

TIFs, BIDs, and PRT:

Applicability of Tax Increment Financing or Business Improvement Districts to Building Personal Rapid Transit

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ABSTRACT

Proponents of personal rapid transit systems often claim these systems can pay for themselves once installed. However, acquiring the initial capital to build such a system has proven impossible to date. This paper explores whether tax increment financing or business improvement districts might be able to provide a reliable cash flow to a personal rapid transit development project. The paper finds that both BIDs and TIFs can, under some circumstances, provide sufficient funding in order to make such a project happen.

1 OVERVIEW

1.1 Purpose

Personal rapid transit (PRT) is a technology with tremendous promise. It offers a cheaper, more effective way of servicing urban mobility needs. As an unproven technology, however, PRT is a difficult investment, and a nearly impossible investment for risk averse government agencies.

This paper furthers work that investigates whether PRT can be built and operated profitably by the private sector. Previous works have examined whether PRT can be self-sufficient as a standalone company, paying for itself solely from the farebox revenue charged each passenger. Like these works, we accept that it is unlikely that the government will fund a PRT system. Rather than assume it must, therefore, be funded fully by the private sector, we use this paper to examine other roles the public sector can play in a private sector project.

Specifically, we examine two options – tax increment financing and business improvement districts. Each can be considered a public/private partnership, with tax increment financing more focused on the public sector and business improvement more focused on the private sector. Each offers different advantages and disadvantages, and this paper seeks to answer whether either of these would be an appropriate funding source for an initial PRT system.

1.2 What is PRT?

Personal rapid transit is a new type of automated people mover that offers greater flexibility at lower cost. While many proponents advocate city-wide or even metro-wide PRT systems, this analysis is only concerned with the role of PRT systems in serving as a local circulator.

As a circulator, PRT offers several advantages. First, it is low cost. Manufacturers have focused on keeping costs low in their designs. Guideway construction costs are expected to be around \$8 million per mile, with a full system costing roughly \$15 million per mile. This compares favorably to installed costs of \$20 to \$40 million per mile for most automated people movers.

These low costs are achieved by making the people mover much smaller than previous models.



Figure 1: Courtesy Skyloop

Instead of large vehicles traveling along a set path at periodic intervals, PRT systems have small vehicles that are constantly available to move people. Consequently, with smaller vehicles, the size of the guideway can be reduced to the point where steel is a viable alternative to concrete. Steel guideways then reduce costs by being built offsite in assembly lines, and the construction on-site will be measured in days, not months or years like most systems. In addition, the smaller guideway (see figure 1) can sit on a simple metal pole or attach to a building, and it does not require large swaths of expensive land.

Businesses are often concerned with the idea of an overhead guideway in their area. Elevated structures conjure up images of giant rail systems that block out the sun. If you notice, though, modern PRT systems are very small. Aesthetically, the metal skin can be made to blend with the downtown surroundings. Lights and signage can all be incorporated into the design, yielding a consistent, modern look to the business district.

Almost an accidental by-product of the quest to reduce cost is the incredibly functionality of a PRT system. It eliminates the paradigm of large vehicles occasionally passing by each station, and replaces it with a swarm of small vehicles. This means that passengers rarely have to wait for a vehicle; they just show up and most of the time an empty vehicle will be waiting for them.

In addition, with small vehicles it is not possible to stop at every station along the way, picking up and dropping off a few passengers at a time. Instead, it is more efficient for a passenger to get a private trip non-stop to her destination.

With no more scheduled service along a given path, the vehicles are free to roam across a network of rails that can be as big as necessary, whether a small figure “8” circulator or an entire metropolitan area. Each vehicle knows its passenger’s destination and goes straight to that stop, never stopping along the way.

The end result is a trip that is almost ideal from the rider’s point of view:

- No waiting – most of the time you can get in and go immediately
- Private service – the vehicle is just for you and a couple of friends; no strangers on board
- Non-stop service – no stops along the way
- High speed – operating continuously at 35 mph, the system is much faster than autos who have to deal with traffic lights and stop signs
- Convenient stations – because each station is located on a siding off of the main line, stops are not at a distant curb. Stops can be built inside of or adjacent to existing buildings.

(See figure 2.)



Figure 2: PRT vehicles are shown opening directly into the building which is their destination. At left, vehicles pull inside a hotel. At right, vehicles pull up directly into a large convention center. Vehicles going to other destinations continue on the mainline without stopping. L courtesy Skyloop, R courtesy Taxi 2000.

1.3 What is TIF?

Tax increment financing is a way of capturing the added value of a real estate project and using these funds to help pay for the improvements that enable the project to come to fruition.

For example, a given real estate project is expected to generate \$100,000 per year in new taxes, but the developer is unwilling to undertake this project unless the city makes \$1 million in infrastructure improvements. Note that the \$100,000 in taxes is not exclusive to the city, but would be divided between all property tax collectors – potentially the city, county, school districts, hospital districts, etc. Tax increment financing allows the collection of all \$100,000 per year into a special fund. The presence of a reliable income source allows the city to issue a bond against this revenue, and the bond can be used to make the necessary infrastructure improvements. Once the bond is paid off, the \$100,000 is no longer set aside, and it is shared among all jurisdictions in the normal fashion.

The procedure for establishing a TIF district varies, but in general starts with a government agency suggesting its creation. The agency would suggest boundaries, measure support among the private sector, and attempt to ascertain the feasibility of the proposed project. In many states, the area would need to be designated as blighted or as an economic development area. State laws vary greatly in what it takes to receive one of these designations. Next, the TIF plan is drafted and debated publicly. At this point, opposition from tax districts within the TIF will be most keenly felt. If approved, the TIF can be put into place almost immediately, with bonds issued in order to generate up front capital for the development project.

Tax increment financing (TIF) was first instituted in California in 1952. It gained popularity in the 1970s, at a time when an economic recession forced cities and states to become more creative in their search for development funds [1]. At the time of Klemanski's 1989 study, 29 states were found to be using TIF funding. By 2001, 48 states had legalized TIFs.¹ [2]

On the spectrum from public sector to private sector initiatives, tax increment financing is more of a public sector contribution. TIF funding does not cost the private sector any additional money. Instead, tax jurisdictions give up some future revenue in the near term in order to capture gains in the long run. Typically, in conjunction with the public sector improvements, the private sector matches with a six-fold multiple in development expenditures.

TIFs are still somewhat controversial. In principle, funds paid to a TIF district aren't missed by the tax jurisdictions that would have normally received them, because the increase in the tax base would not have happened otherwise. However, certain taxing authorities, particularly school districts, argue that while they might not have had the revenue were it not for the TIF development, they also would have had fewer pupils and therefore fewer costs. The TIF district, therefore, adds demand for social services but does not pass along incremental revenues to pay for these services. In some states, deliberate measures have been taken to ensure that TIFs do not interfere with school funding. In others, though, the establishment of a TIF district is further complicated by in-fighting between affected tax authorities.

¹ Because of legal challenges to TIF-enabling legislation in West Virginia and Arizona, reports of the number of states with TIF programs vary from 46 to 48.

1.4 What is a BID?

A business improvement district is a legal entity, usually a non-profit corporation, that allows local property owners to contribute to a fund that performs functions intended to raise the value of the property. To avoid free rider problems, the “contributions” are legally binding, most often as surcharges on the property tax.

The property-based business improvement district, or PBID, is the most common type, although sales tax BIDs are another option. Some states offer similar entities that go by other names, such as the municipal management districts of Texas. These districts can have much more creative funding schemes. For instance, the Arlington Entertainment Area Management District assesses only hotels in the district, and the rate is 90 cents per occupied room night [3]. Much of the analysis that follows is appropriate for any type of entity. Financial calculations were done solely for PBIDs.

Activities of a BID are most often service oriented. Typical efforts include street cleaning, security, and public awareness campaigns. Capital projects, when attempted, are usually limited to small scale improvements to landscaping or curbs. No examples could be found of BIDs funding large infrastructure projects.

The first BID to be paid for by assessments against local properties was founded in 1974 in New Orleans, Louisiana [4]. Since then, states have followed a wide variety of paths in determining the structure and rights of BIDs. Some states, such as Colorado, give powers to a BID rivaling those of a city government, while New Jersey does not even allow BIDs to issue bonds.

In the spectrum of public to private investment, BIDs are strongly on the private side. Businesses voluntarily choose to increase the levy on themselves. The public sector is responsible for creating and overseeing these districts, and in some areas the public sector will collect the revenue. Other public sector involvement is usually limited. In fact, there are some fears that initiatives like this by the private sector will further limit the government’s expenditures on similar items such as street cleaning and police patrols.

2 APPRAISING TIF USEFULNESS

TIF districts have clearly been popular tools to spur urban redevelopment. But funding urban transit infrastructure is not one of their primary uses. This section address two important questions. First, can TIFs be applied in this way? Second, would it be effective?

2.1 Structural Issues

2.1.1 Legal Concerns

One concern is whether it is even legal to use TIF funds for the development of an urban transit system. The laws regarding TIFs vary from state to state and they change regularly, so it will be impossible to make blanket statements with complete certainty.

Johnson and Man were used as the most thorough source of information regarding legal provisions of TIFs in various states [2]. Neither Johnson and Man nor a review of other literature revealed any conflicts regarding the application of TIFs to funding PRT systems. However, several areas of concern emerged.

First, TIFs are usually envisioned to apply to “blighted” areas only. Although the strict definition varies, common parlance suggests this would be an area performing poorly by economic standards, with land values noticeably lower than the norm for the community. PRT systems are often envisioned to be placed in areas where high property values make the use of land for parking very expensive. Thus, these two generalities make TIFs and PRT seem incompatible.

However, this need not be the case. Only four states require a finding of blight based on quantifiable measures. Twenty states do not require blight at all, even by subjective standards. [2] Even among those requiring blight, experts find the term to be extremely flexible. Lawrence M. Friedman, Professor of Law at Stanford University, cynically noted, “Finding blight merely means defining a neighborhood that ... is well-located for some important interest’s wish to build.” [5]

Numerous examples exist of TIFs being applied to areas of apparent affluence. In Pittsburgh, TIF projects were developed on property worth \$279,000 per acre, compared to an average value of \$17,789 for most blighted property [6]. In the Dallas/Fort Worth metroplex, the community of Las Colinas – a posh planned development home to 30 companies from the Fortune 500 – has created a TIF district. Blight is clearly not a necessity.



Figure 3: Las Colinas, Texas. Example of a non-blighted TIF district.

A large potential obstacle lies in the form of the process used to enact TIF development plans. In most states, there are provisions requiring these plans to be in conformance with existing growth plans. However, personal rapid transit systems are not a part of any city’s plans today. The creation of a TIF district for the purpose of assisting the construction of a PRT system would likely entail making changes to the region’s long-term plans. Eventually, this may be easy, but if such a development is proposed before PRT systems are proven, the need to satisfy municipal planners could complicate and possibly delay a project.

2.1.2 Bonding

Of course, creating a TIF district is only the first step. A necessary subsequent step for using TIFs to fund PRT is to issue bonds based on the proceeds. The vast majority of states, but not all, allow the issuance of bonds against TIF revenues. Bonds of this type are not new to the

financial markets, with over \$10 billion in TIF-backed bonds being sold from 1990 to 1995 [2]. Generally, these bonds were tax-free, but a significant portion of them is issued as taxable bonds.

In funding the construction of a PRT system, it will ultimately be the public bond market that decides whether the project has an acceptable risk/reward ratio. Since most TIF bonds are unsecured by anything other than revenue from the TIF, the market must judge whether a PRT system will be effective at raising property values by solving congestion, land use and mobility problems.

While bonds have never been issued for a PRT project, the bond markets have evaluated projects with enough similarities to provide a framework for judging the viability of such a project. In Las Colinas, the TIF will be providing matching funds to construction costs related to the extension of light rail from Dallas, connecting the people mover that operates within Las Colinas to the new light rail station nearby. The markets are satisfied with the risk/reward ratio offered by this development.

Similarly, the bond markets are comfortable with the financing of toll roads, and they have developed sophisticated models to determine whether the charges incurred by users of that transport system will be sufficient to pay the capital and operating costs of the project. In fact, due to their steady income stream and ever-worsening congestion problems, such fee-per-use systems are very attractive to investors [7].

A critic may find toll roads to be a poor choice of comparison, since their history is much better understood. In that case, reference should be made to the Las Vegas Monorail project, the first recent transit system to be paid for privately with bonds against future revenues. Its projected cost was fully financed by \$650 million in bonds issued in public markets.² Here, the market had to judge whether ridership and farebox estimates for this automated system were accurately projected, and whether the construction and operating costs were accurately predicted. The fact that these bonds were AAA rated [8] and oversubscribed at issuance is a sign that the market did feel it could accurately and safely predict the risks.

In conclusion, the creation of TIF districts and the issuance of bonds against the future revenue will certainly cross new territory for the first government entity to go through the process. However, there are no obvious obstacles to the process, from the moment of inception through the issuance of the bonds.

2.1.3 Size

While it seems *possible* to use a TIF district to fund transit infrastructure, most TIFs are small. This presents two obstacles. First, they have little need for an automated transit system. Second, an early personal rapid transit system would likely need \$30 million to \$60 million in funding, with debt payments from \$2 million to \$6 million per year. A small TIF district could only pay a small portion of its cost. So it is important to ask whether it is *practical* to expect a TIF district to finance such a large project.

² Local hotels and casinos did contribute \$150 million to the project. This was in the form of second-tier bonds, not as an equity investment or purchase arrangement. These bondholders fully expect to be repaid just as do holders of the first-tier bonds.

Historically, most TIFs are not this large. Frequently, TIF money funds small efforts in small towns. At the other extreme, though, TIFs can be used as an enabler for large-scale projects, from the General Motors Poletown Plant in Detroit to Yerba Buena center in San Francisco [9].

The potential value of a TIF depends on many factors, including the interest rate, tax rates, and baseline assessed values. However, a first approximation can be obtained by estimating that the total project cost must be less than the total incremental change in the value of real estate [10]. Thus, to fund a \$30 million transit system, the system must generate \$30 million in increased assessed value to the tax jurisdictions.

This may be above the median value for TIF districts, but it is certainly well within the realm of feasibility for certain large TIFs. For instance, Chicago's Central Loop TIF has an assessed value over \$1 billion. The tax increment revenue exceeds \$40 million per year, and allocations from the fund to subsidize development frequently exceed \$5 million [11]. Thus, it is certainly possible that large TIFs have sufficient size, both in terms of area and annual budgets, to fully support a personal rapid transit system. In fact, the 171 densely-developed acres of the Central Loop TIF are the ideal size for a personal rapid transit system.

Many cities evaluate the success of their TIFs based on the amount of private investment they stimulate. Typically, they like to see six dollars in private investment for every one dollar of TIF funding. This paper does not speculate about private sector development that is done to match the TIF funding, but we do believe that where space permits, it is very likely that dense development will be attracted to the land adjacent to the PRT system.

2.2 Services targeted

Conceptually, a primary purpose of TIFs is to make infrastructure improvements. In practice, however, TIFs have found a broader array of uses. In Chicago, direct subsidies to developers are popular. In many cities, especially among smaller districts, TIFs fund streetscape improvements, architectural initiatives (frequently involving signage), and security patrols.

While not highly common, it is not unusual to see TIF funds used for transit. Primarily, though, it is to make improvements to the appearance or accessibility of existing transit stops or stations. Las Colinas was the only example found of a TIF paying significant amounts for the construction of transit infrastructure. There is indirect evidence that, in some areas, TIF funds may have been used to purchase land that was then used for transit stations, but no examples could be identified.

2.3 TIF obstacles

TIFs receive criticism from many sides. Some people dispute the claims that TIF revenue is really revenue that would not otherwise occur. Frequently, critics claim, a TIF district simply changes where development would have occurred, thereby having a negative impact on taxation in other areas. This criticism is frequently coupled with arguments about the distribution of the impact, such as the school example previously described.

Haulk and Montarti point out a range of other complaints. They see an increasing use of TIFs as simple subsidies to developers, and not a tool to fight blight. They find TIF projects being

developed on highly valuable land – land where private development was already clamoring to build. In addition, the TIF projects sometimes create unnecessary competition with established activity, activity that was sending its full tax payments into the general fund. [6]

Collectively, these arguments can reduce public support for the creation of a TIF district, regardless of the merits of the project as viewed in isolation. For instance, a \$157 million redevelopment project in San Antonio, Texas, ground to a halt when the local school district withdrew from the TIF negotiations. The project team responded by offering incentives worth \$28 to \$43 million, but the school district was not persuaded to rejoin. [12]

Thus, despite their popularity, approval of TIF districts is not guaranteed. Investors will face a difficult balancing act in investing in early studies to enable the creation of a TIF district, while not spending too much on actions that could be made moot if the district does not get approved.

TIFs hold some promise of providing conditional funding for a PRT system. That is, the system may expect a certain amount of revenue and a certain subsidy in order to break even. However, the bond market may insist that the TIF be available to provide additional funds if necessary, but it would not be required to make such payments in years where the PRT system was on budget.

To provide this assurance, the TIF should plan on collecting its share of tax revenue every year. Then, in years where this income is more than is for the PRT system, the surplus can be disposed of in four ways. First, it can be used for other initiatives within the district. Second, it can be carried over without being spent, in effect being saved for a rainy day. Third, it can be used to pay off the bonds early. Fourth, the surplus can be returned to the tax jurisdictions that would have normally received that amount of the tax. The latter method would effectively make the TIF a “just in case” funding source, having no effect except in years where the PRT system needed additional subsidy.

2.4 Applicability of TIFs to PRT

In summary, tax increment financing appears to be a potential funding source for a personal rapid transit system. TIF districts are often an appropriate size for building this sort of automated people mover, and TIFs generate sufficient revenue to make such an investment possible. Moreover, both the public sector and the bond market are comfortable with issuing bonds against this sort of revenue stream.

As a public/private partnership, this has great potential. The TIF district self-funds an item that should improve property values and quality of life, and the city gets a free transit system, one that can be expanded in the future to serve additional areas.

3 EVALUATING BID USEFULNESS

Like TIFs, business improvement districts have clearly been popular tools to improve the quality of life in urban areas. But funding urban transit infrastructure is not one of their primary uses. This section address two important questions. First, can BIDs be applied in this way? Second, would they be effective?

3.1 Structural concerns

3.1.1 Legal

A first concern is whether BIDs could be used to fund the development of an urban transit system. Do the charters of BIDs give them the legal right to engage in such activities? Can they bond against their future cash flow in order to obtain funds for capital projects? Does their manner of governance make the procurement of a transit system possible?

The question of legal restrictions seems to settle in favor of BIDs engaging in capital projects. As with TIFs, laws vary state to state, but at least in many states, there are no obvious factors that would preclude their use.

Historically, though BIDs have not been used to build infrastructure, something that has been viewed as the government's role in a public-private partnership. It would be a first to propose that businesses contribute to the funding of their own private transit system. Yet that's precisely what happened when Las Colinas was originally built. A fully private automated people mover was installed between many buildings, and rents reflected the costs incurred. A study of PRT by Tom Richert of Land Eagle Development found that the cost per tenant would be approximately the same as they pay per month for garbage disposal.

It is expected that any city would appreciate the private sector building a transit system, especially one that can be expanded later to serve a larger area. The hard task will be gaining the necessary support among the private sector. Requirements vary by state, but in many cases the BID petition must have support from 51% of the list property owners, support from the owners of 51% of the property by value, and 51% of the list of tenants. Convincing everyone that a privately funded transit system is in their interest could be a challenge.

However, these constituencies are motivated by the bottom line, and a financial analysis of the project is in order. As seen by the bond market's agreement with the positive net present value of the Las Vegas and Las Colinas projects, it is reasonable to assume that businesses and property owners are also capable of supporting an objective financial analysis that showed positive net present value of future returns.

3.1.2 Bonding

Again, laws vary from state to state, but in most states there is no difficulty in bonding against revenues from a business improvement district.

One concern would be the presence of mechanisms that allow the BID district to be taxed conditionally upon the need of the transit system. That is, can the BID provide reserve funds that are only tapped in bad times? Opinions among professionals varied about the ease of doing so, but in California it was noted that such an arrangement is possible. Steve Gibson of Main Street Group, a BID consultancy, reported that while the establishment of a business improvement district requires the declaration of a maximum assessed value, it is up to the BID board each year to set the actual assessment for the coming year. In years where the system is adequately paying its way, the BID levy can be decreased, and increased up to its limit in years where the system needs additional subsidy. {Gibson, 2002 #220}

3.1.3 Size

To successfully finance a PRT project, the BID must have sufficient size in two respects: land area and annual budget.

Benefits from a high quality transit system cannot be stopped at the borders of the BID. Instead, they spill over to neighboring blocks. A BID must be large enough that most of the benefits are captured within the district, as property owners would not likely support a district that charges them in order to pay for someone else's benefits.

In addition, the BID must be capable of providing the necessary funds to support the system. A PRT system in a business district may cost \$3 to \$10 million per year if no fares are charged, or less if riders are charged fares. In some situations the system will be self-sustaining, meaning no payments from the BID are required, but given the novelty of this idea, it is expected that the capital markets would want assurances from the BID that it was capable of covering these costs. Consequently, the BID must be of a size where it could make such payments.

Fortunately, these size requirements are not out of reach. The LA Fashion District Business Improvement District covers a 92-block area, almost perfect for an early PRT installation. A PRT here would link the area to a rail station that sits adjacent to the district, but on the other side of a freeway. The BID currently has an annual budget of about \$3 million, meaning a BID such as this could cover minimum payments even without matching funds from the government. Similarly, most major cities have a BID in the central business district of at least this size.

3.2 Services targeted

Business improvement districts are usually focused on providing services within the district. A typical BID might pledge to clean streets, work to eliminate or reduce panhandling, operate private security patrols, and provide friendly representatives on the street to help visitors. Apart from small-scale landscape improvements, infrastructure is rarely part of the mix.

Emeryville, California, provides a notable exception. In this dense cluster of high-rise buildings near Oakland, traffic congestion was becoming a major impediment to recruitment and retention. In response, major employers created a BID that funds a fixed route shuttle system serving the downtown area. This highly successful program shows that it sometimes makes sense for the private sector to provision its own mobility solutions.

3.3 BID obstacles

Business improvement districts are becoming extremely popular, with few systemic weaknesses to cite. The largest obstacle is in setting one up the first time. Steve Gibson reports that, once established, BIDs are almost invariably renewed with stronger support than for their original creation [13].

One potential obstacle is the lifespan of the BID in certain states. In California, for instance, BIDs are initially limited to a five-year charter, and subsequent renewals can be for ten years [13]. Such short time horizons would not likely allow sufficient time for issuing bonds, constructing a system, and recouping the costs.

Even where time is not a factor, convincing businesses to support the initial creation of a PRT-supporting BID may be the most difficult step. Financial “proof” of the payoff from this investment does not exist. The closest benchmarks would be the Emery-Go-Round and the new Las Vegas monorails.

The Emery-Go-Round is a free shuttle that operates throughout the downtown area of Emeryville, California. It is paid for by a voluntary consortium of major employers and property owners. The employers were frustrated that traffic congestion was making Emeryville an unattractive place to work. Property owners recognized the value that could be gained from maintaining Emeryville’s thriving urban core. Originally a voluntary association, the funding as recently been converted to a BID. This example provides a powerful case of businesses working together to solve a common transportation problem.

3.4 Applicability to PRT

Previously, this paper cited BIDs with budgets of several million dollars per year as proof that BIDs are capable of achieving the size necessary to back a PRT system. However, these existing BIDs already have their budgets fully allocated. Therefore, a BID that has a budget of \$3 million cannot hand over that entire amount to a PRT developer. In fact, if it is at the limits of its budget as most BIDs are, it may not have any spare funds for PRT.

As a result, this paper expects that in order to fund a PRT development, BIDs would have to be used in one of two ways. Most obviously, an area without a BID would have to create a BID for the purpose of building a PRT system. This may work in areas where a BID is not already in place. Many strong business districts, however, already have a BID, and owners and tenants might be resistant to the creation of a second overlapping BID. In these areas, it will be necessary to convince them that the increase in BID collections will have a positive pay off over time.

Another area where a PRT developer might find resistance from the community is from the notion that the only costs a BID will have is for the construction of the system. As Paul R. Levy points out in his article “Making downtowns competitive,” infrastructure built in isolation won’t solve an area’s problems [14]. Instead, a multi-pronged approach will be necessary, one that addresses needs both at a governmental level and within the business district itself.

4 FINANCIAL ASSESSMENT MODEL

For creating a BID or a TIF district, financial estimates will be demanded by property owners, tenants, and local governments. Unfortunately, for any of the purposes of TIFs and BIDs, the ability to accurately predict how improvements to transportation, aesthetics, and public safety affect property values is far beyond the capability of today’s models.

Moreover, for the purpose of this paper, the question is not to determine the exact return from a particular project, but to address whether TIFs or BIDs might be effective sources of funds for a PRT development. This gives us the luxury of not calculating a specific financial return, which would have been impossible without picking a particular location. Instead, we simply need to determine whether there are conditions which, when met, would validate the hypothesis that a

TIF or BID could be a suitable funding source. To do that, we need to determine when such a project would have a positive return to the relevant constituencies.

The model we use is shown in the subsequent figures. Simple models are proposed to evaluate the effects on retailers, employers, property owners and local government. These models will be used in Section 5 to explore the circumstances that would lead to positive returns for each group. All models are pre-tax. When consistent with a company’s style of analysis, after-tax numbers can be a more accurate indicator of the net effects.

4.1 Employers

Employers will find the biggest effect to be in their ability to recruit and retain employees. They may also receive benefits from the government for participating in such a program.

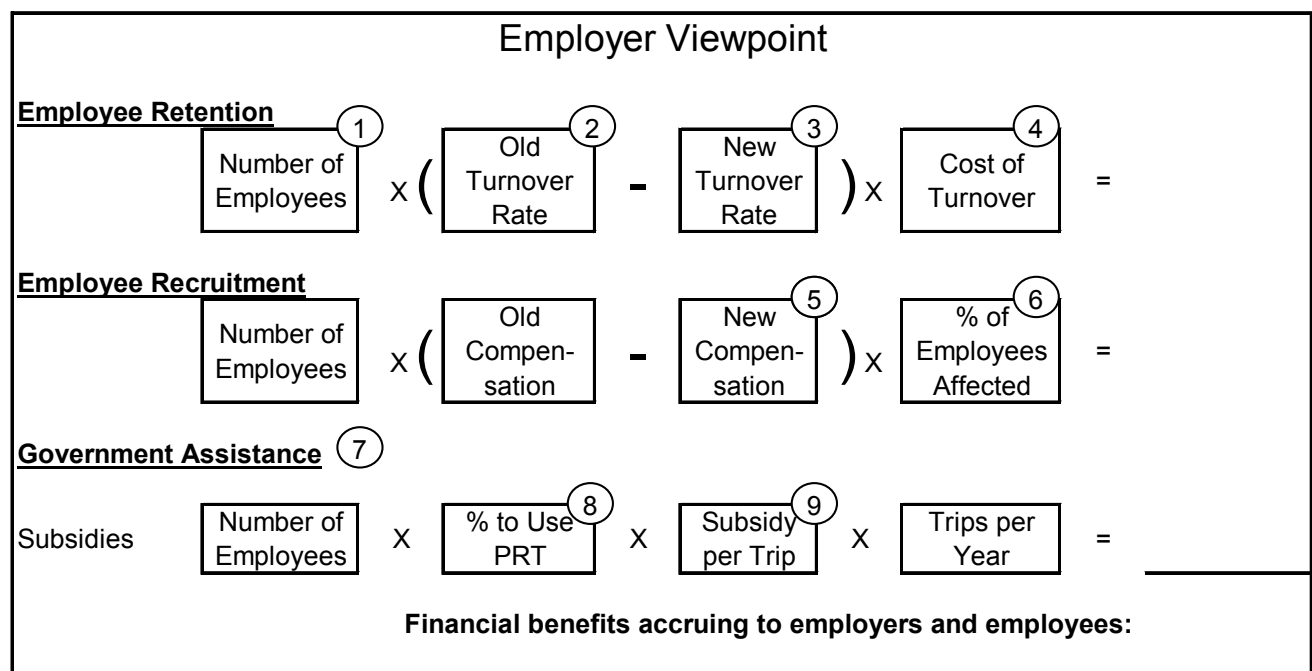


Figure 4

Elements:

1 – Number of employees. Simply the number of employees the company would have in steady state following the construction of a personal rapid transit system. This could be different than the pre-PRT number of employees. In that case, the difference is presumably because additional employees were hired in order to meet increased demand (in the case of retail) or to take advantage of the improved mobility at this location. In both cases, although the employees represent an additional cost, their cost is only incurred in order to take advantage of opportunities. Therefore, they do not increase costs on the employer; in fact, they may actually represent decreased costs or increased revenue. This potentially beneficial effect is omitted from this analysis.

2 – Old Turnover Rate. The rate at which employees left the company before the PRT system was built. Expressed as a percentage of the workforce per year. Because part-time employees

are almost as hard to replace as full-time employees, the numbers used should be for the number of employees, not the number of full-time equivalent positions (FTEs).

3 – New Turnover Rate. The rate at which employees leave the company after the PRT system is built. This rate is presumed be lower than the old turnover rate due to the improved access to and from work, which results in less time and stress being spent on the journey to and from work.

4 – Cost of Turnover. This is a highly disputed value. For certain positions, such as sales, the cost of turnover is estimated to be as much as twice as the person's annual compensation. Also, in industries such as high tech, it is commonly believed that the cost of replacing a highly skilled is at least the person's annual salary. In reality, such a figure will vary greatly for the different businesses affected.

5 – New Compensation. Improving the commute might lower the total cost of compensating employees. This conclusion is based on the theory that wage levels within a firm are driven by the compensation to the most employer-indifferent workers. That is, employers try to hold wages constant, and they can do so as long as new employees are willing to work for the same wage. When management needs to hire a worker who has a closely competing offer, management is more likely to offer a higher wage, and this often sets a new floor for future wage offers. A PRT system would presumably make an employer more attractive and would, therefore, lower the floor for future wage offers.

6 – % of Employees Affected. Economists describe wages as “sticky downward” – once a person's wage is set, it is very difficult to lower that amount, regardless of economic circumstances. Thus, the ability to offer lower compensation once a PRT system is in place only applies to new employees. The total number of employees in the firm who would be receiving this new rate follows the formula $1 - (1 - \text{New Turnover Rate})^N$, where N is the number of years the system has been in operation. This factor assumes that the turnover rate is the same for new and old employees.

7 – Government Assistance. Employers may be able to take advantage of government assistance from participating in the BID. This assistance could be explicit, such as a program that subsidizes transit passes or air quality bonuses for reducing emissions. The assistance could be implicit; for instance, whether compensation that pays for employees' transit expenses is pre-tax or post-tax is a government decision that affects the employer's financial analysis.

8 – % to Use PRT. Very simply the percentage of the employees (by number, not by FTE) that use the PRT system. This number should be annualized based on the number of working days. So, for instance, in a firm of 100 employees, two part-time employees who each use the PRT system daily because one works in the morning and one works in the afternoon would count as 2% PRT usage. If those employees work alternate days, each would only count as ½ of the annual working days, for a combined total of 1% PRT usage.

9 – Subsidy per Rider. This is the combined government subsidies per rider per year. This is the sum of all explicit and implicit subsidies. This number will vary greatly, and many individual subsidies to transit ridership will be negotiated directly with the local transit agencies.

4.2 Retail Tenants

Retail tenants have a straightforward view of the benefits: Will it increase my sales, and how much will it cost? Although difficult to estimate, the impact on revenue is easy to model. The question of cost depends on how much of the TIF or BID payment the landlord passes onto the tenant. This will vary based on the lease terms, the local market, and the strength of each side's bargaining position.

This analysis applies to any business that sells products or services within the district. Besides traditional retailers, this analysis can also be prepared for hotels and even service providers such as CPAs and attorneys. They also stand to gain from improved mobility.

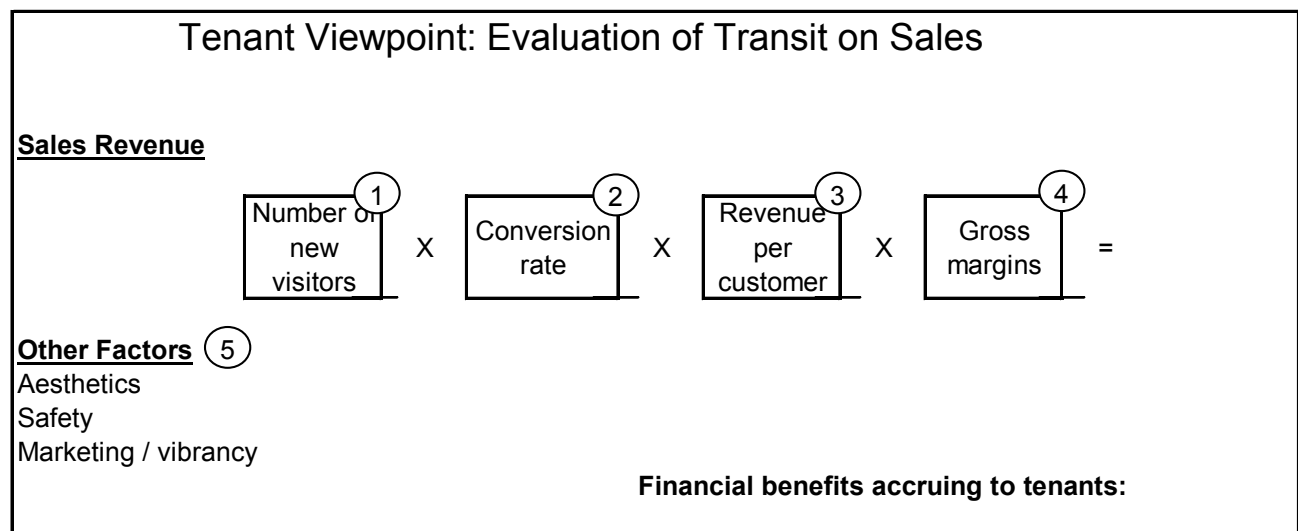


Figure 5

Elements:

1 – Number of new visitors. The number of new people who will visit the store or, more broadly, the shopping district.

2 – Conversion rate. Of these visitors, what percentage will actually make a purchase.

3 – Revenue per customer. Of the visitors who make a purchase, how much do they spend? This number is important, and it is highly dependent on the economic conditions and the type of retailer being examined.

4 – Gross margins. The retailer is concerned about profit, not revenue. This converts the amount of sales into a number more meaningful to the retailer.

5 – Other Factors. It may be that the sales revenue is not the only factor that would drive a retailer's decision. According to Lon Yaeger, general manager of the Hilton Hotel in Arlington, Texas, the direct impact of the local trolley system on his bottom line is important. But since it

is so difficult to measure precisely, he also weighs heavily the role that that the trolley system plays as a marketing tool in making the destination more attractive [15].

4.3 Property Owners

Property owners stand to be the biggest beneficiaries of this sort of development. If the transit system helps spawn a revived urban core or a hot new commercial center, it is property owners who can capture the biggest gains. It is ironic, then, that they have the most difficult challenge of assessing the impact they are likely to expect.

Rather than a straightforward calculation from a spreadsheet, property owners can probably make their best decisions by comparing themselves to others who have been through a similar process. While this makes it hard to do something truly new like PRT, there are close examples from privately funded shuttles and from privately funded monorails and people movers.

Numerous authors have established a connection between the presence of high quality transit services and property values. While these results varied greatly, relevant examples can be found for many types of real estate.

Due to the uncertainty around so many factors, the spreadsheet below takes a very simple approach to the property owner's evaluation. It looks at three factors, land appreciation (the amount of appreciation in the property value), captured value (of the increased value of the property to tenants, the amount that the property owner can extract), and the value of local government allowing higher density development due to the presence of transit.

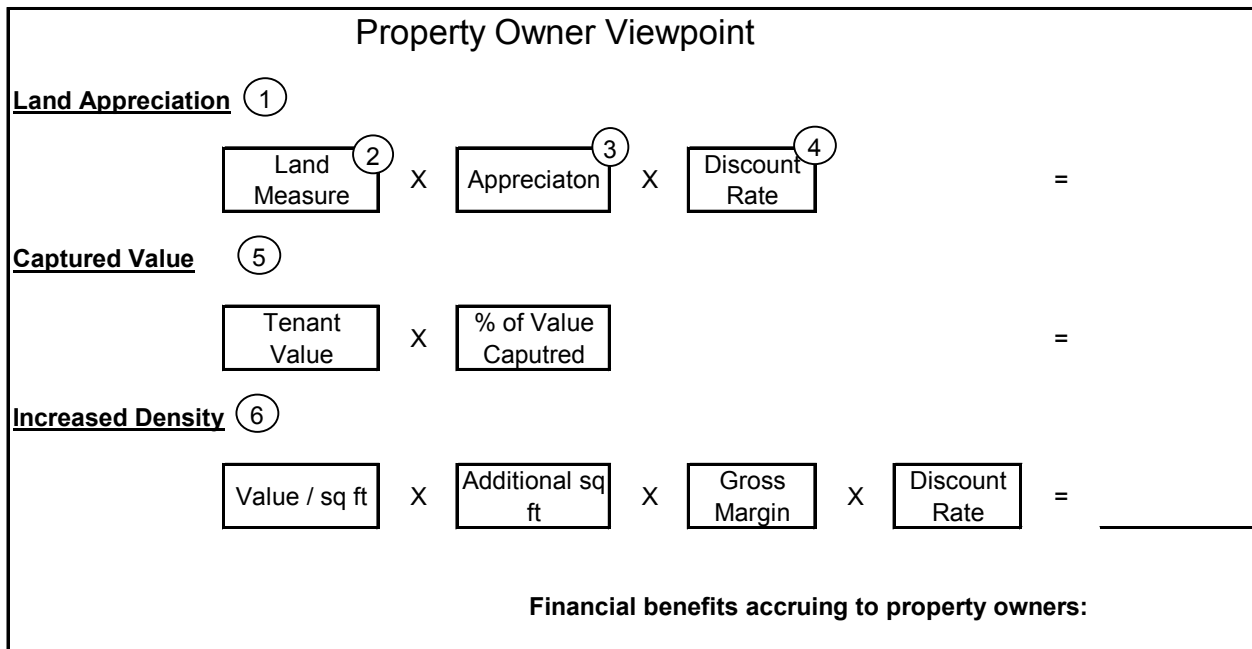


Figure 6

Elements:

1 – Land Appreciation. This term seeks to capture the increase in value that directly accrues to the land already in place due to the overall increase in property values.

2 – Land measure. Amount of property owned and affected by the TIF or BID, generally in square feet or acres.

3 – Appreciation. The percentage increase expected in the value of the existing property.

4 – Amortization Rate. The increase in the land value is a change to a value that, other things equal, will remain the same into the future. For comparison with a TIF or BID levy, this one-time change in value must be translated into a number that represents an annual figure. The amortization rate breaks the total value into a value accrued in each year.

5 – Captured Value. As previously described, tenants (whether retailers, employers or others) can expect some benefits from being in a district with a personal rapid transit system. It is unlikely that they can retain all of this for themselves. Instead, the improved sales or decreased employee turnover will make the area more popular, driving up rents and allowing the property owner to capture some of that value.

6 – Increased Density. In many cases, this will be the largest gain to property owners. It presumes the presence of high quality transit services decreases the amount of auto travel. Consequently, cities can reward developers by letting them increase the density of their developments. This is measured by the number of new square feet of build out they are allowed multiplied by its value. The total revenue is then reduced to the gross profit. This one-time valuation then needs to be amortized to reach an annualized figure for comparison to the district levy.

4.4 System Cash Flow

The fundamental factor in determining the feasibility of TIFs or BIDs as funding sources is answering a question: Can they supplement other revenue enough so that the system can cover all expenses and pay off construction debt?

The analysis below assesses the cash flow of a system.

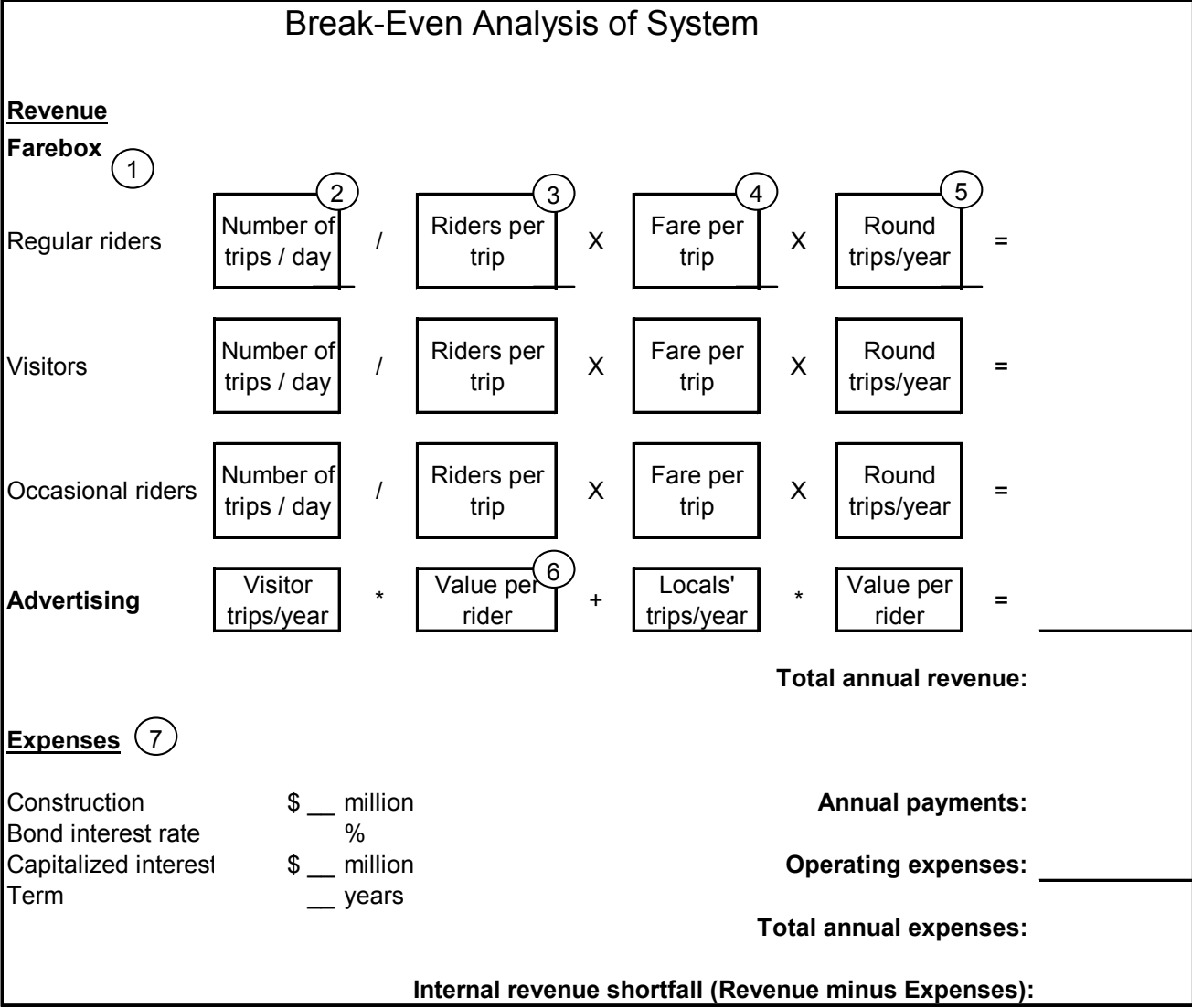


Figure 7

Elements:

1 – Farebox revenue. Farebox revenue is simply the number of trips multiplied by the revenue per trip. For some systems, this might be an important revenue source. This is the amount collected per rider. Usually this is the amount the rider pays, but some business may choose to subsidize the travel or their customers or employees by paying part of the fare. In some locations, businesses may prefer to provide the mobility as a free service, much as moving sidewalks and escalators are free, and farebox revenue will be nonexistent.

In the case of a commercial development, we divided the riders into three categories: Regular riders, visitors, and occasional riders. This is because each set of riders has unique characteristics. Assuming frequent riders are given discounts, each category will also have a different average fare.

2 – Number of trips. This is the number of trips in each category per day. It counts the total number of riders, whether or not they ride together. Assuming each passenger makes a round trip, this would be twice the number of passengers carried per day.

3 – Riders per trip. Since fares are likely to be charged per vehicle rather than per person, persons who ride together reduce the number of fare-producing trips.

4 – Fare per trip. This includes direct payment from passengers as well as any subsidy per ride.

5 – Round trips per year. This scales the daily trip figures to annual figures.

6 – Value per rider. The peak value for a transit rider is probably from the Las Vegas market, where appealing to visitors is extremely lucrative. The minimum value is that of common transit services such as buses and light rail. The individual nature of each trip opens the possibility for new and more lucrative forms of advertising, though.

7 – Expenses. Expenses are made up of two components. First is the annual debt payments on the construction cost and any capitalized interest that accrued before the project began earning revenue. Second is the annual operating costs.

5 SCENARIO: COMMERCIAL DEVELOPMENT

This scenario envisions a commercial district that is home to a number of companies, each hiring skilled workers. In addition, a number of shops and restaurants are also in the area.

It is anticipated that 15% of employees would ride the PRT as part of their journey to work, mostly by carpooling or via the train, which stops near the district and would have its own large station on the PRT network.

The assessment below is calculated to represent the total gains in each category. Individual decision makers may make their own assessment.

5.1 Financial Assessment

5.1.1 Employers

Employers stand to be the biggest beneficiaries, mostly through improving employee retention. Increasing the average tenure of an employee from four years (25% turnover) to five years (20% turnover) is expected to save a whopping \$30 million in costs, even when a relatively low cost of turnover (one-half of salary) was used.

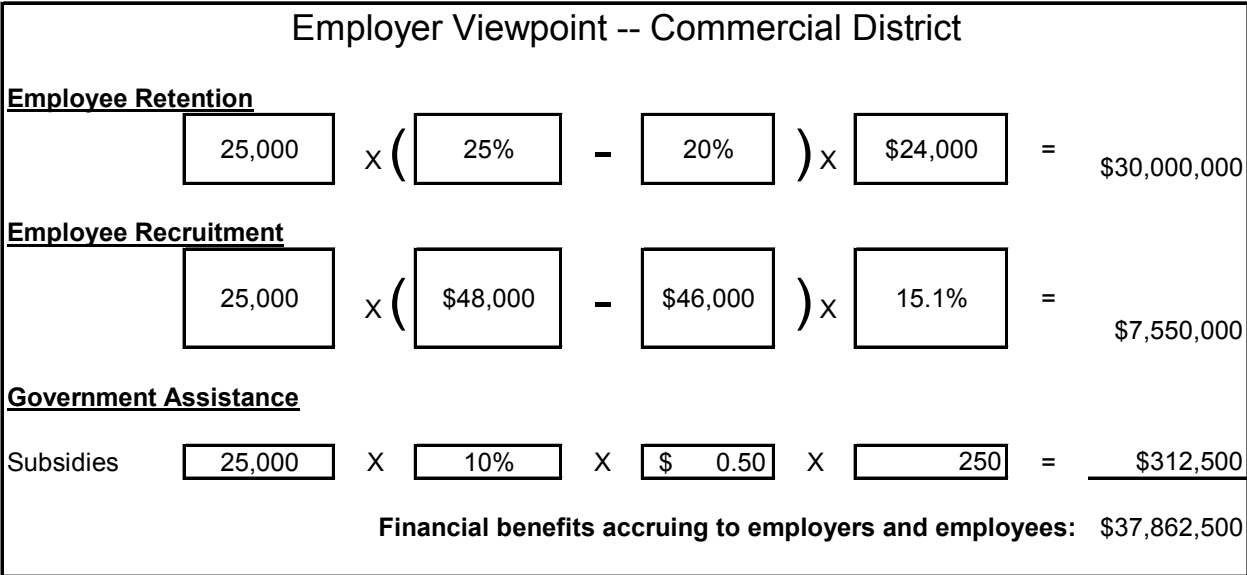


Figure 8

5.1.2 Tenants

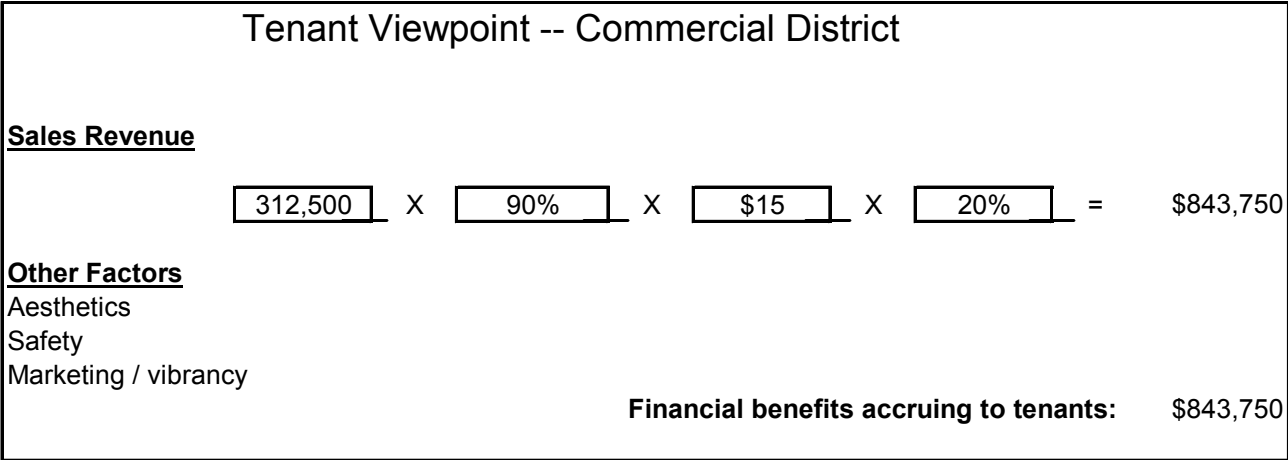


Figure 9

Tenants expect to see a positive impact from an automated transit system. Primarily, their gain comes from an increased number of daytime visitors from employees of the office buildings. Previously, mid-day trips required moving one’s car and finding parking. Now, these trips are faster and without hassle. Lunchtime trips are most common.

5.1.3 Property Owners

Property owners can identify certain tangible benefits. Their five million square feet of property were assumed to appreciate by 5%, or \$6. In addition, it was assumed the city allowed new construction of one million square feet of property. We did not assume any increase in rent. Of the total increase value, 1/10 was assumed to be applied to any individual year.

Property Owner Viewpoint -- Commercial District									
Land Appreciation									
	5,000,000	X	\$6.00	X	0.1	=	\$3,000,000		
Captured Value									
	\$843,750	X	0			=	\$0		
Increased Density									
	\$125.00	X	1,000,000	X	20%	X	0.1	=	\$2,500,000
							Financial benefits accruing to property owners:	\$5,500,000	

Figure 10

5.1.4 System Cash Flow

Break-Even Analysis of System -- Commercial District									
Revenue									
Farebox									
Regular riders	8,000	/	1.1	X	\$1.50	X	250	=	2,727,273
Visitors	48,000	/	1.2	X	\$1.80	X	2	=	144,000
Occasional riders	16,000	/	1.1	X	\$2.00	X	10	=	290,909
Advertising	96,000	*	\$0.40	+	2,160,000	*	\$0.15	=	362,400
								Total annual revenue:	3,524,582
Expenses									
Construction	\$60.0 million	}						Annual payments:	\$5,308,047
Bond interest rate	5%							Operating expenses:	\$1,200,000
Capitalized interest	\$6.2 million							Total annual expenses:	6,508,047
Term	20 years								
								Internal revenue shortfall (Revenue minus Expenses):	(2,983,465)

Figure 11

In this case, the system is identified to be three million dollars short of the funding it needs. Sufficient gains were found among the parties to believe this level of expense could conceivably be financed.

5.2 Funding through TIF

Tax increment financing for this scenario seems appropriate. Additional costs would be incurred due to the capitalized interest. The interest would have to accrue for several years before the new system had an affect on land values.

It should be noted that this is a very large TIF district, valued at approximately \$600 million. It is somewhat alarming, then, that the payoffs are not larger. Previously, TIF budgets were assumed to be capable of supporting much larger infrastructure improvements than were envisioned here.

5.3 Funding through BID

A business improvement district makes sense for this scenario. The businesses are all receiving benefits and should be willing to share the burden of system installation. One concern is that current property owners and tenants would be paying for a system that does not benefit them immediately and only benefits future tenants. However, the fast construction time of a personal rapid transit system – under two years – helps to mitigate this concern.

6 SCENARIO: TOURISM DISTRICT

In this scenario, a personal rapid transit system is built to connect an entertainment district. We expect it to include several attractions, such as an amusement park, a water park, a sports stadium, and some smaller attractions, as well as hotels, restaurants and a convention center.

The model for this scenario is the entertainment district of Arlington, Texas. It hosts 6,500,000 visitors per year. It is home to a Six Flags theme park, a water park, a baseball stadium, a number of hotels, a convention center, and other attractions such as a wax museum.

6.1 Financial Assessment

6.1.1 Employers

In this scenario, employers stand to benefit much less. First, there are fewer employees. Second, their salaries are lower. Finally, it is not expected that they will be as influenced by the availability of transit.

Employer Viewpoint -- Tourism District					
Employee Retention					
	4,000	x	(50% - 45%)	x	\$12,000 = \$2,400,000
Employee Recruitment					
	4,000	x	(\$24,000 - \$23,000)	x	15.1% = \$604,000
Government Assistance					
Subsidies	4,000	x	10%	x	\$ 0.50 x 180 = \$36,000
Financial benefits accruing to employers and employees:					\$3,040,000

Figure 12

In this scenario, employers stand to benefit much less than in the commercial district scenario. First, there are fewer employees. Second, their salaries are lower. Finally, it is not expected that they will be as influenced by the availability of transit.

6.1.2 Tenants

Tenants (from hotels to amusement parks) can expect a significant return on investment. An increase of 500,000 visitors per year (a 7% increase) is worth almost six million dollars, assuming they each spend at the rate calculated in Arlington.

Tenant Viewpoint -- Tourism District					
Sales Revenue					
	500,000	x	100%	x	\$58 x 20% = \$5,800,000
Property Owners' Capture:					20% = -1,160,000
Financial benefits accruing to tenants:					\$4,640,000

Figure 13

6.1.3 Property Owners

It is difficult to measure the effects of this on property owners under this scenario. We expect that many tenants and employers will own their own property, so it is difficult to break the benefits out separately. Also, since the property owners are not planning on selling, the appreciation in value is meaningless to them, possibly even costly if land appreciation results in higher taxes for them.

Property Owner Viewpoint -- Tourism District						
Land Appreciation						
	1,100	X	\$50,000	X	0.1	= \$5,500,000
Captured Value						
	\$5,800,000	X	20%			= \$1,160,000
Increased Density						
	\$600,000	X	600	X	20%	X 0.1 = \$7,200,000
Financial benefits accruing to property owners: \$13,860,000						

Figure 14

We assumed that 1,100 acres of land would be held by owners interested in selling, and that the land appreciated by \$50,000 per acre. In addition, we assumed some tenants would not be the same as property owners. Due to the importance of location, it is expected that property owners have a strong negotiating position and will extract 20% of the value that tenants gain. The largest gain comes from the development of 600 additional acres. We feel this is a very conservative estimate, and in some cases the actual value could be several times this amount.

6.1.4 System Cash Flow

Break-Even Analysis of System -- Tourism District											
Revenue											
Farebox											
Regular riders	400	/	1.1	X	\$1.50	X	250	=	136,364		
Visitors	8,000	/	2.5	X	\$3.00	X	120	=	1,152,000		
Occasional riders	200	/	1.1	X	\$2.00	X	10	=	3,636		
Advertising	1,920,000	*	\$0.40	+	204,000	*	\$0.15	=	798,600		
Total annual revenue:									2,090,600		
Expenses											
Construction	\$60.0 million	} →	Annual payments:							\$5,308,047	
Bond interest rate	5%									Operating expenses:	\$1,200,000
Capitalized interest	\$6.2 million										
Term	20 years										
Total annual expenses:									6,508,047		
Internal revenue shortfall (Revenue minus Expenses):									(4,417,447)		

Figure 15

Similarly to the other scenario, there is still a revenue shortfall to make up.

6.2 Funding through TIF

TIF funding seems less likely for this scenario. Due to the presence of a large number of long-term property owners, evaluating the change in assessed value will be difficult, even to well-trained assessors. Without an established market for property in the district, increases in the assessment are likely to be challenged. In addition, some stadiums and convention centers pay no taxes, thus leaving the TIF collection smaller than expected.

However, there is sufficient value added to the district to support a TIF. These spreadsheets do not capture the large intangible value from creating a more popular destination, nor do they capture the spillover effects that increased tourism brings to the community at large (both good and bad).

6.3 Funding through BID

A BID seems like a more likely option than a TIF. In Texas, where the Arlington Entertainment District is located, financing can get very creative. Rather than simple charges against land values, assessments could be based on occupied room nights, number of admission tickets sold, attendance at conferences or games, or any number of ways that result in members paying only for their share of the district benefits.

7 CONCLUSION

The low cost of a personal rapid transit systems is opening up a whole new world of possibility for funding urban transit systems. Rather than simply relying on the public sector or the private sector, public/private partnerships can be effective at securing the funding necessary to build one of these systems.

Tax increment financing is a powerful way to capture the long-term value that transit can bring. Business improvement districts allow the private sector to take charge and, in effect, tax itself in order to fund projects that benefit it. While neither method has previously funded infrastructure like this, there are no obvious reasons why it could not be done.

	TIF	BID	Preference
Reliability	Uncertain	Reliable	BID
Time to revenue receipts	Up to several years	Immediate	BID
Bonding ability	Tax-free	Varies	TIF
Area condition	Blighted or economic development	Any	BID
Creation method	City or agency vote	Property owner vote, tenant vote, city vote	Varies
Time to establish	24 months	6-18 months	BID
Typical uses	Infrastructure or services	Services	TIF

The table makes it appear that a choice must be made between a BID and a TIF. In fact, the best solution may be to do both. Even in California, where a BID district is initially limited to a five-year life, the BID can provide a powerful boost to a TIF project.

With a TIF, the first few years often have no revenue while the property markets adjust to take into account the effects of the improvements. During this time, capitalized interest builds up that adds to the overall cost of the project. If a BID were to provide a guaranteed level of funding during this period, it would greatly reduce the cost of the project, and greatly reassure the bond markets.

In addition, the combination of a BID and a TIF could help align the interests of the public and private sectors. In Las Vegas, although private financing was used, local property owners were asked to buy subordinated debt. They property owners can consider this a loan to the project. Yet it provides more than funding; it sets up an incentive for the property owners to promote the system. If it fails, they do not get their money back, so they have a financial incentive for its success, and it brings their interests into line with the project developer's.

Thus, TIFs and BIDs could be a powerful tool for building urban infrastructure like this. Such a project will be a breakthrough in the field, and it will require the most skilled and creative professionals behind it. Given the potential rewards, it is a challenge worth undertaking.

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