

e) Transit Oriented Development

Mark Bachels* and Peter Newman**

1. Introduction

Transit Oriented Development (TOD) is a policy process that links land use to transit in order to make the most of the transit system. It is a major policy to reduce car dependence. Transit oriented developments (TODs) are the result of this policy; they generally have higher densities for residential and commercial activity, provide very pedestrian friendly environments and are closely connected to a quality public transport station. Parking is less available and is managed to reduce its negative impacts, and walking, cycling and transit use are encouraged. TODs are intended not only to bring about high quality community development, but also to be part of overall growth strategies along corridors or for entire metropolitan areas, strategies to decrease urban sprawl as well as car dependence.

This linking of land use planning to make use of the benefits of transit corridors and transit centres, is now a major policy in the developed world. Many cities in the developing world are already transit oriented, with major corridors carrying immense numbers of people, surrounded by much denser mixed-use localities, less car dependence and less restrictive planning codes than cities in the developed world. And developing world cities the world over are increasingly following the lead of cities such as Bogotá and Curitiba and accentuating these trends in their recent planning, with higher density development along transit routes, and a range of other measures to favour low carbon transport planning.

This section will outline some case studies of TOD. It will also outline a new approach that takes advantage of the land value increases that accompany good quality transit. If these increases can be captured and used as a means of financing and assisting the building of the transit system, then this can be called Development Assisted Transit (DAT) – see Box 3.1. There are emerging examples of this across the world, though Hong Kong and Tokyo have been practising it for many years.

Box 3.1 TOD language?

There are many words to describe what is going on around stations. The term ‘Transit Adjacent Development’ (TAD) merely associates transit with land use, and is not worthy of further consideration. The new term ‘Development Assisted Transit’ (DAT) describes the process whereby land developers fund all or part of the cost of the transit service integrated into the TOD, in return for which they earn extra income from the enhanced value of the properties there, given their closeness to transit. The term provides a better understanding of how land development can actually help build transit, rather than transit simply enhancing the land development (which is all that is implied in the TOD concept). Others have called DAT ‘Joint Development’ (see note 1) but this is not specific enough. The idea of value capture lies behind the concept of DAT but is also used for any infrastructure or amenity improvement. TOD and DAT both result in TODs being built next to transit.

* National PlaceMaking Executive, Environment and Planning, Parsons Brinckerhoff.

** John Curtin Distinguished Professor of Sustainability, Curtin University Sustainability Policy (CUSP) Institute, Perth, Western Australia.

Cities across the developing world are emerging with their own models of this kind of DAT as they address the need to provide expensive transit systems while accommodating powerful forces of development. While relatively new in most cities, DAT is a strategy that can be adopted the world over, which is why it is described here. It provides a way in which finance can be obtained not only for the transit services, but also for walking and cycling facilities, for parks and even low income housing close to stations, as transit providers and housing providers have a mutual interest. It therefore lends itself to Public Private Partnerships. In cities with limited public budgets to fund transit services, improvements to footpaths and public spaces and the like, such a method of financing has big advantages. In fact, schemes for DATs may be easier to implement in many developing world cities, because they will not be challenging accepted financing, planning and transport procedures and regulations to the extent that they do in the developed world.

The case studies of TOD are taken from Delhi and several cities in the USA, whilst the case studies of DAT are taken from Hong Kong, Christchurch (NZ), Portland and Bangalore.

TODs can generate both negative and positive ‘externalities’ for those living and working in the broader locality. They invariably raise the value of property in the area generally which is positive for land owners but hard on renters who may be pushed out due to the inability to pay higher rents that flow from higher property values. So it is important that governments take measures to ensure that some of the housing associated with the development is low income, and that a proportion of housing in the broader locality remains affordable for those on low incomes. On the positive side, local residents and workers can take advantage of the transit services, walking and cycling facilities, parks, employment opportunities, reduced pollution and noise, and more attractive environments that the TODs have generated and financed (wholly or partly).

Thus, in short, Transit Oriented Developments are well-designed, higher density, mixed-use precincts or areas of development which include public transport stations.¹ They feature jobs and residential buildings within five to ten minutes walk distance of a transit station or stop, and the best examples generate a sense of place for the community that lives, works and plays there. Development Assisted Transit achieves the same result as TOD but uses the potential leverage of the transit to raise finance from the building of the area around the planned transit. Thus, high-quality TOD communities deliver increases in walking, cycling and public transport, and reduce private vehicle use.² They also mean less drain on limited government and city budgets.

2. Benefits of Transit Oriented Development

Economic benefits

TODs reduce the cost of living. By clustering a mix of uses within walking distance of stations, development can lessen reliance on cars and other private vehicles. This can significantly reduce living costs for those individuals and families who might otherwise outlay a large proportion of their income on buying and running a vehicle, and can allow this money to be freed up to meet other household needs. One assessment of the household economics of TODs found that TOD residents use cars about 50% less and save around 20% on household income as they need one less car per household.³ In denser and less car-dependent developing world localities, the need for TOD residents to have a private vehicle is likely to be even less.

TODs can be, in part, self-funding via value capture mechanisms. Governments, businesses and home buyers all recognise that an address near a transit station is a good one, and the value of such

property rises accordingly. If the land is zoned for higher-density residential use or mixed use the value can be even higher. The process by which government helps to generate these rising property values and then reaps financial rewards is commonly known as ‘value capture.’ And this can be used to help finance not only the development of mass transit through DATs but also special community services or social housing due to the extra value in the land provided by the transit.

Redevelopment of land around stations is economically beneficial over new fringe development.

The evidence that urban sprawl is economically costly in terms of infrastructure, transport, greenhouse and health has been reviewed globally and applied to the Australian situation comparing TOD type redevelopment to urban fringe development.⁴ Productivity gains in the economy of 6% were estimated simply due to the extra walking done by those in the TOD compared to urban fringe development. As a result of this kind of evidence TODs are happening in highly car-dependent cities like those of Australia and the US,⁵ and they can also help to prevent car-dependence becoming a problem in developing countries as they grow economically.⁶ Planners have been concerned to reduce car-dependence in ‘greenfield’ (new) developments (as discussed in ‘new urbanism’ literature) but the evidence of success is not good.⁷ However, the evidence that TODs reduce car-dependence and improve alternative transport use is much better.⁸

The economic evidence that DATs can assist the building of transit systems is found in the growing number of cities that are using land development to help finance their quality transit systems.⁹

Social benefits

TODs deliver travel choice and convenience. The proximity of transit infrastructure and services to homes, jobs, shops, schools, universities, other daily activities and special events makes everyday travel easier and faster. A variety of transport forms are available, and because more people and activities are clustered around stations, people are more likely to use transit services. It thus becomes economical to provide such services more frequently, and this in turn makes them even more convenient for users.

TODs promote healthy lifestyles. TOD planning gives special emphasis to walking and biking. Active travel is a key factor in achieving a sustainable and healthy community. In some TODs, approximately one-third of trips are made on foot, which has significant positive impacts toward improving community health and reducing obesity.

TODs save on unnecessary travel. As TODs are high-density, mixed-use developments, more destinations are within easy walking distance, whether they involve going to work, shopping, accessing services or recreational facilities, or mixing with family and friends. As Sam Adams, Mayor of Portland, Oregon, put it, success is ‘the trip not taken’.¹⁰

TODs benefit those who cannot or choose not to drive. By creating a network of connected centres, more travel options and destinations are accessible to a broader cross-section of the population. Recent research shows that TOD residents in the United States are half as likely to own a car as the general population is.

TODs create more vibrant neighbourhoods. TOD neighbourhoods accommodate a broader mix of uses and lifestyles, and a variety of family forms and sizes, including single people, couples without children, nuclear families and extended families. TODs can thus create a diverse and vibrant urban village community.

Environmental benefits

TODs make more efficient use of land. Their denser and more mixed-use development pattern results in a broader range of land uses within convenient walking distance, making it quicker to reach destinations by non-mechanised transport and thereby reducing a person's overall transport. This reduces the need for cars and frees up land currently dedicated to moving and parking cars. In fact, TODs often limit car-parking spaces, which frees up funds and land for other purposes.¹¹

TODs create a green dividend. By using space more efficiently and reducing car dependence, TODs also reduce fuel consumption, air pollution and transport-related greenhouse gas emissions.¹²

TODs and associated urban infill development relieve pressure on the urban fringes. The use of infill, mixed use of land and increased densities contribute to urban renewal and significantly relieve pressures to build on the urban fringes. Thus more land on the fringes can be retained for purposes such as food-growing.

3. Greenhouse gas emissions reduction potential

TODs have been shown to reduce travel by at least half compared to average urban development. An Australian study found that residents of TODs each generated on average 4 tonnes of greenhouse gas from their daily travel, or 2.5 tonnes in well-located TODs, compared with 8.4 tonnes in standard fringe development.¹³

4. TODS and their implementation in more detail

The defining features of a Transit Oriented Development are:¹⁴

- a mix of uses, horizontally or vertically
- a high level of activity for around eighteen hours of the day
- compact, pedestrian-oriented design
- moderate to higher density development, especially near transit
- limited parking
- a range of other green features

As well as this, they often demonstrate:

- a sense of vitality
- a commitment to innovation, flexibility, and the removal of barriers to development
- evidence of leadership and community vision
- responsiveness to market supply and demand

These defining features of Transit Oriented Development can be described in more detail as follows:¹⁵

A mix of uses

Creating a mix of land uses provides diversity and variety, helps to define the centre and creates an active eighteen-hour-a-day environment.

The diversity in land uses enables people to take care of the majority of their needs within a short walking distance. The mix of uses can be either vertical, on different floors of the same building, or horizontal, located next to each other in the same or separate buildings.

The key is to locate the various uses close together, make them easily accessible and supportive of each other.

For example, in Dallas, Texas, the Mockingbird Station is a 4-hectare, mixed-use TOD that features a movie theatre, 211 loft apartments, retail, a planned new hotel, offices and restaurants.¹⁶

Fruitvale Transit Village is another example of this mix of uses. It includes a childcare facility, health care facility, senior centre, library and community resource centre, as well as affordable family and senior housing, retail and office space, and a pedestrian plaza. It is also an example of a centre designed by and for the neighbourhood surrounding the station. Located in a low income neighbourhood, the residents, along with the Unity Council (a non-profit community development organisation), began developing the Transit Village Plan to link the local economy to transit, thereby increasing pedestrian and bicycle traffic and revitalising the neighbourhood. Connected directly to the BART Transit Station, this mixed-use TOD provides a sense of arrival and was a catalyst for the economic and social transformation of the community. The village covers about 10 hectares and has over 400 employees and 200 housing units. The village station was designed to serve 15,500 passenger trips daily.

Figure 3.20 Fruitvale Transit Village, Oakland, California



Picture Credit : Parsons Brinckerhoff.

An active, eighteen-hour place

A mix of employment, residential and recreational land uses within the TOD or easily accessible from it means that the numbers of people using the transit system are much more even throughout the day, evening and weekends, and involve a more even number of passengers in both directions. This is a much more efficient use of transit than a pattern of high usage in one direction at weekday peak commuting times, and much less use at other times.¹⁷

Pedestrian-oriented design

Within a TOD, non-car trips increase when a mix of uses is easily accessible and arranged in a way that enables safe and pleasant travel on foot rather than by car. In Portland, Oregon, research found that residents of TODs were twice as likely to choose to walk for non-work trips as residents of the general region.¹⁸

Creating a good pedestrian environment requires attention to the scale and attractiveness of spaces. As one design study on TODs put it, ‘most people do not feel comfortable walking in a wide-open area with busy traffic passing close by. Pedestrians are drawn to streets and paths with a feeling of intimacy and enclosure’.¹⁹

‘This feeling can be created by locating buildings close to the sidewalk, by lining the street with trees, and by buffering the sidewalk with planting strips or parked cars. People on foot enjoy small details, such as displays in shop windows, street level lighting and signs, and public art and displays.’

Figure 3.21 Pioneer Place in Portland, Oregon, incorporates the transit station directly into the design of this 10,000 square metre mixed use TOD in the heart of downtown Portland



Picture Credit: Parsons Brinckerhoff.

Moderate to higher density development near transit

Residences or workplaces near transit stations provide a ready demand for transit trips, and higher densities further strengthen this demand.

TODs should have higher densities than surrounding areas, and, within TODs, densities should be highest nearest transit. Experience indicates that 15 to 17 dwelling units per hectare will support a bus line and 20 to 60 dwelling units per hectare will support a rail line. When the density increases to over 123 dwelling units per hectare, the number of car and non-car trips are equal. From US based research, the general rule is that a 10 percent increase in density equates to a five percent increase in transit trips. Although the figures may be different for developing world cities, the trend will be the same: in higher density areas transit will have more passengers and will be more affordable, both to run and to ride on.

Limited parking

Parking is one of the most challenging aspects of any TOD. In developed cities, typical suburban commercial or shopping development, with 50 to 75 percent of the site devoted to surface parking, results in land use densities that are too low to support transit services. But by limiting the parking supply (and moving parking from surface parking lots to on-street parking or parking structures) not only can this low density land use be improved, but also residents, shoppers and employees will be encouraged to walk within the TOD and to use transit to get to the TOD.

Figure 3.22 The Embarcadero line in San Francisco is part of a TOD design that has moderate to high densities, a mix of uses, development at a pedestrian scale, and the creation of a defined centre and civic spaces.



Picture Credit: Parsons Brinckerhoff.

There needs to be sufficient parking to meet car needs that cannot be satisfied by transit. Shared parking between people using the TOD for different purposes can reduce the need for parking by up to 25 percent when compared with conventional ratios, depending on the mix of uses.

Parking facilities should be located so that buildings, not parked cars, are the dominant visual feature. The design of the parking needs to relate to the streetscape, circulation routes and pedestrians, and to be integrated into the development. The City of Reston, Virginia, when adjusting its codes and design guidelines to support mix-use development, changed its parking standards and ratios, to discourage personal vehicle use, and to require carparks to be well-designed and concealed.²⁰

Other green features

As we have seen, TODs contribute to increased urban density, and encouraging people to travel less or use forms of transport that produce low (or no) greenhouse gas emissions. But they can reduce emissions further and generate other environmental benefits through a range of other features. These include energy-efficient building designs and appliances, smart grids and smart metering, on-site renewable power generation, water-saving appliances and gardens, water recycling, and the use of planting – including on walls and roofs – to ‘air-condition’ buildings.²¹

Some points about implementation of TODS

To ensure success in the delivery of TODs, the following need to be attended to:²²

Town planning schemes need to be supportive and to be adapted to reduce car-dependence. In the developed world, TODs are often ‘illegal’, in the sense of not being consistent with planning legislation, with town planning scheme codes and with traffic engineering standards. These codes have been devised to build suburbs and shopping areas on the assumption of car dependence — with each dwelling or building serviced by car use alone — and the codes often also specify low densities and single use zoning. The picture can be mixed in developing world cities, but in general they tend to allow higher density building development and more mixed land uses, and they tend not to require so much car parking, if any at all. (This is discussed more fully below.)

Contracting arrangements need to ensure proper integration between all aspects of the TOD and cooperation between government and private parties involved. The power of TODs lies in the fact that government and the private sector can work closely together to build both the TOD and the transit system, and revenue raised within TODs can help to pay for the transit system. This close synergy is being demonstrated today in many cities around the world. It requires equity arrangements to enable private funding to occur, and contractual arrangements to ensure necessary cooperation between transit operators, land developers, financiers and different levels and departments of government.

Communities need to be engaged. The community may not be happy about car dependence and may like the idea of TODs, but at the same time they may not support a TOD nearby, a phenomenon sometimes referred to as the NIMBY (‘Not In My Back Yard’) syndrome. They may fear that the increased density and urban activity will lead to traffic congestion, loss of amenity, increased crime and noise, and reduced real estate values, rather than seeing the opportunity to be part of a village and an exciting, visually appealing city-building process. Engaging the community early in the planning process enables key concerns to be resolved, and improvements suggested by the community can then be incorporated in the TOD project.

Land assembly in station precincts needs to be made easier, and facilitated. A major challenge, when seeking to ensure the commercial viability of private sector involvement in a TOD, particularly in existing urban areas, is that of ensuring that the private developer can assemble disparate parcels of land to achieve a development close to transit that is of sufficient size. There need to be incentives, either in planning codes or financial development incentives, to encourage land amalgamation around station precincts. This can also be facilitated by government working in collaboration with the private sector.²³

It is critical that there is governance across agencies in delivering TODS. Councils, government agencies and funding authorities need to work closely together to ensure accountable and responsive governance of TODs. On the government side, these cooperative arrangements normally involve public transit agencies, planning agencies and transport or traffic agencies.

The specifics of TOD implementation in developing countries

The major difference between developed and developing country cities when it comes to TODs is that in the latter most land use is already dense and mixed. The main task is therefore to build the transit system and to ensure it is adequately linked into the land use through good pedestrian connections and good networks of buses and auto-rickshaws. When this happens the dense, mixed areas will often regenerate and create further development options.

One of the significant advantages of the new Metro in Delhi is that it has been used to regenerate old parts of the city and also helped to focus and build new centres more effectively. The Metro consists of 6 lines with 161 km of service and 135 stations and significant regeneration and development are observable at each station. The first line opened in 2002 but recent lines have linked the central area of Old Delhi into the network as well as linking it to the new city of Gurgaon near the airport. Both were failing as transport access to them was poor. Old Delhi had been emptying out as the cramped streets became less accessible. Cars and auto-rickshaws just did not fit in, so shopkeepers were moving to more accessible places. The City was dying. With the coming of the Metro the area's fortunes have reversed. The underground station now sees shoppers pouring out of the station at all hours and shopkeepers and residents have returned to their closed and once-forgotten buildings.

At the other end of the Delhi Metro the new centre of Gurgaon had been struggling as traffic had rapidly filled the new streets and the buses were not competing adequately. Once the Metro went through to Gurgaon the residents and workers had a quality option linking them rapidly to the whole city. The result has been a dramatic interest in further development around the Metro station.

Delhi Metro shows that when quality transit is built into a developing city it can help focus and regenerate urban areas in the same way that TODs have been seen to operate in the developed world. As passenger numbers for the Delhi Metro are considerably more than numbers for most developed city rail systems, the resulting income from fares helps justify the investment in a short period of time.

Town planning regulations in the developing world vary greatly when it comes to issues like maximum densities, mixed use zoning, and required parking provision for new developments. For example, in Bangkok regulations are quite loose, thus allowing high density developments near transit stations. In India, on the other hand, they are stricter, and often prescribe unnecessarily low densities (although still higher than most developed country densities); this has been amended in areas close to Delhi Metro stations. In many parts of the developing world, following the trend in car-dependent developed cities, there are now minimum parking provisions in new developments which will encourage higher car use and undermine

Figure 3.23 Chawri Bazar Metro Station amidst very dense urban development



Picture Credit: Saurabh Gupta.

successful future TODs, for example, in Malaysia, Philippines, Indonesia, Thailand, and increasingly across South Asia. Such requirements are more modest in China and Vietnam.

If developed world style regulations that reduce densities, forbid mixed land use and encourage more car traffic are already in place in developing world cities, a first step may be to have special provisions for TODs. If done well, this will serve to demonstrate the potential benefits of such provisions over a wider area. But it is important to get it right. In Curitiba, for example, most of the high-rise residences near Bus Rapid Transit stations are occupied by wealthy people who drive cars. Increasing restrictions on parking spaces and requiring the provision of some low-income housing would reduce this problem. This issue of the effect of town planning regulations on car use and urban densities is also dealt with in other sections of this chapter.

Some examples of Development Assisted Transit

DATs are appearing in many cities: the new Copenhagen Metro was built entirely out of land development funds; the Aguas Claras development in Brasilia financed the Brasilia-Samambaia underground Metro; the redevelopment of central Tokyo station is being funded out of land development around the station; and in Istanbul land development has funded a number of transit system improvements.²⁴

The Hong Kong Mass Transit system was built using DAT principles. The Mass Transit Railway (MTR) Corporation in Hong Kong used the experience of the rail builders in Tokyo to acquire land around each station that was to be part of their planned MTR system. Then they became the developer and were able

Figure 3.24 Kowloon Station, Hong Kong

Picture Credit: Parsons Brinckerhoff.

to leverage considerable financial benefit from the land development venture, and these funds were then ploughed back into the MTR. The train system now makes more money from land than from fares. In 2009 they made a net profit of HK\$7.3b and out of this the MTR made HK\$3.55b from property and HK\$2.12b from rail operations.

Kowloon Station is considered the flagship of mixed land use development for the Mass Transit Railway (MTR) Corporation in Hong Kong. The station is owned and operated by the MTR and involved four joint ventures to develop 16 residential towers, a commercial building and a hotel over and around a multimodal transit hub. In all, the development provides housing for over 58,000 families, over 230,000 square metres of office space and a 330-room hotel. The development is built on a massive podium with its roof designed as a park. The podium box houses a shopping complex and the transit hub of the MTR, as well as buses, mini buses and taxis.

The station serves local residents, employees and visitors to Kowloon, as well as providing access to Hong Kong International Airport, via the MTR. It provides in-town check-in service for flights and free shuttle bus services to most major hotels in the urban centres.²⁵

Pearl District DAT

In Portland, Oregon, the Pearl District is a 90-block area that was largely abandoned industrial, warehouse and railway land adjacent to the CBD. The City of Portland wished to make it a model regeneration development with a quality transit system at its base. However it did not wish to pay for the transit system. The not-for-profit business Portland Streetcar Incorporated was set up to manage the building and operation of the system within the Portland TriMet system. Funds were raised from businesses that wanted to be in the Pearl District and that could see the advantages of the light-rail system that was to be built

there. The system has been extremely successful, both at facilitating development and as a transit system. Since the Pearl District regeneration began in 1997 the area has experienced an increase in density directly linked to the presence of the streetcar line. As of 2007, the area had over 2,700 residential units and has seen US\$879 million worth of development since 1997. The Portland area was the first city in the US to demonstrate a reduction in vehicle miles travelled in the past decade while increasing its economic growth. The Pearl District was a major part of that success.²⁶

Christchurch Bus Xchange, Christchurch, New Zealand

It is possible to use DAT principles to assist in the development of part of a transit system, rather than building an entirely new line or system. An example of this is the Christchurch bus exchange which was built as part of a redevelopment of the whole system, in partnership with a developer whose building was able to benefit from the increased numbers of people using the facility he helped build with the City of Christchurch.

In the late 1990s the Canterbury Regional Council and Christchurch City Council established a Public Transport (PT) Advisory Group, made up of approximately 20 members representing key agencies, interest groups, users and non-users. The PT Advisory Group met for a year to establish an overall public transport strategy for Christchurch. Measures identified by the Advisory Group to improve public transport included better integration of land uses, increasing frequency of services, improved transit priority, better ticketing, and new bus interchanges.²⁷

The Christchurch Bus Xchange involved successful public engagement, and governance by multiple agencies and the developer, to produce a modern bus station. The bus Xchange is integrated with two floors of retail, a new primary school, an over-street bridge built to provide better access between a major department store and the main street, and short-term car parking built to support the increased retail activity. The entire development and Bus Xchange was encased behind and within a heritage building. The project also required significant investment in smart-card ticketing and real-time information systems, which galvanised system-wide major investments. Since completion of the Bus Xchange development (and a number of other projects) patronage has more than doubled throughout the system.

The Bus Xchange set new standards for the quality of public transport passenger facilities, particularly the off-street waiting lounges, which have carpeting and air-conditioning, are separated from buses by sliding glass doors, and are supported by real-time passenger information. The Xchange also has numerous direct connections to surrounding retail areas. As a result of these qualities, the Bus Xchange has since its opening been the subject of international interest. The developer was also able to gain considerably from the extra numbers using the rest of his building.

A similar experience has occurred in Bangalore where the new Metro is being built. The involvement of private developers at some stations has been used to assist with the building of some quality stations in exchange for the right to direct pedestrian traffic from the Metro through their developments. Based on this idea a proposal to regenerate the Bangalore commuter rail system through land development around stations has been proposed.²⁸

5. Costs and sources of funds

TODs and DATs do not cost more; they just need an appropriate planning framework to enable them to occur. Trubka and colleagues found that in Australia TODs saved A\$85,000 per dwelling in infrastructure costs compared to new greensfields development, and over 50 years will save A\$250,000 in transport

Figure 3.25 Christchurch Bus Xchange

Picture Credit: Parsons Brinckerhoff.

costs per household, as well health savings and a productivity gain of 6% due to increased walking.²⁹ DATs can enable transit systems to be built that otherwise would just be dreams.

6. Conclusion

Transit Oriented Developments are a model for contemporary urban planning, with their higher densities, mixed land use, closeness to transit, walkable streets and restricted parking. In the developed world, they have demonstrated a very different way of living in cities, a way that is attractive, convenient and low-carbon. Developing cities tend to already have higher densities, mixed use and low levels of car use, but there will be other features of TODs described in this section that can be applied in order to improve urban life.

Development Assisted Transit is a step forward in developing TODs through new partnerships between land developers and transit operators – partnerships that provide hitherto difficult-to-source finance for these projects. By helping to meet the costs of transit through the sale of property, cities with limited budgets can develop transit services and achieve a more sustainable built environment at the same time. Examples of DATs are appearing in the developed and developing world.

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