual Report on Urban Rail in India, CEPT study^[22]

projects with private dollars based on the expected increases in property values. The following sections briefly highlight the examples of a few Indian cities that have begun to tap into urban land values as a way of financing urban rail.

Value capture in India has been used to finance urban infrastructure projects in the context of development of highways, especially ring road development, building rail transit systems, provision of civic amenities and affordable housing infrastructure projects. Table 2 below shows that land based VC mechanisms were adopted in five out of nine metro rail projects in India^[5,15,23].

Some Indian states have made legislative amendments to enable urban local bodies to levy impact fees, premium FAR sales, and betterment charges. Many state governments have permitted the ULB to levy impact fees to mitigate the impacts of construction of commercial buildings that lead to increased traffic and necessitate decongestion measures. Such a fee is also levied for the sites abutting certain important potential

Table 2. Indian transit cities status on VC concept adoption

City/Metro rail	VC applied?
Delhi Metro	Yes
Bangalore Metro	Yes
Mumbai Metro	Yes
Ahmedabad Metro	Yes
Hyderabad Metro	Yes
Gurgaon Rapid Metro	No
Kolkata Metro	No
Jaipur Metro	No
Chennai Metro	No

Source: Compiled information from secondary data source^[5,15,23]

roads where the land values increase post road construction and demand for commercial activity will creep in. For example, the legislatures of states of Karnataka and Andhra Pradesh have enacted such VC instruments through an amendment to their existing legislation.

The Government of Andhra Pradesh has applied financing mechanisms to levy betterment charges originally through the Hyderabad Municipal Act, 1955. The Hyderabad Municipal Corporation has been using incentive zoning for the past 15–20 years with relaxation in planning norms including grants of Transferable Development Rights (TDR) for widening major roads. Greater Hyderabad Municipal Corporation levies an impact fee to generate resources for infrastructure development. A special development charge per square meter is levied on any development occurring within the 1 km growth corridor on both sides of the ring road. Hyderabad Municipal Corporation has employed a value capture mechanism based on cost recoupment via a betterment levy or special assessment tools for funding infrastructure needs to the extent of \$115 million^[15,21,23]. Likewise, a 300 m belt all along the metro rail corridor in Hyderabad is designated for multiple uses and an impact fee is levied per square foot of total built up area at the time of issuing the building permission. In addition, a city level infrastructure fee based on land use is levied across all buildings of more than 5 floors or 15 meters in height. Most of these levies are fixed as one time charges on spatial parameters like per square foot or square meter charges^[15].

Similarly, the Government of Karnataka made amendments to the Karnataka Town and Country Planning (KTCP) Act to enable capturing the land value through various methods like auctioning of sites, additional FAR, levy cess and surcharge, TDR and additional property tax in the catchment area of their Metro.

Bangalore’s sale of excess land along the airport transport corridor generated US\$500 million as a part of a traditional public-private-partnership (PPP) to fund and finance the infrastructure^[21]. Section 18A of KTCP Act provision enables the collecting of a cess and surcharge for water supply, ring road, slum cess, and MRTS cess, with a maximum cap of 10% of market value. Section 20 of the KUDA Act 1987 provides the ability to charge a betterment tax in addition to a betterment levy. These levies direct funds to the accounts of public bodies like Bangalore Metro Rail Corporation Ltd. (BMRCL), Bangalore Development Aut-

hority (BDA) and Bangalore Water Supply & Sewerage Board (BWSSB). For instance, under the KTCP act, levy of cess and surcharge at 5% of market value of land or building is charged to create a dedicated metro infrastructure fund. These revenues are shared by the metro transit agency BMRCL, BWSSB, and BDA at a proportion 65%, 20% and 15% respectively. In the last 5 years, the revenue received from 5% levy of market value is about Rs. 1250 crores (equivalent to about US\$185 million)^[24].

Additionally, the Floor Area Ratio (FAR) values were raised to 4 from 2.5 within a 500 m distance along the Metro rail corridor and a levy cess of 10% of market value for residential and 20% market value for commercial on the additional FAR granted is charged. Bangalore accrued to the tune of about Rs 432 crores (equivalent to US\$63.5 million) in last 5 years from the cess on additional FAR granted. This again was shared across BMRCL, BWSSB, Bangalore Bruhat Maha Palike (BBMP) and BDA at a proportion of 60%, 20%, 10% and 10% respectively.

The BMRCL also issues TDR (Transfer of Development Rights) to secure land for the metro rail alignment in lieu of compensation for the acquisition of land and private infrastructure bonds. Notably, Karnataka is the first state in India to impose the 5% cess on the guidance value of all new layouts. The collected amount has to be deposited into a Metro Infrastructure Fund (MIF) and from this pool the revenue is shared in the following ratio as BMRCL 45%, BDA 20%, BWSSB 20% and BBMP 15%. The amount collected is utilized for the provision of infrastructure in those new layout areas only. Thus new areas can be developed well before people move into new areas and thus make for a planned layout making provision for all civic utilities, pedestrian paths, cycle paths, as well as earmarking the metro alignment^[15,21,23,24].

Peterson and George^[21] report that shares from the Mumbai Metropolitan Regional Development Authority (MMRDA) auction of 13 hectares of land in Mumbai's financial center, generated US\$1.2 billion to fund and finance projects in the metropolitan transportation plan via the issue of municipal bonds. This revenue generated was 10 times its total capital spending in 2005–2006 and 3.5 times the total value of municipal bonds issued by all urban local bodies and local utilities in India during the decade 2001–2011. This clearly establishes the fact of VC potential in India.

Mumbai metro focus on advertisements and auction

the naming of stations; other non-fare box instruments include premium FAR, TDR and land sales. In Maharashtra state, Pimpri-Chinchwad city, FSI was increased from 1 to 1.8 along the BRTS alignment to raise resources. The proceeds were transferred to an Urban Transport Fund.

In the capital city, the Delhi Metro Rail Corporation (DMRC) has been mandated to incur an initial 7% cost of the project through property development, 30-year concession and long term lease for commercial development on vacant lands and development on vacant pockets respectively. Delhi Development Authority (DDA) is responsible for formulation of redevelopment schemes and modification of land use accordingly within the Delhi Metro "influence zone" (500 m). DDA also plans "Metro realty hubs", the first project under a new Transit Oriented Development policy for Delhi. Real estate charges thereby are to be performed by the authority on any profitable projects which may return investments in a latter period^[25].

The Nagpur city Improvement Trust Act (1936) has the regulation of 'Betterment Charging', which provides a legislative framework to implement value capture mechanisms. However, the Nagpur local agencies have not been able to implement this regulation due to the absence of a holistic framework and robust implementation mechanism^[7].

Another VC practice includes land pooling through the town planning scheme that enables the best redevelopment potential around stations. This has been popularly practiced in the state of Gujarat. In such schemes, the government purchases agricultural plots on the city's periphery, constructs infrastructure, then sells the now richer land back to the former owner. The farmer gives a portion of the new value, as a betterment fee, then keeps or sells the remainder. Conceptually, this approach is a win-win for both parties and offers a way to uplift the urban poor. Town Planning Schemes (TPS) have been used to acquire undeveloped land in kind to build road infrastructure in Ahmedabad city which is within Gujarat state. Out of the total road length of 76.3 km of the outer ring road, 57 km were acquired through TPS. Core features of TPS include minimal displacement of people and the inclusion of self-financing, which enables everyone to benefit^[23].

5. Lessons Learned from Indian Cities VC Practices

Although it is a small start among Indian cities, the land based VC concept is still an evolving alternative.

The majority of the practices viewed VC mechanisms as only an additional tax financing tool which has led to underestimation and under-utilization of the true potentials offered by the momentous urban rail boom in India. The VC mechanisms are generally not highly regarded as they so far lack clarity, and are unable to develop a strategic VC perspective from planning to implementation stage of the project. The majority of VC practices introduced are only from fiscal policy or administration and legislative perspectives but lack beneficiary or stakeholder participation which is a key driver for VC success. Many of them lack clarity on redistribution of captured gains beyond sharing the funds. Most of the projects overlooked the necessary support investments for transit infrastructure integration and the urban design for sustainable community development aspects around station areas.

Some of the issues and key lessons are summarized below:

1. Most of the VC mechanisms implemented do not cover the full costs of a transit system and are grossly inadequate to cover ongoing transit operations as mostly they are only upfront one-off contributions.
2. No attempts seem to have been made to involve the transit beneficiary community or resident tax payer community in the VC process and its design.
3. Few Indian cities try to tap the indirect benefits of a transit system due to lack of legislative powers, effective policies and skills.
4. Many transit agencies and urban local bodies in Indian cities lack VC skills in house nor have yet realized such significance. Thus many cities in India are looking for guidance, framework and capability building in the VC implementation from planning to implementation stages.
5. Most projects not followed any scientific VC assessment methods on fixation of amount of VC based tax. Majority fixed based on adhoc decision, earlier experiences, political acceptability and based on a consulting study input.
6. There is no one size VC solution that suits all. Thus participatory approaches to VC involving the beneficiary community may yield good results as India's democratic processes are deeply embedded (refer to CUSP video^[26]).
7. Legislation may be needed for transit agencies to levy cess or define taxes.
8. VC implementation calls for seamless coordination between multiple participating agencies involved and require a centralized nodal governance model with stakeholder representation and transparent operations.
9. FSI sales or Premium FAR sale are popularly used across many cities. These however need to be regulated between civic agencies as the additional FAR means there is a need for additional civic infrastructure like fire stations, police stations, water and power requirements and street lights.
10. Many sources of VC are still untapped in India — levies like vacant land charges, betterment levy, cess on new development, cess on fuel, parking taxes, congestion charges, auction based motor vehicle registration, quota systems.
11. If applied strategically the VC can be transformed as a potential financing mechanism, but risks and challenges involved in each project should be carefully analyzed and addressed upfront from the planning stage itself. A clearly defined risk mitigation plan should be prepared upfront to ensure effective implementation. Such risks include unpredictable volatile real-estate market, gentrification, zoning regulations, political interference, forward looking leadership and unwillingness to pay by stakeholders, long gestation periods and revenue deficit, to name a few challenges.
12. Accountability and collaborative institutional setup for the fund management and transparency in allocations and fund administration are also a key for VC success.

Overall, the VC practices in Indian cities are still at a nascent stage and are evolving. They are indeed looking for guidance, capabilities and a framework to adopt VC approaches and strategies.

6. Conclusion

Emerging transit cities if planned strategically with participatory VC based approaches can not only maximize their revenue potentials but can offer a tremendous opportunity to promote a sustainable development along the corridor. Smolka^[27] highlighted that practicing successful implementation demands political resolution between local government and state government leaders, a fluid dialogue among fiscal, plan-

ning, and judicial entities and management skills to deal with many complex factors and diverse stakeholders. The key conclusion from various VC best practices is that there is a huge potential that exists for a VC based funding opportunity in India and other emerging nations and cities. If it can be tapped with a strategic approach from the planning to implementation, the cities involved will have significant development benefits. The stakeholders, the beneficiary community and taxpayer community participation and involvement in structuring VC from planning to execution stages, is also crucial to VC success. However, if private sector funding is to be sought directly through land development opportunities it will be essential to involve private sector bids at an early stage to enable the best redevelopment options to be targeted. The way forward of the research is to develop a VC framework for the emerging transit cities, which offers a step-by-step guidance to help define the VC based urban rail transit funding and financing processes from VC planning to VC operations.

A combination of private and public capital, involving both active and passive VC mechanisms, may work as the best approach in providing the highest potential value proposition.

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