Role of Transit Service Providers in Land Development

By

Yingyan Lou, Ph.D., Jay Lindly, Ph.D., Steven Jones, Ph.D., and Frances Green
Department of Civil, Construction, and Environmental Engineering
College of Engineering
The University of Alabama
Tuscaloosa, Alabama

Prepared by

UTCA

University Transportation Center for Alabama
The University of Alabama, The University of Alabama at Birmingham, and
The University of Alabama in Huntsville

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University Transportation Center for Alabama

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16 Abstract

While various transit development initiatives, such as integrated transit and land development and transit-oriented development, have been proposed in the past, many transit agencies in the United States are experiencing declining ridership and increasing dependence on government subsidies for operating costs. Compared to US, several foreign counties have been very successful in transit development. One particular strategy is to encourage (and subsidize) transit service providers to compete and invest in land development. This study is helpful in identifying barriers that need to be overcome in order for transit agencies to reap the benefits from investing and participating in land development.

This study also conducted a cost-benefit analysis on data from the financial reports of two agencies praised in the literature for their involvement and investment in land development. These agencies are the Washington Metropolitan Transit Authority and the Mass Transit Rail Corporation. The analysis showed that participation yields significant profits, but participation coupled with investment is extremely profitable, with a calculated internal rate of return for the MTRC's property development activities being 571%.

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Table of Contents

List of Tables

List of Figures

Executive Summary

Livability and sustainability have been identified as top priorities by three government agencies, including the Department of Transportation, the Department of Housing and Urban Development, and the Environmental Protection Agency. In this inter-agency coordinated effort, transit systems are recognized as a bridge between urban development and transportation development that plays a key role towards achieving the livability and sustainability goal. While various transit development initiatives, such as integrated transit and land development and transit-oriented development, have been proposed in the past, many transit agencies in the United States are experiencing declining ridership and increasing dependence on government subsidies for operating costs. Compared to the US, several foreign counties have been very successful in transit development. One particular strategy is to encourage (and subsidize) transit service providers to compete and invest in land development. The strategy helps to fortify the connection between transportation and urban development, which in turn benefits the society in terms of livability and sustainability. This strategy might be a potentially promising policy alternative that can be modified and applied in the US. This research aims to explore the practice of transit agencies investing and participating in land development.

By means of a comprehensive literature review and an online survey sent to government planning agencies, land developers, and transit agencies, data was collected and analyzed to reveal trends regarding investment in land development, participation in land development, and the influence of government policies on transit's decision to invest. Though the survey data was not large enough for statistical analysis, it showed some trends that are consistent with the findings of the literature review. Those trends are the relationships between transit agency participation in land development and policies such as parking, initial funding, communication between stakeholders, recognition of the benefits of involvement, and the availability of land developer expertise. However, no clear trend was identified regarding the relationship between zoning policies and transit agency involvement in land development and the relationship between trip reduction ordinances and transit agency involvement in land development. Attitudes towards and awareness of the practice of transit investing and participating in land development were also identified. This study is helpful in identifying barriers that need to be overcome in order for transit agencies to reap the benefits from investing and participating in land development.

This study also conducted a cost-benefit analysis on data from the financial reports of two agencies praised in the literature for their involvement and investment in land development. These agencies are the Washington Metropolitan Transit Authority and the Mass Transit Rail Corporation. The analysis showed that participation yields significant profits, but participation coupled with investment is extremely profitable, with a calculated internal rate of return for the MTRC's property development activities being 571%.

Future research, perhaps with a larger study, will be able to confirm or disprove these trends. A more detailed feasibility study is definitely proposed for future research, as is a study that takes into account user opinions on the practice of transit investing and participating in land development.

Chapter I Introduction

1.1. Background

Increasing traffic congestion, environmental degradation, and changing demographics in the US have raised new challenges in urban and transportation planning. The US Department of Transportation (DOT) Secretary Ray LaHood has identified livability and sustainability as top priorities in future urban and transportation development (Office of Public Affairs, 2009). Livable communities aim to provide an integrated, convenient, and affordable living environment. In a broader sense, the concept also incorporates environmental and economic sustainability. This notion is in line with the smart growth movement which promotes sustainable and less auto-dependent urban forms. In the effort towards these goals, transit systems play a key role. It is clear that an effective transit system provides an attractive transportation alternative, and well-coordinated transit and land development would support all six livability principles laid out in Office of Public Affairs (2009).

Unfortunately, the current conditions of US transit systems are far from the level of supporting the livability principles. Except in a few metropolitan areas, US transit systems often suffer from small coverage and low ridership and are often heavily subsidized. Although transit ridership remains steady over the years with the population growing, its share compared to other travel modes has decreased in most of the US (Deakin and Cervero, 2008). Due to the low ridership, heavily regulated fares, and increasing operating cost, self-financing is often a challenge faced by today's transit service industry. Federal subsidies to public transportation have an extensive history in the US starting from the 1960's, when the dominance of the private sector in public transportation service started to shrink (Mistretta and Gregg, 2002). However, the effectiveness of federal and local subsidies has long been argued because a significant percent of dedicated subsidies is often used to cover increased operating cost (wage, suppliers and maintenances), while only a small percent is used for service expansion (Iacono, 2007). Karlaftis and McCarthy (2002) found that federal and local subsidies have different impacts on transit systems with different sizes. Even in systems where statistical analysis indicates subsidies did help increase bus transit frequency and keep the fare from rising, the practical improvements were too small to change the productivity and public perception of the bus transit service industry (Iacono, 2007). Increasing government operating subsidies is hardly a sustainable solution.

Various policy initiatives have been launched to improve the transit systems in the US. Integrated transportation and land development policies were proposed in the late 20th century. These policies encourage transit considerations in urban development, and can be viewed as development-oriented transit policies. However, they did not experience much success due to the limited impact transit service providers have on the planning of land development and due to

inadequate resources available to transit service providers in extending their services (Christopher, 2006).

Another initiative is transit-oriented development, which promotes compact and multi-function communities near transit facilities. Although some midsized cities with well-coordinated transit and land developments, such as Portland, have seen rapid increase in transit usage between 19990 and 2000 (Tompson et al., 2006), the capacities of these policies are often limited by the lack of funding, inadequate land, and other issues.

Compared to the US, some foreign counties have been very successful in transit-oriented development. Their success not only leads to well-functioning and cost-effective transit systems, but also more livable and sustainable communities. One particular strategy which is new to the US but has been successfully implemented in some Asian counties is to encourage (and sometimes subsidize) transit service providers to compete and invest in land development. The strategy helps to fortify the connection between transportation and urban development, which in turn benefits the society in terms of livability and sustainability. Not only are the transit providers making profit through the land development, transit service quality has also been improved, and the community vitality boosted. When the transit service provider is from the private sector, this strategy becomes a relatively unique form of public-private partnership. The Mass Transit Railway (MTR) Corporation in Hong Kong, China is a good example of this strategy (Chisholm, 2001; Wikipedia, 2010). MTR started off as a government-owned transit service provider in 1975 and later became a private company in 2000. With the government subsidies (which decreased after the company's privatization) in land market, MTR invested heavily in shopping centers around its transit lines. In addition to the five shopping centers it owns, MTR also developed several residential communities. MTR's revenue from land development exceeds that from its fares. In 2009, the former generated HK$3.55 billion net profit while the latter contributed HK$2.12 billion.

Successful experiences from foreign countries indicate that allowing transit service provider to invest in land development may be a potentially promising strategy that can be modified and applied in the US. Transit service providers in the US often view themselves only as transit operators rather than a service industry (Deakin and Cervero, 2008). This strategy would help shifting transit service providers' traditional reactive role in the market to a more proactive one that is also responsible for creating more transit demand. Although this strategy may not find support under current US legislatures, its potential should not be overlooked. Through extensive and rigorous research, a better understanding of all aspects of this strategy would be obtained to serve as a basis for possible future transit development initiatives.

1.2. Problem Statement

Many U.S. transit agencies are in a state of financial dependence on the government to cover thier operating costs. Since transit benefits the community socially, econocmically, and environmentally, it is an essential mode. In some areas of the world, transit agencies invest in

land development and enjoy financial independence and stability. This reseach aims to investigate to what extent these investment practices are recognized in the U.S., and what the barriers are that prevent such investment and participation in land development. The three questions that this study will attempt to address are:

1. What is the current state of transit in the United States?
2. What are some current practices involving transit companies in land development?
3. What factors affect transit company investment in land development?

Via a literature review and a survey, these three questions are explored, and the results are presented and interpreted in this report.

1.3. Project Overview

This project aims, with an extensive literature review and survey, to identify land development practices and policies regarding land development that support transit use, provide income to transit agencies, and positively impact the community. Experts from around the country are then surveyed to gain insight into the feasibility of such practices in the United States, and both encouraging factors and barriers to transit investment and involvement in land development are determined from the survey results.

Chapter II Methodology

The project consisted of three parts: a thorough literature review of pertinent information concerning transit service providers' involvement in land development, the development and analysis of results of a survey given to selected interviewees, and a cost-benefit analysis. The literature review was intended to provide a background of transit in the United States and the acknowledged factors that affect the invovlement of transit agencies in land development. The survey is intended to gain expert insight into the impact that the identified factors have on transit agencies' invovlement in land development. Finally, the cost-benefit analysis is intended to provide an idea of the resources that some agencies have put into land development and the corresponding profits from those inputs.

Previous research on the subject is varied. Some, like Hendricks and Goodwill (2002), Dunleavy (2001), and Cervero et al. (2002) provide helpful summaries of the current state of practice of some of the transit-friendly land development initiatives discussed in Chapter III of this report, while others, such as Miller et al. (1999) and Bailey et al. (2007), propose models to reflect the relationships between land use patterns and transportation. In some of the literature, such as that of Hendricks and Goodwill (2002) and the Dunleavy (2001), surveys of expert opinion were conducted, but the analysis of such survey results were approached more informally than researchers propose to do in this study. A study similar to this project was conducted by Christopher (2006), but that study focused on bus transit service only. This study will focus on both bus and rail transit. Furthermore, with a wealth of new information on the practice of transit service providers investing in land development, an updated, comprehensive literature review is needed.

The following sections detail the methodology behind the research presented in this reoprt.

2.1. Literature Search

The first step in the research was to conduct a thorough literature review. Literature selected for inclusion in this paper is intended to represent the wide range of available information on the subject of transit service provider involvement in land development as well as other topics that pertain to the history and current practice of transit in the United States and elsewhere. Scholarly journal articles, books, and some credible websites provided the necessary information for the literature review, which in turn provided crucial information for constructing the survey.

Researchers kept three main goals in mind while compiling the literature review:

1. What is the current state of transit in the United States?
2. What are some current practices involving transit companies in land development?
3. What factors affect transit company investment in land development?

2.2. Survey

The following sections address the design of the questionnaire and the reponses received after the survey had been released.

2.2.1. Survey design

The literature review and the survey design took place concurrently. The aim of the survey is to gain the perspective of qualified experts (transit officials, land developers, and government officials) on the factors that affect the involvement of transit service providers in land development, and to verify literature review findings about the state of practice through statistical anaylysis of the survey results. Researchers became familiar with the current issues and practices of transit companies throughout the world before the survey was designed. The interview questions are designed to obtain relevant stakeholder opinions on the current state of transit and how land development policies actually affect transit ridership and transit provider financial health. Additionally, the interview questions are designed to identify the barriers and/or encouraging factors to transit service providers in land development and the general attitudes that affect the extent to which transit companies participate in land development.

Several different survey dissemination methods were considered, and it was decided that an online survey would reach the most people. Furthermore, responses to a well-designed online survey are easily compiled and processed.

From the literature review, researchers realized that some useful information pertaining to land development activities, government subsidization, and attitudes towards transit in new developments can come directly from the developers or the government, as many transit agencies might not be able to answer all of the survey questions pertaining to zoning policies or government subsidies. Therefore, three sets of survey questions were developed: one for transit agencies, one for land developers, and one for government officials. Some of the questions overlap between surveys, but this overlap is useful to identify where attitudes of players differ and where communication between players might be weak. The survey was posted on a website, and responses were sent to the researchers for analysis.

A detailed compilation of the questions presented to the transit agencies, land developers, and government employees are provided in the appendix of this thesis. The government planning agency survey had 25 questions, the land developer survey had 23 questions, and the transit agency survey had 47 questions. The topic areas addressed by the surveys are presented in Table 1.

Table 1. Topic Areas Covered by Survey

General Area	Questions Address:
Subsidies	Current practices Desired forms of subsidies
Policies	Zoning Parking Trip Reduction Ordinances
Levels of involvement in land development	Current levels Desired levels Factors affecting
Potential for new developments	Spatial potential Financial availablility Demand
Information about transit in the area	Ridership Location Population Mode (rail, bus) Age of agency
Transit Investment in land development	Awareness of the practice Attitude towards the practice Perceived feasibility Attitudes towards development and real estate (no development)

2.2.2. Survey responses

Interviewees were selected and invited to take the survey based on their affiliation with either transit companies or with state Departments of Transportation. Other interviewees were selected based on their affiliation with land development companies or government planning agencies in corresponding areas. An invitation was sent out to members of the American Society of Civil Engineers Transportation and Development Institute Public Transportation Committee.

The reponses to the surveys numbered 17 in total. Among those 17 respondants, 8 were transit agency representatives, 2 were a land developers, and 7 were government planning agency representatives. Figure 1 reflects the response rates from each group. While the small sample size does not allow researchers to draw rigorous statistical results, it does identify trends in the data that can later be explored.

The responses reflected agencies from various locations and with varying populations. The areas of the country represented by the responses are given in Figure 2, and the populations represented by the responses are given in Figure 3. According to data from the survey, 80% of the areas surveyed generate a mix of transit-dependent and choice riders. Only 6.7% of the areas surveyed generate only transit-dependent riders, and only 13.3% of the areas surveyed

experience transit as a significant portion of the modal split. Because the surveys were anonymous, the possibility of duplicate demographic data exists. This could occur when a transit agency and a government planning agency from the same city responded to the survey. Theoretically, their answers to the "fact" questions such as the state of ridership and different policy climates should be the same. Therefore, there is a possibility that some of the areas are actually duplicated.

Figure 1. Breakdown of Survey Responses

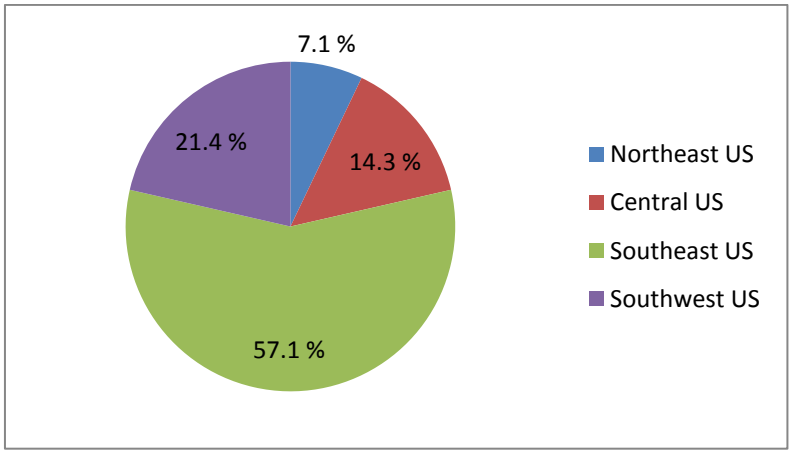

Figure 2. Areas Represented in the Survey

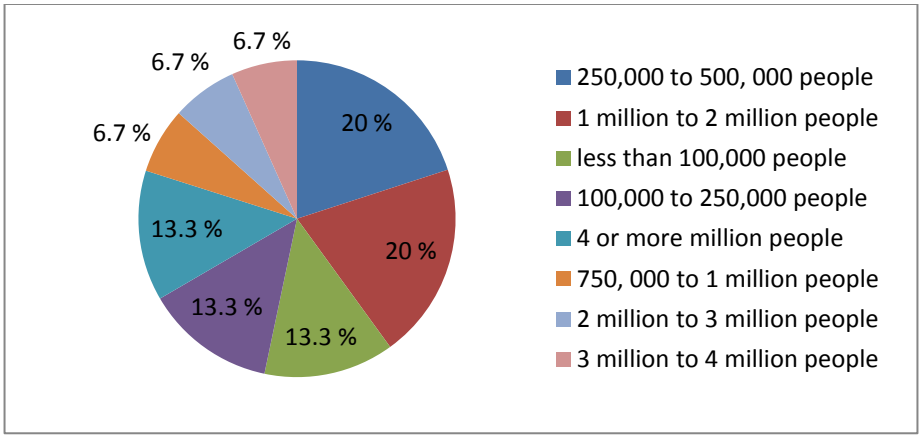

Figure 3. Population Represented in the Survey

2.3. Analysis Methods

To analyze the data, a simple frequency analysis was first conducted. This first step was designed to alert researchers to any unusual results that might need additional analysis. Cross tabulation was also conducted among some variables to determine if any relationships exist. Chapter IV provides the survey results in more details.

Chapter III Literature Review

Transit in the United States has a long history. As transit nears its second century in existence in America, its scale and form resemble only minimally the transit that began in America in the 1820's. The relationship between land use and transit has been well established, and leaps in technology have moved transit away from animal power to electricity and gasoline and have increased the extent of public transit service areas while affecting ridership patterns. Transit ridership and the financing mechanisms for public transit have also evolved throughout the history of public transit in the United States. Transit ridership is currently not strong, and likewise the financial stability of many transit companies is somewhat tenuous. Over 10.4 billion trips were made on public transit in 2009, and it cost transit agencies $37.2 billion to provide those trips, only about 37% of which fare revenue covered (American Public Transit Association, or APTA, 2011). The subsidies needed to make up the difference between costs and revenues totalled $24.4 billion in the same year (APTA, 2011). This means that subsidies covered around 63% of the cost of providing service. Subsidies might be an answer to the financial insecurity faced by many agencies, but with the rising costs of operation today, it is unlikely that subsidies alone are a sustainable solution. The participation of transit companies in developing the built environment is one way to encourage ridership and generate lease and land sale profits. The following sections examine the relationship between transit and land development and present some initiatives that are currently in use in the United States. Transit agency involvement in land development is further categorized into different levels. This section also briefly addresses the benefits that transit investment in land development can have, as well as influential policies and practices. Finally, case studies of transit participating and investing in land development are presented.

3.1. Transit and Land Use

3.1.1. Relationship between Transit and Land Use

The relationship between transit and land use is well recognized. The consensus is that mixed land use in areas that are densely populated is the most conducive to transit usage. The theory is that people will be less likely to drive if they can access desirable destinations conveniently. To encourage people to avoid making car trips, the built environment should provide easy pedestrian, cycling, or transit access to the places essential to their daily life. In other words, lower car usage tends to occur in areas that are densely developed (Dunphy and Fisher, 1996; Schimek, 1996 a, b; Cervero and Kockelman, 1997) with mixed land use (Loo et al., 2010; Hondorp, 2002). Loo et al. (2010) further emphasizes that the coexistence of high density developments and mixed land use might be essential to promote transit use. By developing land to be high-density *and* of mixed land use to discourage automobile use and encourage alternative

forms of mobility such as transit, development and land use can support transit usage. Basically, under the correct circumstances, public transit and dense, mixed land use can have a symbiotic relationship, with one encouraging the other.

The relationship between land use and transit can be measured economically. The impact that public transit has on the values of the surrounding land are cited to be in the range of 5 – 10% for residential developments and 10 – 30% for commercial developments (Agence Francaise de Development and the French Ministry of Ecology, Energy, Sustainable Development, and the Sea, 2009). Papa et al. (2008) similarly asserts that for the city of Naples, at least, the amount of change in land values is dependent on the type of land use, with differing land value impacts for commercial and residential uses. The impact can be even larger than 30%, as Priemus and Konings (2001) assert was the case in Tokyo, Japan, when land values along a new rail line rose by 57% after the land was developed. Of course, developed land generally is worth more than undeveloped land. Similar examples of land value increases near transit stations include the case of Helsinki, Sweden (Agence Francaise de Development and the French Ministry of Ecology, Energy, Sustainable Development, and the Sea, 2009). Thus, development can affect property values significantly. If the transit agency owns those properties, this can lead to increased lease and land sale revenue.

Because public transit and land use are so interconnected, it makes sense that transit service providers might involve themselves in land development and that land developers might involve themselves in transit. This study examines one aspect of the complicated relationship between the two concepts: that of transit companies's involvement in land development. There are many initiatives and practices that currently include transit agencies in the land development process. The next section outlines some of those initiatives and the benefits associated with them.

3.1.2. Initiatives

With transit in the precarious state it is in today, the practice of transit companies investing in land development is not widespread. However, the practice is not dormant. Three of the more recognized forms of transit companies' investment in land development are transit-oriented development (TOD), joint development (JD), and smart growth. This section discusses these initiatives. Because all three of the initiatives provided in this section mention high-density and mixed land use, it is important to note that here mixed land use does not imply residences among heavy industry as in the cities in the early 1900's, and high-density does not mean overcrowding. The mix of land uses referred to here implies a blend of residences, buinesses, retail shops, and restaurants that will provide residents with business, shopping, and dining options while maintaining pleasant living conditions, and the high-densities referred to in this section typically means more compact development, such as houses on small lots, townhouses, or apartments.

Transit-Oriented Development

Transit-oriented development essentially focuses on the development of land around an existing transit station or hub. Lai (2008) defines "land around" as the areas, whether public or private,

within walking distance of a station, regardless of whether the land is publicly or privately owned. An area can be termed a "transit-oriented development" if it fits one of the many definitions in the literature. Bernick and Cervero (1996) defines the transit village, which would be the same thing as a TOD in the modern vernacular, as "a compact, mixed-use community, centered around the transit station that, by design, invites residents, workers, and shoppers to drive their cars less and ride mass transit more." Cervero et al. (2004) later gives a broader definition for transit-oriented as an area that is "dense, pedestrian-friendly, and transit-supportive." Hondorp (2002) defines a TOD as a development that "[encourages] the use of public transit by siting residential, commerical, or office uses—or a combination of all three—close to a transit node." Notice that all three definitions address the land use around the station and the encouragment of transit use. There is no quantitative definition of TOD in terms of size, population density, or the mixture of land use, because the size and location of the city in question can cause the density and other factors to vary significantly.

Transit-oriented development has had a long history. Though many do not realize it, TOD has been in existence for over a century. At the turn of the 20th century, as rail lines became more and more popular, people began developing suburban areas, simply because the rail provided convenient access to the urban centers that people were so desperately trying to escape for their private residences. Transit service to the suburbs made this desire for suburban life a reality. Basically, the early suburbs of American can be considered the first TODs in America (Foster, 1981; Bernick and Cervero, 1996; Hondorp, 2002; Hendricks and Goodwill, 2002). Suburban development could only occur in areas that were well-served by a transit system. Providing the service was profitable to the transit companies not just because of the increase in ridership, but also because the transit companies could purchase land to build railways, and then sell any extra land later to turn a profit even if the actual transit service itself was not profitable (Foster, 1981). The suburbanization of cities and the widespread use of the automobile led to development that was no longer transit-supportive, and thus transit did not participate much in these initiatives as the 20th century progressed.

Only recently, faced with financial failure, has the concept of rejuvenating and redeveloping the areas around transit been reconsidered. In the 1990's in particular, initiatives such as the "New Starts" funding program encouraged local governments to take action to make transit use easier and more attractive in their cities, while federal policies became more transit-friendly with the Intermodal Surface Transportation Efficiency Act and the Transportation Equity Act for the 21st Century (Hendricks and Goodwill, 2002).

The decision to build a TOD is a complicated one, as the success of the TOD can depend on many things. Belzer and Autler (2002) provides a six-criterion framework for assessing the success of a TOD: financial returns on investments, location efficiency, value recapture, livability, choice, and efficient regional land use patterns. The first two criteria make sense: becoming involved in a TOD project that does not cover the cost of investment in the foreseeable future is not a financially sound move for a transit agency or a developer, and a location and design for a TOD that does not either incorporate transit or provide relatively simple, non-motorized ways to access transit is hardly a TOD at all (Belzer and Autler, 2002). The third,

fourth, and fifth criteria pertain to homebuyers: people will look for properties that will allow them to save money while still having lots of choices for locations and travel modes that yield a good quality of life (Belzer and Autler, 2002). The sixth criterion applies mostly to planners who are concerned with the big-picture of the region's development. A successful TOD will meet some if not all of these criteria.

Unfortunately, not all TOD developments are unquestionable successes. For example, as of 2004, two TOD's (Center Commons and The Round) in Portland, Oregon experienced only limited success. The developers for the Center Common experienced financial woes over their inability to sell some of the housing units in the development, and the first developer for The Round actually went bankrupt on account of unxpected costs associated with the project.These projects did achieve higher density and mixed land use that is transit-supportive, as is discussed in section 3.2.5, but they were not successful in terms of construction or leasing out the newly developed land. Other TODs in Portland enjoyed some success. The Pearl District was successful as of 2004 (Cervero et al., 2004), experiencing notable ridership from development around its streetcar line (Cervero et al., 2004). A Reconnecting America report (Thorne-Lyman et al., 2011) identifies key issues facing the Portland, Oregon region in its endeavors to build TODs. Among those issues, limited funding sources is listed first. On the other hand, the report also addresses the risk associated with TOD projects as a limiting financial factor in developments. Investments for TODs might be difficult to obtain if TODs in the area have a record of being financially unviable. TOD can be transit-supportive only if the project is successfully constructed and the housing and business units are sold or leased. Otherwise,as two of the Portland, Oregon TODs demonstrate, at least one party in the development process will likely experience financial difficulty.

Joint Development

The distinction between joint development and transit-oriented development is sometimes blurry. For example, Forkenbrock et al. (1990) defines joint development as "land development near an existing transit facility, taking advantage of value created by the concentration of passengers." In the words of Beltran et al. (1986) "joint development refers to the planning and implementation of an income producing real estate development which is adjacent to or physcially reltated to an existing or proposed public transportation facility." Cervero et al. (2002) explains that more specific definitions for joint developments address the "fiscal, institutional, or legal dimensions" of the partnership between the public transit agency and the private developer and therefore distinguish JDs from TODs. With respect to the financial aspects of a joint development, the two groups of JDs that the Cervero et al. (2002) identifies are joint developments that engage in revenue-sharing (i.e., arrangements to increase the revenue of the transit agency) or joint developments that engage in cost-sharing (i.e., arrangements designed to lessen the costs the agency would face as a result of the development) with the private developers.

There are several distinctions between TODs and JDs. A distinction between the two are presented by Cervero et al. (2002): TODs are typically of a larger scale than JDs. Lai (2008) draws the distinction that while TODs can be built on land owned by a variety of entities, JDs are

usually built on public land, usually directly on top of transit stations. Furthermore, frequently in TODs a public agency will coordinate the project, whereas with JDs, a public-private partnership is formed.

A 2004 study (Cervero et al., 2004) identifies more than 100 TODs and JDs in different states within the US. Further research from selected web references (listed at the end of the References section of the report) updated the study's numbers of existing and planned TODs and JDs within those states, and the results summarized in Table 2 show 173 Rail and Rail/Bus TODs and 10 Bus TODs. Using the Center for Transit-Oriented Development TOD database, the total number of existing transit stations in the specified states was found to be 3014. By this method, within the selected states, the percentage of stations that are recognized TODs and JDs is around 6%, though additional TODs and JDs might exist to make this statistic slightly higher for the entire U.S. As of 2004, Bethesda Metro Center was the most financially successful joint development project in the U.S (Cervero et al., 2004). While rail travel is the most predominant mode of travel for joint developments as it is for transit-oriented development, bus joint developments make up a higher percentage of the total joint developments than bus TODs comprise of the total TODs in the United States (Cervero et al., 2004).

Table 2. Estimates of Transit-Oriented Developments (Existing and Planned) by State

State	Rail and Rail/Bus TODs	Bus TODs	Date
California	50	1	-
Colorado	5		2006
Delaware		1	2004
Florida	2	1	2004
Georgia	7		2008
Illinois	6	1	2012
Kentucky	1		2004
Maryland	10		2011
Missouri	1		2004
New Jersey	24		2012
New York	5		2004
North Carolina		1	2004
Ohio	3	1	2007
Oregon	11		2007
South Carolina		1	2004
Texas	6		2004
Utah	26		2012
Washington	3	3	2004
Washington, DC	13		2004

Smart Growth

Smart growth is a similar development concept to promote transit use among other things, but the arguement for it has a unique underlying premise than the arguements of economics and social benefits presented to support transit-oriented and joint developments. Smart growth, as defined by the Surface Transportation Policy Project and the National Resources Defense Council, is development that is "compact, walkable, and transit accessible"(Miller and Hoel, 2002). This definition is rather similar to those of transit-oriented development and joint development. However, transit smart growth definitions more typically address environmental impacts as well: Miller and Hoel (2002) cites the Environmental Protection Agency and others as identifying smart growth as "an approach to (metropolitan) development that serves the economy, community, and environment." Of course, many of the principles addressed by transit-oriented and joint development also can have a positive effect on the environment by reducing emissions and urban sprawl, but their definitions rarely state a specific environmental preservation goal. Smart growth appears to be more a code by which urban growth can occur in ways that are healthy for the community and its residents and less an identifiable project like many joint developments.

Transit-oriented development, joint development, and smart growth are just three of the more common development types that aim to create more liveable communities. All three recognize the role that transit plays in that goal. Of course, any initiative that reduces the amount of car trips a person makes will have a positive impact on air quality. Similarly, initiatives that are aimed at densifying the built environment likely will have a positive impact on transit ridership. As transit ridership goes up, so will transit agency profits. Furthermore, the creation of communities that are well-rounded, with a mix of land uses and a built environment calculated to make daily life easy and pleasant without car use, will improve the overall quality of life of community members.

3.1.3. Recognized Benefits of Selected Initiatives

Papa et al. (2008) reminds the reader that there are two goals that drive the creation of TODs and JDs. The short term goal is to provide a financial lifesaver to transit companies that currently depend on governmental assistance to provide their service, and the long term goal, which provides more economic, social, and health benefit to society in the long run, is to increase transit ridership and to shape future developments to achieve a more livable and sustainable community. In order for transit-oriented developments and joint developments to truly benefit the public, both goals must be kept in mind. If the initiatives work well and these goals are achieved, such benefits can be broken down to specific elements or specific benefits to different groups, as identified by several sources (see Table 3).

As is shown in Table 3, three groups benefit from successful TODs and JDs. Those groups are the transit agencies themselves, homebuyers, and the community in which the development is located. Each group experiences unique benefits from TODs or JDs, and those benefits are discussed in this section.

Table 3. Benefits of Transit-Oriented Development and Joint Development

Transit Agency	
Benefit	**Source**
Increased Ridership	Cervero et al. (2002), Arrington and Parker (2001), Hendricks and Goodwill (2002), Evans et al. (2007), Cervero et al. (2004)
Increased Revenue	Cervero et al. (2002)
"Strengthen Institutional Relationships"	Cervero et al. (2002)
"Efficiency in Transit Service"	Cervero et al. (2002)
"Land Development Profits"	Cervero et al. (2002)
Homebuyers	
Benefit	**Source**
Mobility	Arrington and Parker (2001), Hendricks and Goodwill (2002)
Affordable Housing	Arrington and Parker (2001), Cervero et al. (2004)
"Increase households' disposable income"	Arrington and Parker (2001)
The General Community	
Benefit	**Source**
Safety	Arrington and Parker (2001), Evans et al. (2007), Cervero et al. (2004)
Reduced Traffic	Cervero et al. (2002), Arrington and Parker (2001), Hendricks and Goodwill (2002), Evans et al. (2007)
Reduced Environmental Impacts from Air Pollution	Arrington and Parker (2001), Hendricks and Goodwill (2002), Evans et al. (2007), Cervero et al. (2004)
Economic Development	Cervero et al. (2002), Arrington and Parker (2001),
Decreases Infrastructure Costs	Arrington and Parker (2002), Evans et al. (2007)

Transit Agencies

Ridership increase is the most common benefit listed in the column of transit agency benefits from land development. This increase is intuitive, as transit companies have a say in the development process, and can therefore promote design guidelines and other specifications such that the people who live, work, and shop in the developments can use transit very easily and inexpensively in comparison to using their automobiles. Ideally, the most complete developments will by their very design discourage auto usage within or near the development, and this deterrence will likely encourage the use of other modes, such as walking or transit.

Hanson (2004) and Wachs (2004) both note that land values and transit accessibility have a direct relationship. This can benefit transit agencies that wish to make profits from renting, selling, or leasing their developments. However, some, such as Giuliano (2004), have doubts based on empirical evidence that that relationship is in fact true across the board. Reconnecting America (2007) offers an example to support the positive impact that transit-friendly

development has on land values: in Arlington, Virginia, in a decade's time, land prices around transit stations increased by 81%. The same study notes that the value of the land developed for housing and commercial use within 2 blocks of The Pearl District streetcar station in Portland, Oregon, was worth $2.3 billion in 2005. Of course, were transit companies to sell or lease these developed properties, they would turn a significant profit.

Homebuyers

The first and most obvious benefit that homebuyers derive from transit company participation in land development is increased access and mobility options. With transit company participation input into the development process, developments can have the necessary transit-supportive infrastructure (such as sidewalks leading to transit stations and rail infrastructure) and operating schemes to serve the new developments. When transit becomes as (if not more) safe, efficient, convenient, cost-effective, and otherwise as appealing as private automobiles, homeowners will be more likely to use the transit option for their daily trips.

Furthermore, studies have shown that an increase in property values follows developments that have a strong transit presence. The Reconnecting America (2007) study "Why Transit-Oriented Development and Why Now?" finds that land values increase with transit-friendly development. Such an increase can work in the homebuyer's favor as well, should the owner decide to sell the home. Furthermore, the reduced transportation costs associated with using transit can be a big benefit to residents. Benefits such as these create demand for transit friendly development among homebuyers and make them more willing to invest in properties that are transit-supportive. This in turn benefits the transit agencies that participate and invest in the new developments.

Community

A common benefit for the community is a decrease in the damage that a development inflicts upon the environment. For example, the reduced congestion that Goodwill and Hendricks (2002) and Cervero et al. (2002) mention directly leads to the improvement in air quality, which four out of the five sources in Table 3 give as a benefit of transit-oriented development. This is intuitive, as reducing the amount of automobile trips reduces congestion, which in turn reduces emissions. Of course, for such an effect to be noticeable, transit-oriented development, joint development, and smart growth must become more widespread than they currently are. Because the financial benefits to transit agencies and homebuyers alike are so attractive, there is a chance that these initiatives can become popular enough in the future to positively influence the environment. Furthermore, Cervero et al. (2002) cites "[spurring] neighborhood redevelopment" and Cervero et al. (2004) cites "[creating] a sustainable built form" as benefits of TODs. Both of these benefits promote the ideal of livable and sustainable communities, an ideal that is hard to quantify but nonetheless meaningful to the community members themselves.

3.2. Involving Transit Service Providers in Land Development

3.2.1. Historical Perspective

In the late 19th century and early 20th century, when public transportation was in its heyday, many transit companies were making significant profits and therefore had the capital to invest in land development. Yago (1984) asserts that "land speculators and transit owners nearly always spoke with one voice (and were sometimes the same person)," and therefore implies that transit company owners realized that their services were redistributing the population within their city and realized the profits that could be made from capitalizing on land development and sales in the less developed areas to which their companies provided service. The connection between land development and public transportation was thereby established.

During this period of rapid growth in urban areas, many Americans desired to leave the grimy and overcroweded cities for the cleaner air and more open space that suburban areas offered, and reliable transit service made it possible for many Americans to achieve this goal. With the involvement of transit companies in the development of new suburbs, development could occur in such a way that residents and shoppers were dependent upon transit, so the suburbs of the early 20th century can be considered an example of transit-oriented development (Foster, 1981; Bernick and Cervero, 1996; Hendricks and Goodwill, 2002). Muller (2004) also notes that the suburbs were created on the outskirts of cities largely because developers had more room to work in the less-dense city perimeters, and that transportation was essential to connect these suburbs to the work and shopping attractions of the city. Yago (1984) notes that street railways around the turn of the century were mostly profitable from the land investments that the transit companies made and not from the actual operation of the transit lines, which at that time were in turmoil over the call for public ownership and the rising cost of operations. In the early 20th century, transit agencies not only participated in land development, but also invested in it.

However, transit companies' involvement in land development in the United States slowed as the 20th century progressed. As suburbanization became more widespread across the United States, and as the automobile became more available to the average citizen, transit use declined. Indeed, the suburbs that transit created in the early 1900's contributed to the decline of transit over the next century. As people moved to the suburbs, and as the suburbs themselves became more and more spread out, the land use became less mixed, and population became less dense. Transit use in urban areas declined as people were able to buy automobiles to move easily within the suburbs in a way they often could not do by using transit.

In the 1970's, as public transit became publicly owned as a result of financial woes, transit companies shifted their focus to more strictly defined transit operations such as meeting demand and away from land development (Hendricks and Goodwill, 2002). The initiatives mentioned in section 3.1.2. have gained popularity in recent years, but they are not widely practiced.

3.2.2. Levels of Involvement

The participation of transit service providers in land development can take several forms at several levels. Cervero et al. (2002) identifies three main levels of involvement in land development: proactivism, coordination and facilitation, and inactivity. It is important to note that in this project, these levels of involvment apply to participation but not investment, as transit agencies could invest in land development at any level of participation (see Section 3.2.4. for further explaination).

"Proactivism" involves transit agencies "aggressively seeking to influence land development around their transit facilities" (Cervero et al., 2002). This means that transit companies will proactively seek out opportunities to develop their own land around transit stations. Transit agencies may also actively attempt to influence the owners and developers of land they do not own to develop in a transit-friendly manner. It should be noted here that the level of proactivism involves transit agencies *driving* the development process. This level of involvement requires a deep commitment to the principle that transit companies should financially invest and participate in land development. Of course, the transit companies must be able and willing to accept the financial risks of investing without a clear timeline for anticipated returns, and they must be willing to either hire or train employees in land development details (Cervero et al., 2002).

"Coordination and facilitation" is a more common level of involvement that transit service providers take in land development than is proactivism (Cervero et al., 2002). Coordination and facilitation can include the transit agency consulting with developers about how local land can be developed to encourage transit usage and improve the communitites around transit stations, transit incentives to cities where developments are constructed to fit with and promote transit, and even, as in the case of the Tri-Met company of Portland Oregon, donating transit agency land to developers who are willing to develop in accordance with the goal of increasing transit (Cervero et al., 2002). However, coordination and facilitation can take other forms. As mentioned in Christopher (2006), a communication framework that either exists or can be established between planning agencies and transit agencies is recognized as a highly important institutional policy and practice. Coordinator and facilitator agencies do not lead the development process, but they do offer crucial assistance during the development process.

Perhaps the most common level of involvement, particularly in smaller and even medium-sized cities, is "inactivity" (Cervero et al., 2002). Some agencies are simply unable to involve themselves given limited budgets and other immediately pressing issues, while others do not feel that transit is a legitimate player in land development (Cervero et al., 2002; Christopher, 2006).

3.2.3. Influential Policies and Practices

The involvement of transit companies in land development offers a solution to the financial problems and the decline of transit usage over the years. But there are many policies and practices that affect the success of transit companies' involvement in land development. Such policies and practices can come in many sizes and shapes and can originate from different levels

of government. Banister (2005) presents those levels of government involvement as: 1) National level policies that influence development locations; 2) Regional level policies that influence development types and land use; and 3) City level policies that influence land use, density, and layout. A "package" of policies from different levels is advocated in the literature (Banister, 2005). Some current policies and practices in the US create an encouraging environment for transit involvement in land development. Other policies impact transit service provider involvement in a less positive way. Similar policy classifications are presented by Anderson and Forbes (2011): the programs that promote TOD activities can be divided into the five categories of federal policy, authorizing legislation, design guidelines, local zoning, and direct funding and financial incentives. No matter the level of government from which the policies and programs originate, they have the potential to greatly impact both the transit agency's decision to invest or participate in land development and the success of a development once it has been constructed.

The following sections will provide in-depth discussions regarding policies that affect the ease with which transit companies can develop land to meet the goal of turning a profit from ridership.

Subsidies and Financing

The policy category that typically receives the most attention and to which the most success is credited is that of direct funding and financial incentives. Anderson and Forbes (2011) notes that the direct funding category can be further divided into three groups: funding dedicated to planning the TOD, funding to buy the land the TOD will use, and funding to actually construct the TOD. Of course, financial aid at any stage of a TOD can be a valuable incentive for transit agencies to invest in land development. Table 4 enumerates the state, regional, and local TOD and JD programs and initiatives identified by Anderson and Forbes (2011) by the types of funding they received. As is apparent from Table 4, most of the TOD and JD financial programs are in states along either coast where the population is the greatest. Of course, this might be the reason that the concentration of TODs is greater along the coastal states than in the Midwest and interior states. No program was identified by Anderson and Forbes (2011) that provided funding from the local level for the planning of TODs and JDs. This lack of local funding for planning for TODs actually makes sense, because a TOD or JD cannot be isolated: successful TODs and JDs are interconnected throughout the region by the transit service like the string-of-pearls analogy presented by Deakin and Cervero (2008). Therefore, it makes sense that TOD or JD planning would be funded from the regional or state level and not the local level.

Financial rewards are in some cases offered to transit agencies that invest in land development. An example would be the transit companies who recieve extra funding under the San Francisco Metropolitan Transportation Commission's Housing Incentive Program for investing in or building housing within a quarter of a mile of transit stations (U.S. Department of Transportation Federal Transit Administration, and U.S. Department of Housing and Urban Development, 2008).

Table 4. Types of Funding Initiatives (Anderson and Forbes, 2011)

Property Acquisition		
State	Regional	Local
Maryland	California	Colorado
Minnesota	Georgia	Minnesota
	Oregon	North Carolina
	Texas	Washington
	Washington	
Planning		
State	Regional	Local
California	California	None
Connecticut	Colorado	
Maryland	District of Colombia	
Massachusetts	Georgia	
New Jersey	Illinois	
Pennsylvania	New York	
	Pennsylvania	
	Texas	
	Washington	
Implementation		
State	Regional	Local
California	California	Arizona
Connecticut	Colorado	California
Illinois	District of Colombia	Minnesota
Maryland	Oregon	Oregon
Massachusetts	Texas	Washington
Minnesota	Washington	
New Jersey		
Oregon		

Another kind of fiscal incentive that can impact the success of transit-friendly developments is demand. All the financial aid for construction of TODs in the world will not create successful developments if homebuyers, businesses, and retailers simply refuse to rent or lease land in the developments. No sensible entity, whether a transit agency, a land developer, or anyone else for that matter, will build any development for which there is no demand and no possible demand in the future. One way to encourage homebuyers to think outside the box and consider moving out of suburban sprawl is to offer location-efficient mortgages to those who would relocate to areas that are more densely populated and closer to transit (Hendricks and Goodwill, 2002). This way, some extra demand for transit could be generated. Transit companies would then have a stronger incentive to participate in land development.

Christopher (2006) also mentions funding strategies as a way to encourage the inclusion of transit considerations in land development, by citing developer funding (developers paying the

extra expense of accommodating transit to avoid paying impact fees), muncipal funding (cities finding funds to help pay for the inclusion of transit in development), separate funding sources for planning activities, and tax increment financing as four ways where land developers, government planning agencies, and transit agencies can financially cooperating to create successful transit presence in new developments. These strategies target many stakeholders. When even one stakeholder or participant in land development is financially encouraged and supported, the others are provided with the extra security.

More specifically, financial aid to developers can have a big impact on transit participation in land development. The goal of most developers is to make a profit, and some TOD projects involve higher risks than do normal projects, so banks may be less likely to offer the developers the necessary loans (Hendricks and Goodwill, 2002). Cervero et al. (2002) cites methods such as sliding-scale impact fees and a reduction in other fees to ease the burden on land developers who undertake TOD projects and potentially make these projects more attractive to developers in the future. Tax abatement is another financial incentive for developers to undertake development projects, as is "resourceful and opportunistic" funding strategies (Cervero et al., 2002). Developers who have incentive to work with transit agencies and are able to secure the necessary funding are attractive business partners for transit agencies who may lack their own land development expertise. The financial strength of their development partners may affect a transit agency's decision to enter into a development agreement with a developer.

These programs, initiatives, and funding strategies are ways to lessen the cost of transit participation in land development for all parties involved. Because a development must result from the collaboration between government planning agencies, land developers, the transit agency, and sometimes the public, funding received by any of these parties for transit-friendly development has the potential to encourage transit participation in land development.

Zoning

Funding policies are not the only policies that affect the success of transit service providers' participation in land development. Another important category of policy that impacts transit-friendly development is zoning. Christopher (2006) cites regulatory tools as being influential on bus transit-oriented and joint developments. Zoning policies can affect transit participation in land development in various ways.

Zoning policies can have a negative effect on transit involvement in land development. Hendricks and Goodwill (2002) considers government regulations, particularly the current zoning policies that encourage the low-density sprawl that spawns automobile usage, to be the biggest regulatory obstacle to transit-oriented and joint developments. For example, some prime land for TOD or JD use may be in or near residential zones, and local regulations typically forbid the high-density, mixed land use that encourages the use of public transportation without rezoning (Cervero, 2004). Zoning that does not allow the kind of transit-supportive development that transit agencies would like to pursue would make the development process difficult for transit agencies and therefore discourages transit participation in land development.

However, zoning policies may be necesary to encourage transit-friendly development in some areas if they can accommodate or even encourage mixed use and high density development, at least around stations (Cervero et al., 2002; Morris, 2002). Morris (2002) identifies a few areas in the United States that have zoning policies supportive of transit use. One such area is Montgomery County, Maryland, where zoning policies are not necessarily much different from the typical, transit-hostile zoning policies of many suburban areas of the United States, but the zones themselves are significantly smaller than they are in other areas. This allows for an elegant compromise between mixed land use and the single-family dwelling neighborhoods that are in such high demand. A neighborhood structure still exists, but on a smaller scale, and because the zones are so much smaller, land use naturally mixes. Another example would be Arlintgon County, Viriginia. In this area, transit-friendly zoning that encourages mixed land use and higher densities is in effect within a certain distance of transit stations, and basically the mixed-use zones are oriented around transit stations. Such policies make involvement in land development easier for transit companies, as the companies can encourage the use of their service without going through the added trouble of changing exisiting zoning policies, the ease of which varies from region to region. Similar policies exist elsewhere. Atkinson-Palombo and Kuby (2011) explores the Phoenix, Arizona system of overlay zoning: some zones within the city and around the suburbs have zones within zones, so to speak, where some of the regulations are modified to accommodate transit-oriented development or joint development in the future. One interesting finding of the study is that despite the overlay zoning, the type of businesses and developments already in the area affect the success of the TOD that is introduced to the area. Furthermore, it is found in the same study that the types of developments that occur after the implementation of TODs or JDs depend on the land use before the TODs or JDs are constructed. Therefore, while changes to zoning regulations and structures helped the success of TODs and JDs in some areas, such changes of regulation do not present a solution to the problem of implementation of TODs or JDs for all areas.

Zoning policies and the ease with which those policies can be changed are important factors for encouraging TODs and JDs. They are also important factors for encouraging transit participation in land development because the ease with which a transit agency can develop, regardless of whether the develop falls under the definitions of TODs or JDs, can affect the cost, duration, and other aspects of a project.

Parking

It is recognized that parking policies can influence development. Banister (2005) notes that parking policies influence modal choice in the short term and location for development in the long term. Requiring minimum parking is another regulation that weakens the motivation for transit-friendly development: people who have plenty of parking options and are already set in the pro-automobile mindset of the present will be less likely to take transit. However, some parking policies can be transit-friendly. Pucher (2004) notes that Canadian and European parking regulations set maximum numbers of parking spaces for new buildings instead of the minimum numbers set by cities in the United States. Basically, free and plenteous parking around a transit-friendly development will entice people to drive to the development, thus making the entire

development less effective at generating ridership. If a development is not likely to generate ridership or promote transit interests, it makes sense that a transit agency would choose not to invest or participate in it.

Trip Reduction Ordinances

Another way of promoting TODs and transit use is the implementation of trip reduction ordinances (Hendricks and Goodwill, 2002). Trip reduction ordinances encourage citizens and businesses to decrease the number of trips made by private car. Transit is a perfect way for these ordinances to be met. Trip reduction ordinances, also encourage the ideal of transit participation in land development, because transit-friendly developments are a way for residences and businesses to meet these ordinances, and the demand for the development can be strong. As the local community generates demand, transit companies might be encouraged to participate in development to meet the demand. Of course, a byproduct of meeting this demand is an increase in ridership. This increase in ridership that results from trip reduction ordinances can be a motivation for transit to participate in development.

Transit Agency and Land Developer Commitment

Many transit agencies do not have the personnel or desire to become involved in land development, which they do not view as relevant to their own operations (Christopher, 2006; Cervero et al., 2002). Therefore, many agencies do not actively participate in land development. Cervero et al. (2004) notes that most companies do participate minimally in developments by merely providing guidelines and suggesting regulations to local government and planning agencies, but such guidelines might lack the power or teeth to actually influence the developers' decision to include transit from the start of a project.

Transit participation in land development may be affected by a developer's commitment to working with transit agencies to ensure that transit needs are reflected in new developments. However, commitment to including transit interests in new projects is not always present. Perhaps one of the biggest obstacles to the growth of TODs and joint developments in the U.S. is the ignorance of the developers to the usefulness and potential benefits that public transportation can offer society: because public transportation is not popular in some areas, most developers currently do not consider it in their plans, and as a result a dilemma arises with public transportation being unable to grow and to become a more weighty factor in the plans of the land developers (Christopher, 2006). Hendricks and Goodwill (2002) suggests measures to make the idea of TODs and JDs more palatable to not only land developers but also potential home buyers: perhaps one of the most profound ways they identified in their report to promote to potential home buyers in particular the idea of TODs and JDs is to promote transit-friendly developments as preserving the suburban qualities such as open spaces and plenty of sunlight that attract Americans to the suburbs in the first place. If Americans developed the suburbs in an attempt to leave the noisy and overcrowded cities, a great many of them will avoid a return to similar conditions, even if it means forgoing their access to public transit. However, development can

occur in such a way that is both visually attractive and transit-friendly, and demand for these developments can encourage land developer commitment.

Transit participation in land development is a collaborative effort between transit agencies, government planning agencies, and land developers, and thus a lack of commitment on the part of one agency will discourage participation from the others.

Connectivity between Developments

The amount of TODs and JDs near a city can dictate the success of the developments. A few, widely-scattered TODs will not function as well or generate much demand for a city's transit as several linked developments will; TODs must connect easily with each other and with urban centers for the development to be successful. Deakin and Cervero (2008) liken a successful group of TODs to a strand of pearls in a necklace. It might be attractive to the public to have nice neighborhoods and shopping and business areas near a transit station, but if the transit station does not connect to other transit stations that are near areas where people might shop, work, or live, the development will not generate demand for the transit service. Indeed, the profits from land lease and sales might be the saving grace for the transit company in such a situation, but it would ultimately not advance the larger-picture goal of livable and sustainable communities resulting from increased transit ridership. Transit agency participation in land development will be encouraged if connectivity between developments ensures ridership and creates the potential for future developments.

Communication

Communication between transit agencies, government agencies, and land developers is a crucial practice for development that is transit-freindly to occur. Doubtless there is a wide range of communication levels among these three groups in reality, but it can be safely assumed that the developments that are most transit-friendly are those which are built on strong working relationships between agencies. Communication between agencies is a major aspect of commitment to a project. The agencies that are committed to making a development transit-friendly will do what is necessary, including communicating with other agencies, to ensure success. Without commitment and communication, participation in land development by transit agencies will be difficult and an unattractive investment of time and money.

3.2.4. Case Studies

Around the world, the practice of transit agencies involving themselves in land development is relatively common. However, the extents to which the agencies involve themselves range from minimal involvement to extensive involvement and extensive financial investments in the developments. This section provides examples of different levels of transit agency involvement and investment in land development throughout the United States and in foreign nations. For the agencies that participate and invest heavily in land development, the mechanism by which that development, including the purchase of the land, is funded is examined in this study.

Highest Level of Involvement: Proactivism

The United States: Washington, DC and Other Cities

Perhaps the best example of proactivism of transit companies in land development in America is the case of the Washington Metropolitain Area Transit Authority (WMATA). According to Cervero et al. (2004), WMATA "aggressively seeks out mutually advantageous transit joint development opportunities." In fact, the same report states that as of 2003, WMATA had hired its own TOD personnel (Cervero et al., 2004). WMATA owns the land on which it pursues joint development due to the federal government's financial assistance before the metro system was even built in the 1970s. In acquiring the land to build the original metrorail system, the federal government acquired more land than was strictly necessary to avoid creating unusable leftover land parcels, and the property became WMATA's to develop later on (Cervero et al., 2004).With the land readily at their disposal, the company was able to partner with land developers to create developments that can be leased or sold to generate great revenue. Indeed, as of 2004, WMATA's Metro Center in Bethesda generated the most profit of all the transit-oriented and joint developments in the U.S. with $1.6 million in lease profits (Cervero et al., 2004). Doubtless, ridership and revenue from fares went up as well, as the development attracted new riders. More details about WMATA's joint development program is presented in Chapter V of this report.

The Metro system in Houston, Texas, also invests in land development. METRO invests in joint development of its properties, beginning with a soliticitation for developers (Metropolitain Transit Authority of Harris County, Texas, 2012). The process is well established and documented. Dallas Area Rapid Transit (DART) also engages actively in TOD activities, and also actively seeks new land for such opportunities (DART, 1989).

In the cases of high levels of transit involvement and investment in land development in the U.S., transit agencies such as WMATA receive significant profits for their investment. Of course, it goes without saying that when land is developed to promote transit use, the community will receive the benefits presented in Table 3 that results from increased ridership.

China: R+P

37% of the public transit trips in Hong Kong, China are made on the railways of the Mass Transit Railway Corporation (Loo et al., 2010). Public transit use is very common in Hong Kong, and developments related to transit are frequently successful. A handbook put together by Agence Francaise de Development and the French Ministry of Ecology, Energy, Sustainable Development, and the Sea, or AFDFMEESDSA (2009) presents the high density of Hong Kong as a contributing factor to the success of the developments in which the MTRC invests. The MTRC's unique funding relationship with the Hong Kong government ensures its success with minimal dependence on government subsidies. The mechanism that the MTRC uses to involve itself in land development is the Rail+Property Development (R+P) system. Indeed, because the government and the privately-owned MTRC partner to make these projects a reality, the projects

themselves can be considered joint developments. In fact, AFDFMEESDSA (2009) cites the Hong Kong developments as the most successful joint developments in the world.

The first step in the creation of the development is for the government of Hong Kong to give the MTRC a land grant, thereby saving the company the trouble of purchasing the land around the proposed rail stations (Cervero and Murakami, 2008). Then, a developer must purchase the rights to develop from the MTRC at an after-rail price that is much higher than the MTRC paid under the land grant, and the developer and the MTRC reach an agreement about co-ownership of the property and the way profits from the development will be divided (Cervero and Murakami, 2008). Cervero and Murakami (2008) also mentioned that the MTRC has policies that reflect its belief in its role of bettering the community by collaborating with city planners and others to develop large, transit-oriented developments.

The form of subsidies given to the MTRC is unusual. Unlike other governments that must frequently subsidize and support public transit companies as the companies and the communities they serve age, the government of Hong Kong invests in a one-time initial land grant at the beginning of each project to ensure that the company will be able to sustain itself in the future. The profits from these developments are re-invested in more developments. The reliance of the MTRC in subsidies has in this way decreased over time, and the MTRC cash flow statements from their annual reports do not reflect the receipt of operating subsidies within the past ten years (MTRC, 2001 – 2011).

The increasing growth in China has led to increased suburbanization in China, much like the explosive population increase and immigrant influx did in the United States in the first half of the 1900's (Cervero and Day, 2008). However, public transit is still a strong mode in Hong Kong. Urban rail is a very popular mode of transit in China, and the TODs that support urban rail operations are increasing rapidly. The government of Hong Kong is very supportive of transit in its regulations: zoning regulations are specifically designed to promote mixed land use (Dunleavy, 2001). In this way, the Hong Kong government supports the concept of transit-friendly development, and the policy atmosphere is good for the MTRC to develop.

Of course, the biggest benefit resulting from the invovlement of the MTRC in land development is profit to the MTRC. Cervero and Murakami (2008) model the increase in ridership that occurred as a result of higher densities, which the R+P projects in Hong Kong most certainly create. Therefore ridership increases (and therefore an increase in revenues from fares) is a benefit. Similarly, Cervero and Murakami (2008) use a statistical model to show that R+P projects have higher housing price premiums than housing that was not a part of an R+P project. This means that revenues from leases are likely significant for the MTRC. This means that increased lease revenues are a benefit resulting from the MTRC's participation in land development. Basically, the investment in R+P developments has been financially remunerative to the MTRC.

Japan

In Nagoya, around 77% to 78% of the operating costs of publicly owned bus transit are covered by farebox revenue (Dunleavy, 2001). Ridership is obviously strong. However, Japan presents a different story of transit investment and participation in land development than does Hong Kong. The degree of involvement that privately owned transit service agencies in Nagoya take in land development varies from company to company. One of the privately operated rail companies, the Tetsudo Railroad Company, does invest in real estate, and it draws about 15.6% of its profits from that source (Dunleavy, 2001). The situation in which the public Teito Rapid Transit Authority in Tokyo finds itself is similar to that of the publicly owned transit companies in Nagoya, with farebox revenues covering only 86% of operating costs (Dunleavy, 2001). Private rail companies in Tokyo have turned to real estate investment to help finance the transportation service.

The private rail companies in Japan have some notable success with investments in land development and real estate. Cervero and Murakami (2008) asserts that as of 2006, all of the private rail companies in Tokyo earned significant amounts of their revenue from real estate endeavors. In fact, according to Gilbert and Ginn (2001), transit investment in land development in Japan has caused increases in land values around transit stations. This in turn creates more interest in investment in that land from transit agencies. To get started, the private companies in Japan acquired the land for development and investment from the government. In the case of the JR East and Tokyo Metro companies, a term of their privatization deal in the late 1980's was the granting of land to the companies for development and real estate purposes, but as of 2008, only the the JR East company had been very active in development (Cervero and Murakami, 2008). In this way, the subsidies that are given to transit companies are on a small scale (Priemus and Konings, 2001). Indeed, Japanese rail companies made 5-42% of their operating income from land value capture activities such as real estate (AFDFMEESDSA 2009).

Basically, in Japan the government promotes development, and the transit companies, whether public or private, must simply follow the plan, entitled the "New Comprehensive National Development Plan" (Dunleavy, 2001). This plan promotes livable communities and transit friendly development, but leaves the actual details to individual prefectures, who must develop a 10-year plan for development (Dunleavy, 2001). This kind of development has been acknowledged as promoting transit ridership. When the transit agencies are leasing out the development or the development rights, transit can earn even more of a profit from participating and investing in land development. In this way, land development not only turns a profit for Japanese transit agencies by providing real estate investment returns but also shapes development in such a way that transit use is encouraged.

In the case of several US transit agencies, the MTRC in Hong Kong, and several Japanese transit agencies, investment in land development does occur and can be a significant supplement to the revenues produced by fares. In the cases of the WMATA and the MTRC in particular, the government's help in purchasing the land makes a big impact on the agency's decision to invest in the land development, and consequently in the amount of profits each agency sees. It is

important to note that this initial aid in purchasing the land is in fact a subsidy. However, this subsidy is sustainable. Another example is the MTRC in Hong Kong that receives a land grant and then uses the profits from the development to cover operating costs. These profits have a snowball effect, and in this way, an initial subsidy given by the government to aid the transit company in acquiring land will help decrease transit agency reliance on operating subsidies over time.

Moderate levels of involvement

Florida, Pennsylvania, California, and Minnesota

The Facilitation and Coordination role can be thought of as the moderate level of involvement. In these cases, the transit agencies coordinate with land developers and take upon themselves the role of coordinator and facilitator. The transit agency does not lead the development process.

The examples identified by Christopher (2006) are largely examples of transit agencies in the facilitation and coordination role. The Central Florida Regional Transportation Authority works with developers to make changes and developments that focus on improving the service the transit company offers the area, which will improve the development, and finds other funding for capital improvements (Christopher, 2006). The Centre Area Transportation Authority in Pennsylvania makes reasonable requests from developers early on in the project and works with the developers to find ways around problems that incorporation of transit into the development might pose (Christopher, 2006). Omnitrans of California and Metro Transit of Minnestora participate more from a planning standpoint. Omnitrans participated with the government in developing a Community-Based Transportation Plan that has regional components, while Metro Transit in Minnesota was actually merged with other governmental agencies into the Metropolitain Council, which, among other things, addresses community planning and transit services (Christopher, 2006). These agencies have close ties to local governments and influence land developers through those ties. In these cases, the coordination occurs between the transit agencies and the government, but the agencies themselves still participate at the "coordination and facilitation" level of involvement.

In all of these examples, the benefits resulting from moderate transit agency involvement, which interestingly enough do not in the presented cases include direct investment, are to the community from improved service and more compact and focused land development. Benefits in terms of increased ridership are the benefits experienced by the transit agencies.

Plano, Texas

Another example of transit company invovlement at the "facilitation and coordination" level in land development is that of Plano, Texas in the 1990's. The Dallas Area Rapid Transit (DART) agency worked closely with the city of Plano to create a transit-friendly environment in downtown Plano, Texas. The arrangements of the agreement were that DART would purchase the land necessary for the development, which was designed to rejuvenate a failing downtown

area, and the city of Plano would be responsible for the utilities and making the station accessible, with DART reimbursing the city for construction costs above and beyond the value of the purchased land. This agreement was expanded upon to create a larger-scale transit-oriented development in downtown Plano. In this case the city was the driving force behind the development and urban rejuvenation, but a significant amount of the property that was developed was purchased from the previous owners by DART in the late 1990's (Turner, 2012). In this case, DART took the role of facilitator and coordinator, because their purchase of the land and agreement to assist the development greatly aided in the development process, but the actual development itself was set in motion by the city of Plano before DART became involved. The city of Plano benefitted from the new, more liveable development in their community, and DART benefitted from increased riderhsip, which met its 2010 projected goals (Turner, 2012).

Copenhagen, Denmark

One particular case study presented in the handbook put together by AFDFMEESDSA (2009) examines the benefits that Metroselskabet, the public transportation company responsible for Copenhagen's public transit system, derived from its participation in land development. According to the handbook, the company paid for half of the cost of developing a line addition to the transit system by selling plots of land owned by the city of Copenhagen, which is a partial owner of the company, and other governmental agencies. The other half of the costs were covered by fares from ridership after the land was developed and sold. However, the urban form of Copenhagen also furthers transit interests in the area: Copenhagen's development occurs along lines that radiate out from the central city (Newman and Kenworthy, 1996). Development that occurs is compact, mixed-use, and attractive, and the city itself furthers transit interests by reducing the available parking in the city by a set 3% each year (Newman and Kenworthy, 1996). Basically, the investment of transit agencies in land development in Copenhagen is supported by development and parking policies put in place by the city.

In the case of Copenhagen, the city was the driving force behind the development. In this case, transit agencies did experience direct benefit from their involvement in real estate and development by covering the costs of a new line. Of course, the community benefitted from the line as well. In this case, a moderate level of activity benefitted both the transit agency and the public.

Istanbul, Turkey

Similarly, the Istanbul Metropolitan Municipality participated in land development. After the plans, which would create a shopping and business destination for transit users and also house a repair shop for passenger train carriages, were agreed upon, the land for the development, which was publicly owned, became the property of the nation's housing and urban development administration and was consequently sold to cover the project costs (AFDFMEESDSA, 2009). Furthermore, the same handbook notes that at the time of publication, plans were underway for projects funded in a similar manner. In this case, the investment itself wasn't made by the transit company specifically, but the agency did participate in the development, so the agency acted in

the coordinator and facilitator role. As in Copenhagen, in Istanbul there are benefits to both the transit agency and the community from transit agency participation in the development. The transit agency was able to cover the costs of a capital improvement, and the community benefitted from the new space and the economic activity it ignited.

The benefits obtained from moderate transit agency investment and involvement in land development is felt by both the transit agencies themselves and the community. However, unlike the large financial benefits received by those agencies that invest and participate at the highest levels of involvement in land development, the benefits that agencies receive from investing and participating at the moderate levels of land development are more limited. Still, benefits to both groups are significant enough to be noted.

Inactivity

Singapore

Other countries such as Singapore have a system of transit planning that functions well despite the fact that the transit agencies do not participate or invest in land development. Hong Kong's R+P projects are the result of the efforts of private companies that both own and operate the transit system, while in Singapore the government owns the rail lines and directs the property development around those lines while the SMRT Corporation and the SBS Transit Company actually operate the system with government subsidies (Cervero and Murakami, 2008).

Neither the SMRT nor the SBS companies participate or invest in land development or real estate to supplement their farebox revenue (Cervero and Murakami, 2008). Leading up to 2008, the SMRT Corporation fell slightly short of covering its operating costs by fare box revenue and revenue from advertising ventures, and the SBS covered its operating costs by fare revenues alone (Cervero and Murakami, 2008). The operating subsidies given to the transit operators come from a government fund that is bolstered by taxes and fees on automobile ownership and usage and land-development related activities (Cervero and Murakami, 2008).

Making the land development transit-friendly is the responsibility of the Housing Development Board and the Urban Renewal Agency in Singapore (Cervero and Murakami, 2008). The rail transit operators in Singapore benefit from the transit-friendly development that these agencies encourage and enable only in terms of the increase in ridership and indirectly the increase in property taxes which will fund the subsidies they receive: these companies receive no direct finances from real estate or lease revenues.

In cases similar to that of Singapore, government policies such as taxes and fees take the lead in encouraging transit ridership, which in turn increases transit revenue. When revenue isn't enough to cover operating costs, government subsidies make up the difference from funding raised by the taxes and fees on car use. The system is very functional, even though the transit agencies do not invest in land development.

3.2.5. Lessons Learned

So far in the previous subsection, many examples of transit systems investing (or not investing, as the case may be) in land development have been presented. From these examples, two lessons can be derived:

1. The level of involvment a transit company takes in land development is related to the benefits received by the transit agency.
2. Government policy is a strong factor in the success of a transit system, and in some instances may substitute a transit agency's direct investment in land development for a successful system.

These two conclusions are further explained in the following sections.

Levels of Involvement Affect Benefits Received

As with anything else, the amount of effort that a transit company puts into a development affects the benefits the participants will receive from the project. In this specific case, the higher the levels of involvement and investment that transit service providers take in land development, the greater the financial rewards they receive. The MTRC of Hong Kong is an excellent example. The MTRC is aggressivley proactive with its investments in new joint and transit-oriented developments. As a result, it is considered one of the most successful practicioners of transit investments in land development in the world. A similar approach is practiced in Washington, DC, where WMATA is actively invovled in developing and selling land it already owns to turn a signficant profit. Some transit service providers in Japan draw significant portions of their income from real estate revenues. In all three instances, the proactive investment and participation of transit companies in land development was financially remunerative to the agency, and when the projects were designed to encourage transit use, the community experienced signficant benefits as well.

Transit company involvement in land development at the coordination and facilitation level can also be beneficial to the companies and the communities they serve, but the financial benefits to the transit agency are on a somewhat smaller scale. An illustrative example for this is Istanbul, Turkey. The transit agency's participation in a consulting and coordinating capacity with the government actively selling the land on which the development (including the rail carriage repair shop) was to be built was a successful means of funding a capital expenditure for transit. The benefits mentioned in previous sections were also experienced by the local community. In Copenhagen, the transit agency's participation in plans for development and the actual development itself were essential to the project's success. In both cases, the developments and participation were on a smaller scale than those of the agencies that participate in land development proactively, and the profits experienced by the Copenhagen and Istanbul projects were not as great. However, in both cases, the benefits to the community were significant. Other than increased ridership that might result from transit agency input, the benefits to the community were the primary benefits of the involvement among cases of transit agencies participating at the coordination and facilitation level.

Interestingly, the direct relationship between activity and the financial or other benefits that a transit agency and community derive does not seem to hold true for all transit companies that are inactive in land development. In Singapore, as in many other cities worldwide, transit agencies do not invest in land development. While Singapore transit agencies do not cover all of their operating costs with fares, the public transit system is efficient and has good ridership. The fact that ridership is still strong in Singapore indicates the presence of other factors, such as government policies that encourage transit use, that affects the success of transit in an urban area.

Government Policy and Success of Transit

The other factor having a significant impact on the success of a transit system even if the transit agency does not invest or participate in land development, appears to be government policy in the region. In the instances where transit does invest in land development, local policies that support and encourage transit usage are an additional layer of support for a project that was likely to be successful merely from real estate sales after development. For agencies that do not invest in land development, policies that make transit more attractive or encourage people to drive less can substitute for some of the success that the agencies lose from their inactivity in land development.

For example, in Singapore, taxes on car useage are used to subsidize public transit operating costs, so transit agencies can provide an effective alternative to those who cannot afford or choose not to drive. In Singapore the government has control over housing and new development, so transit interests are always represented in new developments. In Copenhagen, the reduction of parking in urban areas and the commitment to transit-friendly development on the part of the government encourages transit usage. In these cases, strong government policies encourage transit-friendly development, though the transit service providers themselves do not necessarily invest in the development, and transit ridership is strong enough to cover larger amounts of the agency's operating expenses than in other areas.

Higher levels of involvement in land development typically lead to higher benefits for transit agencies and the community, but with the right supporting government policies, transit agency inactivity can still lead to adequate transit service and strong ridership. Sometimes even strong ridership may not be enough to cover operating costs, so the investment of transit agencies in land development can be a useful practice to reduce the dependency of an agency on operating subsidies.

Chapter IV Survey Results

One of the purposes of this study is to identify current practices and trends regarding the policies and practices that pertain to transit use and land development that are presented in Chapter III. The survey responses give interesting insight into the current state of transit in the United States and the policies that support or discourage the initiatives that involve transit service providers in land development. The provision of subsidies, communication levels, transit agency and land developer commitment, zoning, parking, and the applicability of trip reduction ordinances are examined in this chapter (see Section 4.1) to gain a better picture into the common policies in the surveyed areas. Furthermore, the attitudes of various parties towards transit agencies investing in land development is investigated (see Section 4.2). Frequency distributions and cross tabulations are performed to offer insight into the current policies that affect transit-friendly development in the United States.

Surevey respondents represent a variety of populations, areas, and agencies. (Please see section 2.2.2. for further details.) The majority of the survey responses come from the Southeast U.S., but the Northeast U.S., the Central U.S., and the Southwest U.S. are also represented. The size of the population each response represents varies. As mentioned in Chapter II, 15 survey responses were anlayzed. Seven of those responses represent some variety of government planning agency, and eight of those responses represent a transit agency. Please refer to Figure 1, Figure 2, and Figure 3 in Chapter II for more details about the areas and agencies surveyed.

4.1. Survey Results Pertaining to Policies and Practices

The following sections detail the results of the survey questions that addressed policies and practices that affect the participation of transit agencies in land development. Except where indicated, these results reflect responses from both transit agencies and government agencies. To obtain these results, simple frequency analyses were run on each question.

4.1.1. Recognized Benefits of Transit Involvement to the Community

Different agencies recognize different benefits from transit agency investment in land development. It is apparent from Figure 4 that transit agencies perceive the benefits to be financial in nature and affect mostly their own agency, while government agencies recognize the wider benefits of transit participation in land development. This difference in perceived benefits makes sense, as government planning agencies generally think on a broader, community-wide scale than perhaps transit agencies usually think. From these results, one can conclude that transit agencies' motivation to invest in land development might be profit-oriented, but their investment can result in many community-wide benefits as well.

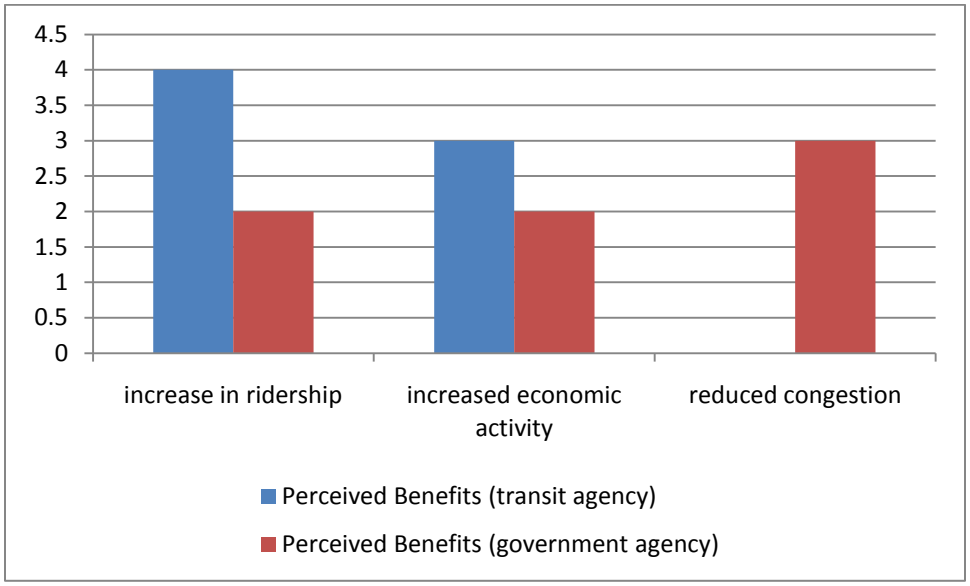

Figure 4. Perceived Benefits of Transit Participation in Land Development

The benefits that an agency perceives it has gained or will gain from participation in land development also impact its levels of involvement. Of the transit agencies that participate in land development at the coordination and facilitation level, 33.3% (1 response) feel that increased economic activity is the biggest benefit to the community, while 66.7% (2 responses) of the agencies feel that increased transit ridership is the biggest benefit to the community. Of those that are inactive in land development, half feel that reduced congestion is the main benefit to transit investing in land development, and half believe that increased economic activity is the main benefit. This could perhaps indicate that transit agencies that do not participate in land development are inactive because they do not recognize increased ridership as an important benefit to their involvement in land development.

The benefits of transit involvement in land development offer valuable insight when viewed from a government planning agency perspective. Of the government agencies who claim that transit agencies in their area participate at the coordination and facilitation level, 50% (1 response) believe that reduced congestion is the biggest outcome to the community for transit involvement in land development, and the other 50% (1 response) believe that increased economic activity is the biggest benefit. Of the government agencies who claim that transit agencies in their area do not participate in land development, 66.7% (2 responses) believe that decreased congestion is the biggest benefit to transit participation, and 33.3% (1 response) believe that increased economic activity is the biggest benefit. Of the government agencies that do not know about the level of transit participation in land development in their area, half (1 response) consider increased economic activity the major benefit of transit involvement in land development, and half consider increased transit ridership as the major benefit of transit involvement in land development.

It is interesting to note that the government planning agencies who have transit agencies in their area that participate at the coordination and facilitation level do not consider increased transit ridership as the biggest benefit to the community resulting from transit participation in land development. This might suggest that transit involvement in land development does lead to broader positive impacts to the community than just the benefit of increased transit ridership, which ultimately affects transit agencies the most.

The recognition of the benefits to the community and to the transit agencies themselves that result from the participation of transit agencies in land development might encourage transit agencies to actively involve themselves in new development opportunities.

4.1.2. Communication Levels among Agencies

All levels of communication were represented among survey responses. The most frequent level of communication between government planning agencies and transit agencies is that of strong communication at frequent intervals (26.7%, or 4 responses). The second most common level of communication is that of moderate communication at frequent intervals (20%, or 3 responses). This leads researchers to conclude that it is common for transit agencies and government planning agencies to communicate frequently and at the very least, moderately. Communication between government planning agencies and transit agencies in the areas surveyed appears to be generally favorable to transit participation in land development.

Figures 5 and 6 break the data into levels of transit agency involvement in land development. From Figure 5 and Figure 6, it is important to note that higher percentages of higher and more frequent communication correspond to transit agency's participation at the coordination and facilitation level. These numbers indicate that frequent communication and higher levels of involvement are seen together, at least in the areas surveyed. However, there is no way for researchers to know if the communication comes as a result of the transit agency's participation or if the communication causes the increased level of involvement. Therefore, no solid conclusions can be drawn about the relationship between level of involvement and communication levels.

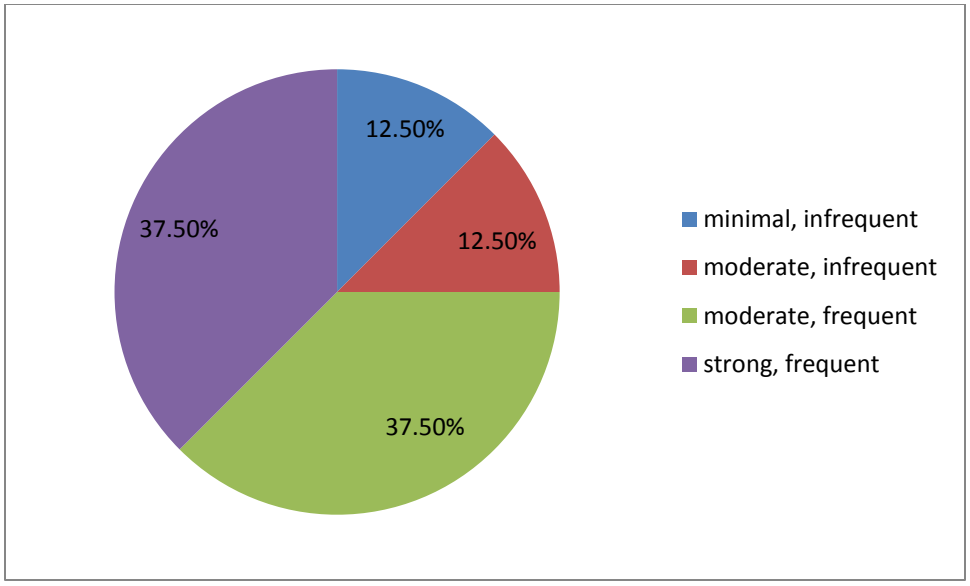

Figure 5. Coordinator and Facilitator Communication Levels

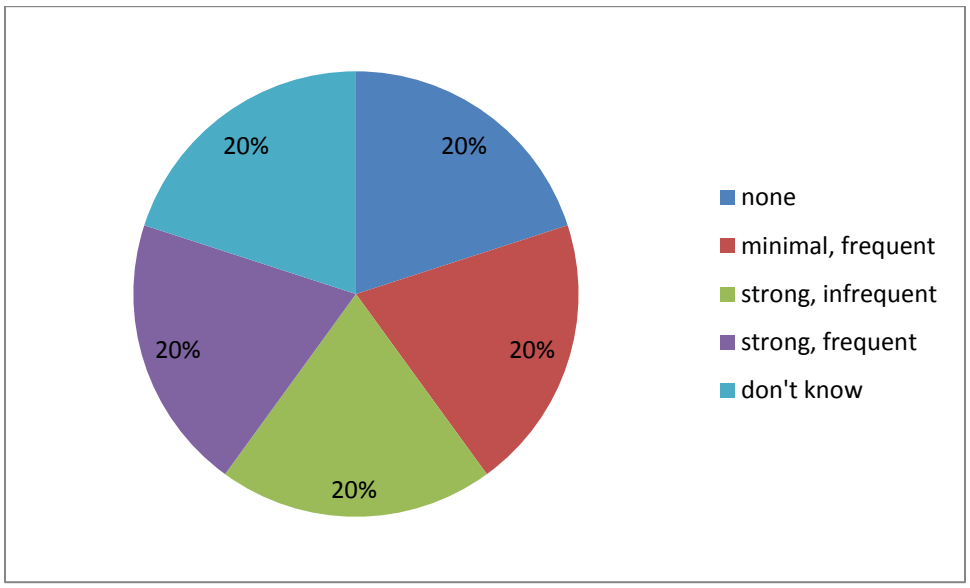

Figure 6. Inactive Agency Communication Levels

4.1.3. Subsidies and Financing

The financial aid currently given to transit agencies tends to come more in the form of subsidies, though grants for transit-oriented development activities are received by transit agencies. However, the funding mechanisms that transit agencies and government agencies feel would

most benefit transit service providers differ somewhat. The actual percentages of operating costs that are covered by revenues from fares are significant. Transit agencies in the areas surveyed mostly (33.3% of agencies) cover 20 – 40% of their operating costs with subsidies. The second most common percentage of operating costs that subsidies covered in the surveyed areas is 0 – 20% (26.7% of agencies surveyed), and 6.7% covered 40 – 60% of their operating costs with government subsidies.

The breakdown of the types of financial aid and subsidies is presented in Figure 7. Of the agencies in the areas surveyed, 42.9% (6 responses) receive grants for transit-oriented development activities, 71.4% (10 responses) receive operating subsidies, and 64.3% (9 responses) receive subsidies for capital improvements. In addition, 7.1% (1 response) do not receive any subsidies, and 7.1% (1 response) are unable to answer questions about subsidies. This shows that a significant amount of the transit agencies surveyed have access to government funding for their participation in land development.

The facts are clear about the kind of subsidies transit agencies currently receive. However, in some cases the breakdown of the kinds of subsidies the agencies would most like to receive is different from the breakdown of what they actually receive. The question that addressed the kinds of subsidies and financial aid that transit agencies would most like to receive was a multiple response question; interviewees could select multiple answer choices at a time. The results are presented in Table 5. Of the transit agencies surveyed, 37.5% (3 responses) would like to receive grants for transit-oriented development activities. 87.5% (7 responses) would like to receive direct financial subsidies for operating costs. 87.5% (7 responses) would like to receive direct financial subsidies for capital improvements.

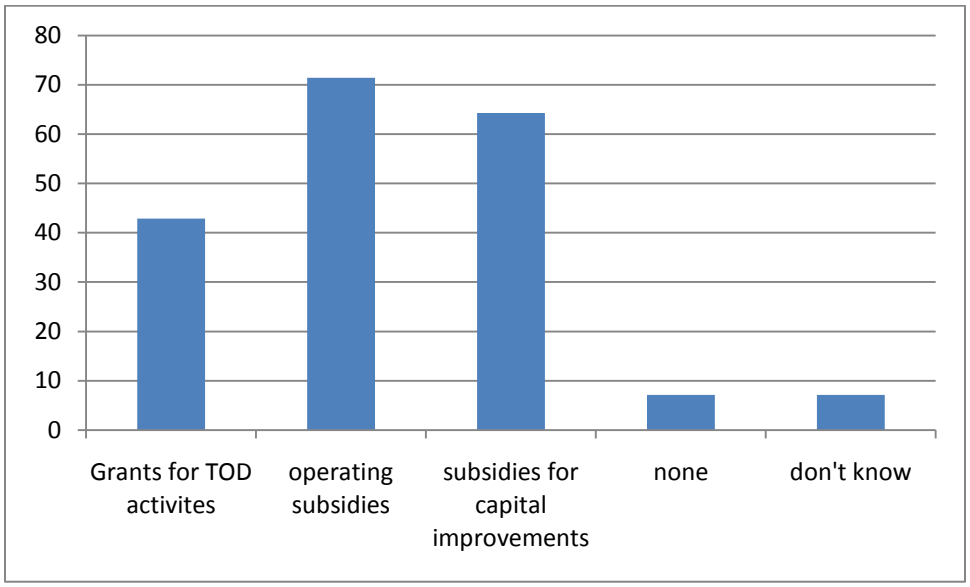

Figure 7. Subsidies and Financial Aid Currently Received

Table 5. Subsidies Transit Agencies Believe Would Benefit Transit Agencies

Subsidy/Financial Aid	Selected by Percent of Transit Agencies
Grants for transit-oriented development activities such as land purchase and planning costs	37.5%
Direct financial subsidies for operating costs	87.5%
Direct financial subsidies for capital improvements	87.5%

Table 6. Subsidies Government Agencies Believe Would Benefit Transit Agencies

Subsidy/Financial Aid	Selected by Percent of Government Agencies
Grants for transit-oriented development activities such as land purchase and planning costs	57.1%
Direct financial subsidies for operating costs	57.1%
Direct financial subsidies for capital improvements	42.9%

Government planning agency officials were allowed to give multiple responses to the question asking about the forms of financial assistance they feel would benefit transit agencies. The results are presented in Table 6. 57.1% (4 responses) of the government planning agencies surveyed feel that grants for transit-oriented development activities would benefit transit companies. 57.1% (4 responses) feel that direct financial subsidies for operating costs would benefit transit companies. 42.9% (3 responses) feel that direct financial subsidies for capital improvements would most benefit transit companies. It is noteworthy that government planning officials rated grants for transit-oriented development activities as beneficial to transit companies as direct subsidies for operating costs. From this data, one can conclude that government planning agencies recognize the benefit that transit agencies will experience from participating in land development.

Clearly, subsidies and funding opportunities are a well-established current practice and can have a significant impact on the extent to which a transit agency participates or invests in land development.

4.1.4. Zoning

The results from the questions addressing zoning policies are presented in Table 7 and Table 8. The most common (according to 66.7%, or 10 responses) zoning climate among the agencies surveyed allows dense, mixed use developments in some, but not all areas. It is notable that only 13.3% (2 responses) of the agencies surveyed claim that the zoning policies in their area encourage dense, mixed use development in all areas. Of the agencies that are aware of their areas' policies on zoning changes, about half (6 responses) claim that changes to zoning policies can be made only with great difficulty, and the other half claim that changes to zoning policies can be made with moderate effort.

Table 7. Zoning Policies

Zoning Policy	Facilitation and Coordination	Inactivity	Unable to Answer
Discouraging dense, mixed land use	100%	0%	0%
Allowing dense, mixed land use in certain areas	40%	50%	10%
Encouraging dense, mixed land use in all areas	50%	0%	50%
Don't know	100%	0%	0%

Table 8. Changeability of Zoning Policies

Zoning Changeability	Facilitation and Coordination	Inactivity	Unable to Answer
Difficult	66.7%	33.3%	0%
Moderately easy	50%	16.7%	33.3%
Don't know	33.3%	66.7%	0%

Basically, the areas surveyed seem to be areas with some dense, mixed-use development, but they are divided on how easily changes can be made to the zoning policies in their area. In a way, the fact that dense, mixed land use is allowed only in some areas in the majority of cases might explain the mediocre ridership that many agencies experience, because the built environment is not conducive to transit use in all parts of a city, so the ridership generated by one neighborhood might not have transit-supportive destination options. This might make transit agencies less willing to participate in transit-friendly development, as previously discussed.

4.1.5. Parking

The most common state of parking among the areas surveyed is that of plenty of free parking (33.3%, or 5 responses). The second most common state is that of plenty of paid parking (20%, or 3 responses). The remaining 46.7% (7 responses) have limited or very little parking, free or paid. This indicates that in many of the areas surveyed, parking availability is not conducive to transit use. The presence of plenty of free parking undoubtedly affects ridership, as many will choose their automobile over transit when parking is convenient to their destination and free. It can also affect a transit agency's decision to invest in land development, as the positive ridership gains resulting from the transit-supportive developments in which many agencies would invest and participate can be undermined by a plenteous supply of parking.

Of the agencies that exist in areas with plenty of free parking, 40% (2 responses) are coordinator and facilitator agencies, while 60% (3 responses) are inactive in land development. Of the agencies that exist in areas with plenty of paid parking, 66.7% (2 responses) participate at the coordination and facilitation level, while 33.3% (1 response) were unable to answer the question about level of involvement. Of the agencies that exist in areas with plenty of free *and* paid parking, 100% (2 responses) participate at the coordination and facilitation level. Of the agencies that exist in areas with limited, free parking, 100% (1 response) are inactive in land development. Of the agencies that exist in areas with limited, paid parking, half (1 response) are inactive in

land development, and half (1 response) are unable to answer the level of involvement question. Of the agencies that exist in areas with limited free and paid parking, 100% (1 response) participated at the coordination and facilitation level. Of the agencies that are unable to answer the parking question, 100% (1 response) participate at the coordination and facilitation level.

On the other hand, of the agencies that participate at the coordination and facilitation level, the most common parking situations include plenty of parking (free or paid). Of the agencies that are inactive in land development, the most common parking situation (60%, or 3 responses) is plenty of free and paid parking. Figure 8 and Figure 9 further present the detailed breakdown. The trend appears to be that the presence of free parking corresponds to increased levels of inactivity among transit agencies. This supports the literature presented in Chapter 3.

The presence of free parking corresponding to inactivity indicates a barrier to both participation and investment in land development. If the presence of free parking near a development affects the success of a development, it makes sense that transit agencies would be unwilling to take the financial risk of investing in a development that is less likely to succeed because of local parking policies. In this manner, the presence of free parking is a barrier to transit investment and participation in land development.

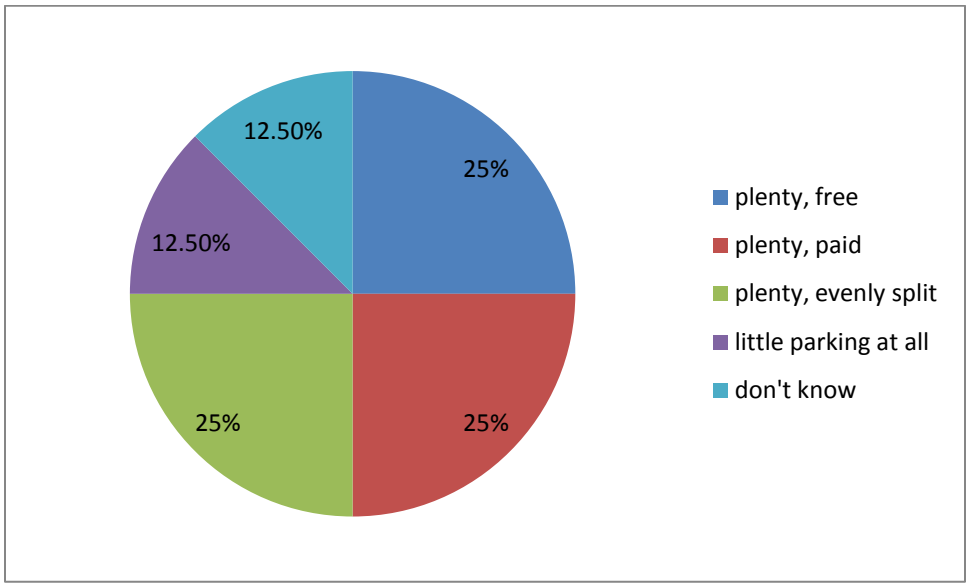

Figure 8 Parking Policies Among Coordination and Facilitation Transit Agencies

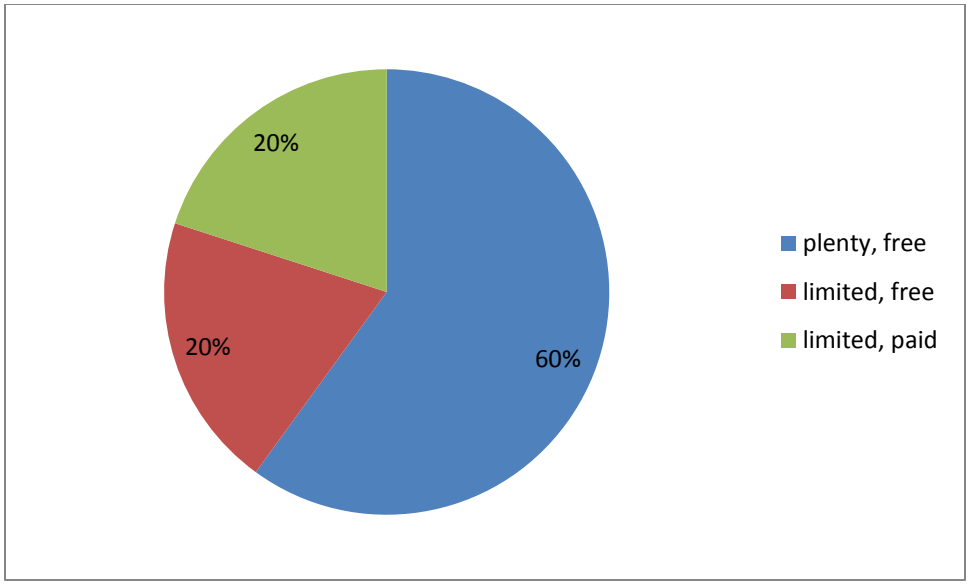

Figure 9 Parking Policies among Inactive Agencies

4.1.6. Trip reduction ordinances

66.7% (10 responses) of the areas surveyed are not subject to trip reduction ordinances, and only 13.3% (2 responses) are. The remaining 20% (3 responses) are unable to answer the question. Apparently trip reduction ordinances are not very common in the areas surveyed. Because trip reduction ordinances can be viewed as an encouragement from local government for citizens to use transit, in areas where they are not enforced, the ties between local government and transit agencies may not be strong. Thus, participation in land development might be more difficult for transit agencies. Furthermore, the demand for transit-friendly development may not be enough without trip reduction ordinances to makes investing or participating in those kinds of development attractive to transit agencies.

Of the agencies that are subject to trip reduction ordinances, half (1 response) participate at the coordination and facilitation level, while half (1 response) are inactive in land development. Of the agencies that are not subject to trip reduction ordinances, 70% (7 responses) are involved in land development at the coordination and facilitation level, while 30% (3 responses) are not involved in land development. Of those that do not know if their areas are subject to trip reduction ordinances, 33.3% (1 response) is inactive in land development, and 66.7% (2 responses) were also unable to answer the question about level of involvement.

Of the agencies that are involved in land development at the coordination and facilitation level, 87.5% serve areas that are not subject to trip reduction ordinances. Of the agencies that are inactive in land development, 60% (3 responses) serve areas that are not subject to trip reduction ordinances. See Figure 10 and Figure 11 for more details. The presence of trip reduction ordinances does not appear to correspond to any one level of participation in land development.

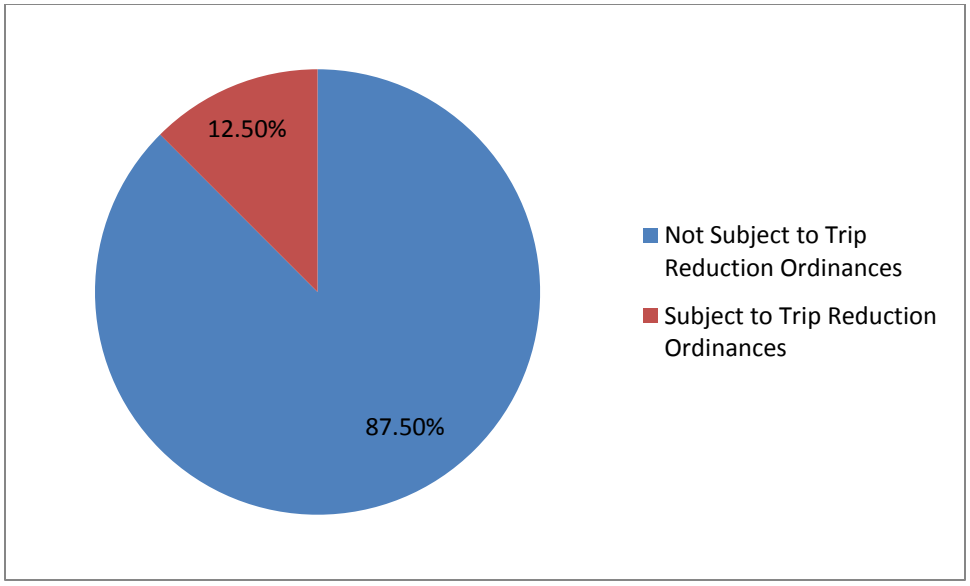

Figure 10. Trip Reduction Ordinances among Coordination and Facilitation Agencies

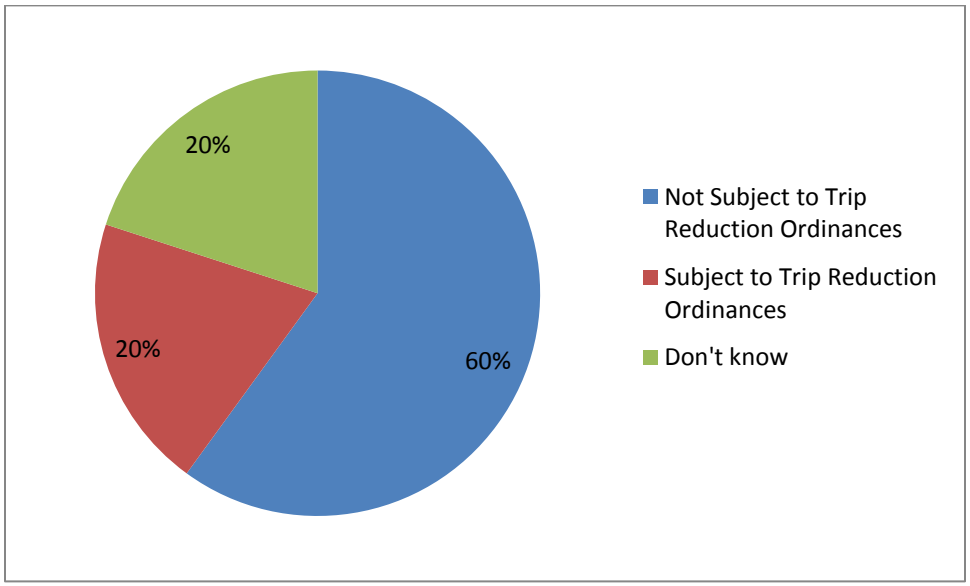

Figure 11. Trip Reduction Ordinances among Inactive Agencies

4.2. Attitudes towards Investments

This section details the results of the analysis of the survey questions that addressed the practice of transit agencies investing in land development. Levels of involvement in land development were cross tabulated with policies, and frequency distributions were run on questions that directly addressed the practice of transit agencies investing in land development and real estate.

Of the transit agencies in the areas surveyed, 53.3% (8 responses) currently participate at the coordination and facilitation level, while 33.3% (5 responses) are currently inactive in land development. The remaining 13.3% (2 responses) are unaware of the level of involvement that transit agencies in their area take in land development. Not a single one of the agencies surveyed is involved proactively in land development (see Figure 12).

4.2.1. Current Levels and Willingness of Involvement

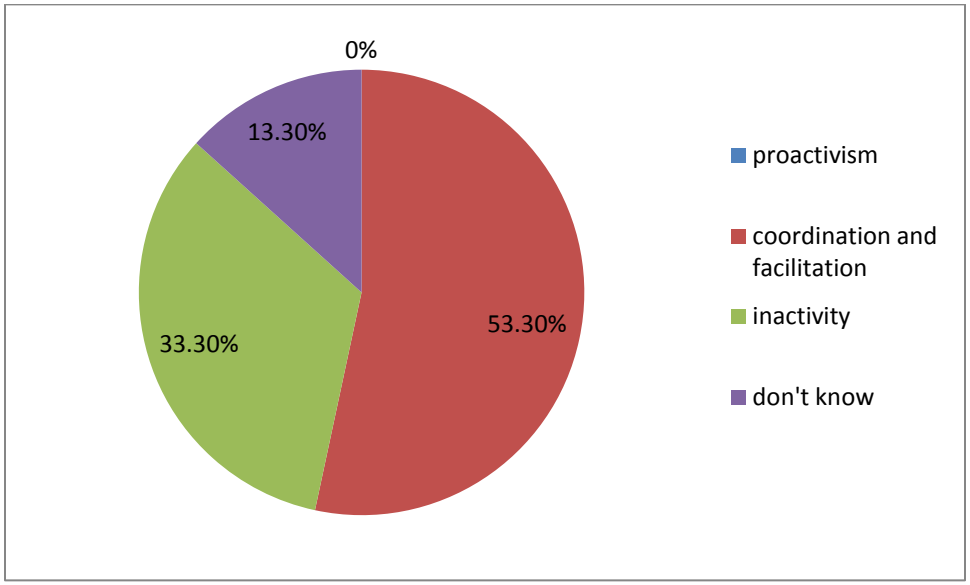

Figure 12. Current Levels of Involvement

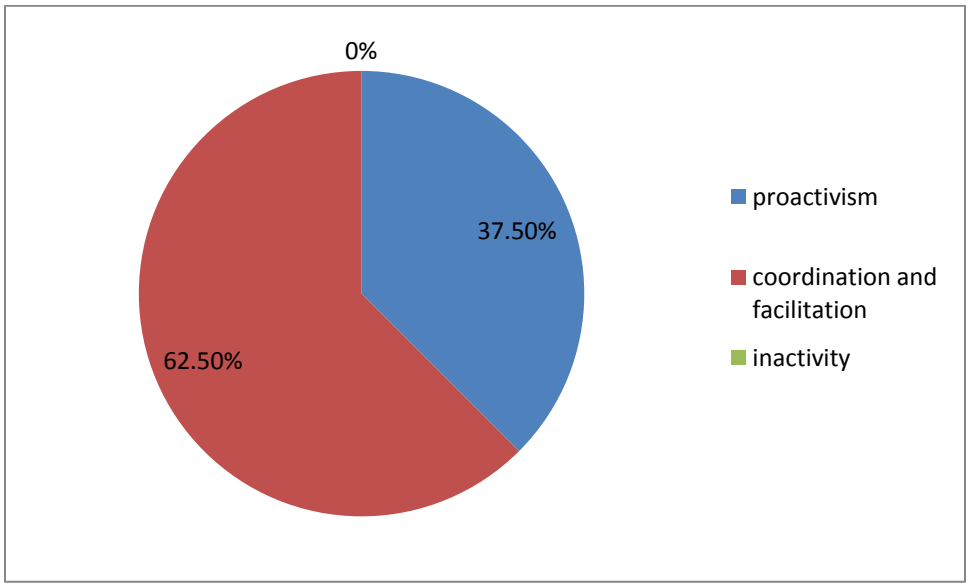

Figure 13. Desired Transit Agency Levels of Involvement (Transit Agency Perspective)

None of the transit agency interviewees feel that their agencies should participate in land development at the level of inactivity. However, the most common level of activity that transit agency representatives feel they should participate at is coordination and facilitation (with 62.5% responses). Only one respondent (37.5%) feels that his agency should be proactively involved in land development (see Figure 13). On the other hand, of the government planning agencies that responded to the survey, 28.6% (2 responses) would like to see transit agencies participate at the proactivism level, and 71.4% (5 responses) would like to see transit agencies participate in land development at the coordination and facilitation level (see Figure 14). It is noteworthy here that the majority of government agencies would prefer transit companies to take the coordination and facilitation role in land development rather than the proactivism role. It is also noteworthy that none of the agencies surveyed believe that transit companies should be completely inactive in land development.

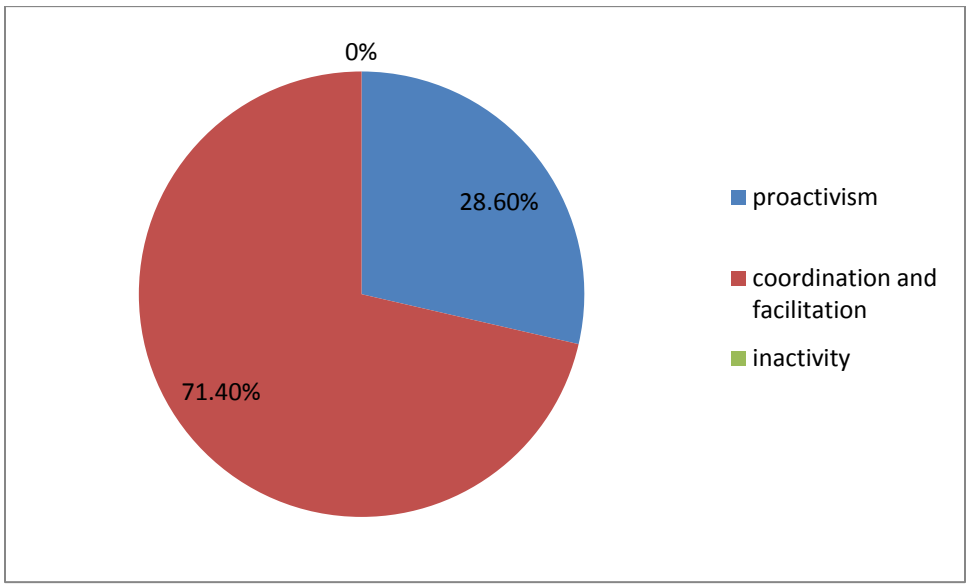

Figure 14. Desired Transit Agency Levels of Involvement (Government Perspective)

4.2.2. Investment Question Analysis

Several questions in the survey inquired about transit agency and government planning agency opinions about certain aspects of transit agency investment in land development. Opinions on the practice of transit agencies investing in real estate (with no development necessary) were also asked. This subsection details the results from the frequency analysis run on the responses for those questions.

Transit Agency Results

The concept of transit agencies investing in land development is not new, but yet many transit agencies are unaware of it. 80% (4 responses) of the transit agencies are familiar with the

concept of transit agencies investing in land development, but none of the ones surveyed claim to be actually involved in land development. This trend alone signals that there are barriers other than a lack of awareness of the practice that affect transit's decision to invest and participate in land development.

The majority of transit agencies feel that in an ideal world they should invest in land development, but only in projects that have a potentially high impact on ridership. Not a single respondent said that transit agencies should not invest in land development whatsoever. So transit agencies obviously see the relationship between transit and land use and feel that transit should be an active participant in land development to increase their own interests.

It is important to note that investment in land development and investment in real estate are both considered in this study. Over half the representatives surveyed feel that their investment in land development is infeasible for their transit agency. And the majority of transit agencies surveyed (60%, 3 responses) are unable to invest in real estate (which would entail buying and selling property that does not require development).

Several factors affect the decision of transit companies to invest in land development. Funding is one major factor. The majority (80%, or 4 responses) of transit agencies surveyed feel that the provision of grants or subsidies for the purpose of purchasing land to develop or sell would greatly influence the agency's decision to invest in land development. This leads researchers to believe that funding the initial purchase and or development of land is a big obstacle for transit agencies who might wish to invest in land development. Similarly, the transit agencies surveyed unanimously feel that grants for the planning and/or construction of new developments would affect their decision to invest. Another major factor is the availability of land developer expertise. The majority (75%, or 3 responses) of the agencies surveyed feel that their decisions to invest in land development would be influenced by the availability of land developer expertise for the project. This implies that transit agencies may not always be equipped to handle land development details without outside help, and the lack of readily available expertise might be perceived as a barrier to investment in land development.

Government Planning Agency Results

Of the government planning agencies that were represented in the survey, a third (1 response) of the respondents had heard of the practice of transit agencies investing in land development before taking the survey, and the rest of respondents had not. A third (1 response) believed that investment in land development would be feasible for agencies in their areas; a third (1 response) believed that the investment would not be feasible; and a third (1 response) was unable to answer the question.

About half of the government planning agencies surveyed believed that the transit agencies in their area would be able and willing to invest in real estate (already-developed properties which may or may not have the potential to impact ridership in the area). The other half believed that transit agencies in their area would not be able or willing to invest in real estate.

The government planning agencies surveyed believe that transit agencies should invest in land development. Only a third believed that investments should be made whenever possible. The remaining two thirds believed that investments into projects that have a potential to impact ridership should be made. The important trend to note here is that not a single respondent believe that transit companies should not invest in land development.

However, barriers do exist that make it difficult for transit agencies to pursue the level of involvement they would like to have in land development, and opinions and attitudes about those barriers were revealed in some of the free-response questions of the survey. One barrier cited by a local government planning agency representative is the unwillingness of some local government to allow transit agencies to invest in land development, which appears to contradict other survey responses. This response might reflect the attitudes that particular official had witnessed. Some survey responses indicated that the previous negative political experiences of transit agencies in other areas who invested in real estate would influence transit companies against investment in real estate. Also, some survey responses indicated that continuity in policies and support levels from the local government between election cycles would be a significant encouraging factor for transit investment in land development.

4.2.3. Summary of Interview Results

From the trends presented above, several barriers to transit agencies' inovlement and investiment in land development can be identified (see Table 9). The barriers are largely intuitive. Note that zoning policies and trip reduction policies are not listed as barriers. Due to the small sample size, no clear trend in the data for those questions was apparent to researchers, so no conclusions about barriers related to those policies are drawn in this study.

Table 9. Barriers to Transit Participation/Investment in Land Development

	Barriers
1	Presence of free parking
2	Lack of initial funding
3	Lack of recognition of connection between involvement and benefits
4	Lack of meaningful communication between transit and government agencies
5	Lack of land development expertise within transit agency

Several attitudes can also be identified (see Table 10). These attitudes reveal interesting trends among transit agencies and government agencies. Transit agencies know of the practice, so the reason(s) that many of them do not participate or invest in land development projects is one of those presented in Table 9 rather than a mere lack of knowledge or support for the idea on the part of any of the participants.

Table 10. Trends Regarding Transit Participation/Investment in Land Development

	Trends
1	Knowledge about the practice is relatively common
2	Government planning agency officials are highly supportive of the practice.

Chapter V Cost-Benefit Analysis

The practice of transit agencies investing in land development was introduced in Chapter 3, and several examples of the practice were presented. To further explore the feasibility of such practice, this chapter presents a more detailed look into the cases of the Washington Metropolitan Area Transit Authority (WMATA) and the Mass Transit Rail Corporation (MTRC) in Hong Kong, China. The analysis gives more quantitative insight into the profits achieved by these agencies and the inputs that are required to realize these profits.

5.1. Methodology

Data used for the analysis in this chapter came from reports published by each agency. For WMATA, the reports used were the Yearly Budgets from 2007 to 2011 and the Comprehensive Annual Financial Reports (WMATA, 2004 – 2006; 2007a,b – 2011a,b). For the MTRC, the reports used were the cash flow statements, financial reviews, and property sections of the corporation's annual reports (MTRC, 2001 – 2011). From these reports, statistics that are relevant to land and property development were extracted. They were then adjusted for inflation to 2010 value and converted to US dollars. The relevant data were plotted to reflect the changes over time. These charts were then compared against each other. The results are presented in this chapter, along with a summary of how the company invests or participates in land development.

5.2 WMATA

The Washington Metropolitan Area Transit Authority is an interesting case study of joint development practices. In the 1970's, the government gave the new transit agency the leftover land from the development of a new rail system. And WMATA now leases out development rights to those lands to generate notable revenues (Cervero et al., 2004). WMATA also has the skills and expertise needed for their joint-development program in-house. The development rights that WMATA grants come with regulations and stipulations, of course. Details of the proposed development are carefully considered to ensure that the development is transit-supportive, and the contract is made such that the developer must adhere to the agreed-upon details (Washington Metropolitan Area Transit Authority, 2008 Joint Development Guidelines). The contract also deals with the compensation that WMATA receives for the development rights. Thus, the joint development process has the potential to become very beneficial to the agency. Figure 15 and Figure 16 present the financial data on WMATA's joint development programs.

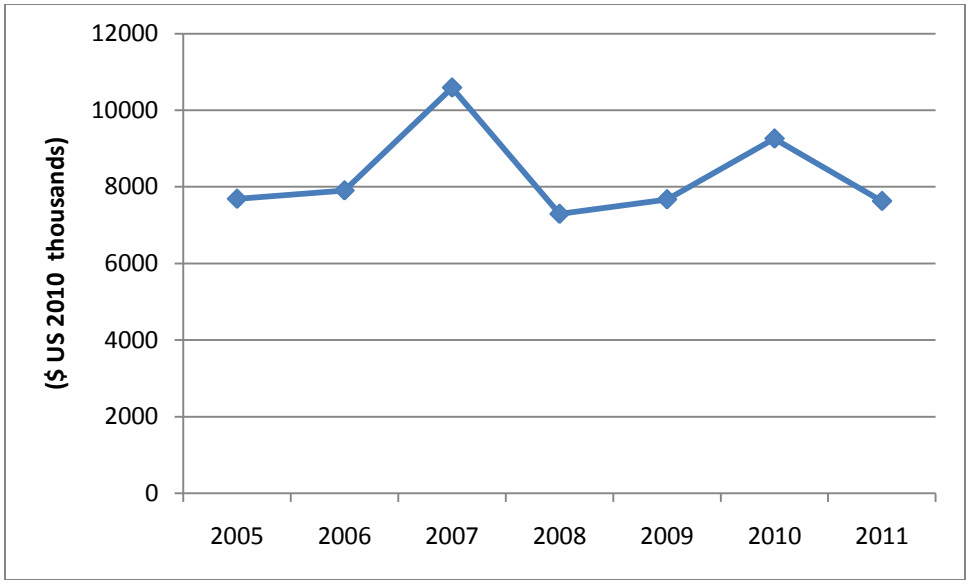

Figure 15. WMATA Joint Development Revenue

As is evident from Figure 15, the joint development revenues that WMATA realizes are in the millions of dollars. Revenues of this magnitude certainly contribute to the operating budget of the agency, as is evident from Figure 17, and those contributions are in the millions of dollars, though they have been decreasing since 2006. It is noteworthy that the revenues are relatively constant and do not reflect an increasing trend over the past seven years. It is also noteworthy that revenues from passengers as presented in Figure 16 have demonstrated an increasing trend over the same time period. Unfortunately, the net operating subsidies in Figure 16 have also been steadily increasing over the past five years.

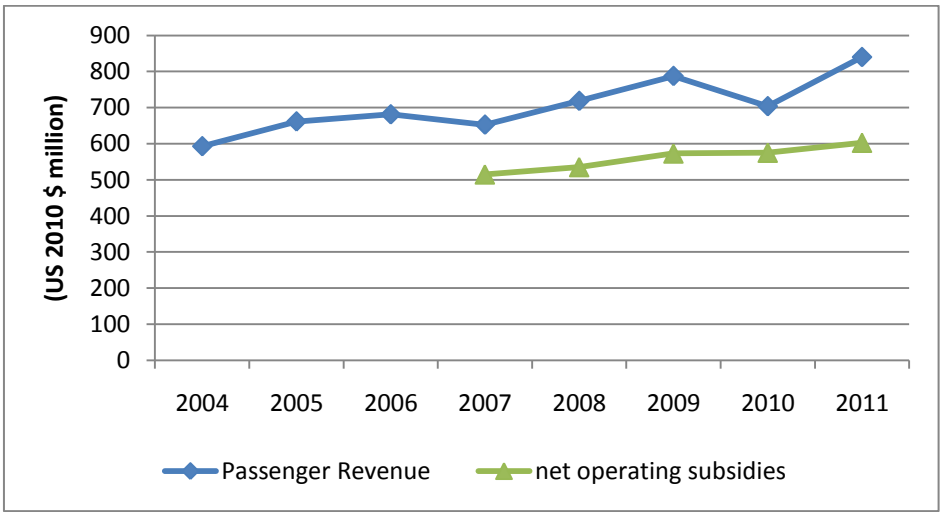

Figure 16. WMATA Passenger Revenue and Net Operating Subsidies

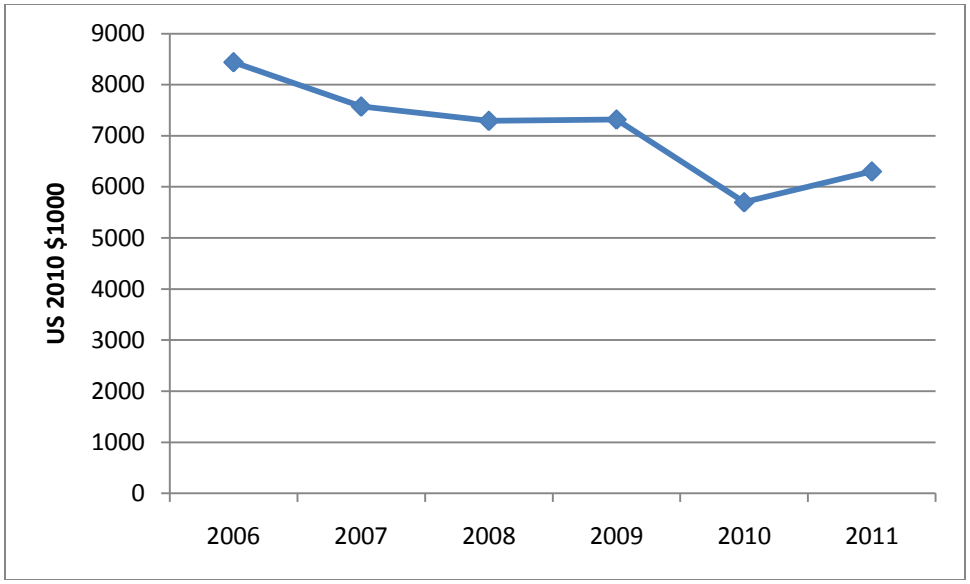

Figure 17. Joint Development Revenue Allocated to Operations

Doubtless, steady revenue from joint development ventures is very valuable to WMATA. The increase in revenues from passengers is doubtless a valuable source of income and a very encouraging trend for the agency. However, the increase in subsidies is not an encouraging trend. Despite the increase in passenger revenue and the stable joint development revenue, the agency's dependence on operating subsidies has been increasing. This indicates that though WMATA participates in land development to receive significant profits, such participation is not enough to counteract the agency's need for operating subsidies.

5.3 MTRC

The Mass Transit Rail Corporation of Hong Kong is also an interesting case study. The MTRC is granted development rights by the government of Hong Kong at a low price. The agency then sells those development rights, along with stipulations about how the land is to be developed, at a higher price (Cervero and Murakami, 2008). The development is, of course, required to be transit-supportive and fit into the vision of the city's urban planners. Property development is a big business for the corportation, with the 2011 receipts over $1.5 billion in Hong Kong currency (MTR Corporation Limited, 2011). The agency receives no operating subsidies (Cervero and Murakami, 2008). The revenues the agency generates from property development among other things are examined in Figure 18.

A closer look at Figure 18 reveals several inconsistencies in the data. Perhaps the most obvious issue is the abnormally high total operating costs the agency faced in 2010 and 2011. While these increases do reflect the increasing operating costs that the agency has experienced over the last 10 years, the increase is especially large for 2010 and 2011. A careful examination of the financial review section of the corporation's annual report explains that this increase is the result

of the expansion of operations (MTR Corporation, Limited, 2010). Another notable inconsistency is the very large revenue that the MTRC derived from land development in 2009. This large profit, however, can be explained by the reports as well as the "final profit recognition of several properties" (MTR Corporation, Limited, 2009).

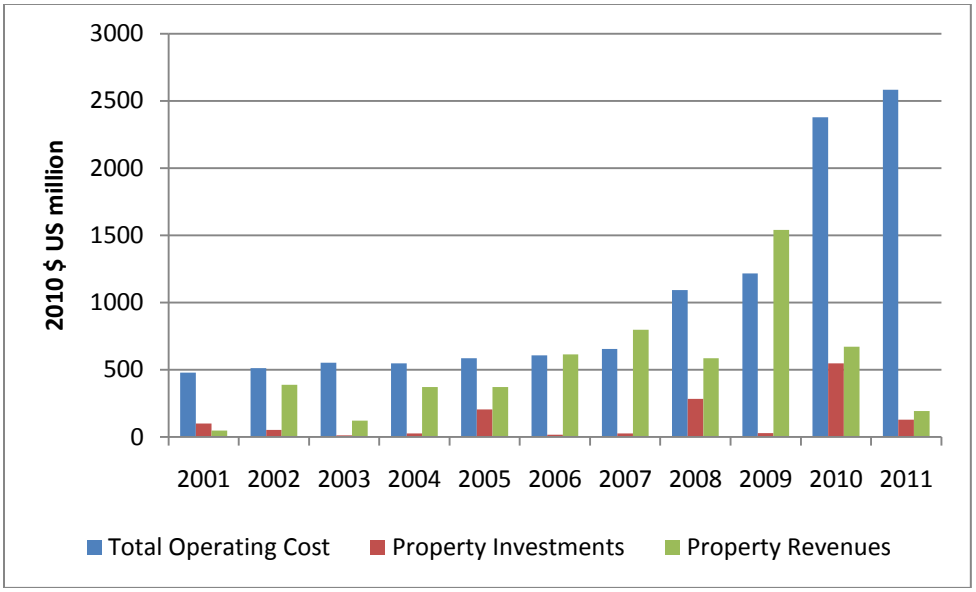

Figure 18. MTRC Operating Costs and Property Investments/Revenues

Despite these inconsistencies, the data is revealing. An important trend to note from Figure 18 is that, up to 2009, the revenues that the MTRC realized from property development were generally increasing. This implies that the investments that the MTRC makes in property development (though sporadic) have in fact led to increasing returns on the investment. In fact, for the data presented in the figure, researchers calculated the internal rate of return to be 571%. This data demonstrates that even small or irregular investments in land development can, with the right supportive government policies, lead to significant profits for a transit agency such as the MTRC.

5.4 Discussion

The two agencies studied in this cost-benefit analysis both represent succesful involvment in land development. However, the profits each agency receives are orders of magnitude apart. What causes this difference? Of course, more research, presumably in form of a more in-depth cost-beneift analysis, is necessary to draw rigorous conclusions. However, this preliminary cost-benefit analysis does provide some useful information. The agency (WMATA) that invests only land and personnel drew less profit from the venture than did the agency (MTRC) that invests significant capital as well. Doubtlessly, the strength of public transit use in general in the respective cities is a likely cause for this difference as is the financial strengh of each agency. Therefore, no strong conclusions can be drawn from the two cases studied. However, as

mentioned earlier in this report, the impression that researchers have gained both from the literature and from this cost-benefit analysis is that agencies that invest more in land development can experience more returns from that investment.

Chapter VI Conclusion

The current state of public transit in the United States is such that some agencies are beginning to explore new revenue-generating practices. Investment in land development is one such practice. Transit agencies can buy, develop, and sell land to meet two goals: encouraging transit ridership by the design of the development, and turning a profit from leases and real estate after the development. In some agencies in other nations, and even in a select few cases in the United States, transit agencies have obtained land (typically with the help of the government), developed the land in such a way as to promote transit use among those who are intended to use the development, and then leased the development out to residents and businesses to generate revenue. In some cases, the profits from land development are re-invested in more land development projects, and profits grow at a significant rate. Of course, as with anything else, the level of involvement that an agency takes in land development does directly affect the profits that the agency recieves from that development, except in cases where supporting local policies encourage ridership in such a manner that agencies derive benefits from ridership generated by new developments in which the transit agency is not involved.

This study aimed to identify policies, practices, and attitudes that pertain to transit investment and involvement in land development. The results of the surveys identified relevant trends and barriers (summarized in Table 11) though the survey sample size was insufficient for statistical analysis. No trends regarding zoning policies or trip redution ordinances were identifiable.

Table 11. Results

	Barriers to Investment
1	Presence of free parking
2	Lack of initial funding
3	Lack of recognition of connection between involvement and benefits
4	Lack of meaningful communication between transit and government agencies
5	Lack of land development expertise within transit agency
	Trends
1	Knowledge about the practice is relatively common
2	Government planning agency officials are highly supportive of the practice.

Overall, the barriers are intuitive and confirm literature review findings. Identifying these barriers gives transit agencies and government planning agencies a starting point for the process of incorportating transit in land development. Knowing that the presence of free parking, lack of intial funding, and the other barriers identified in Table 11 are present in an area, local government planning agencies and transit agencies can work together to overcome the issues that prevent transit agencies from investing and participating in land development. Furthermore, the

identification of the trends in Table 11 gives valuable insight into the state of knowledge and support that exists in the surveyed areas.

This study also conducted a cost-benefit analysis for two agencies that the literature identifies as successful examples of transit-oriented and joint development. The financial reports of these two agencies, the Washington Metropolitan Area Transit Authority (WMATA) of Washington, D.C and the Mass Transit Rail Corporation (MTRC) of Hong Kong, were examined, and a careful look was taken at the magnitudes of the investments in and profits from land development-related items. These were then plotted to the corresponding year to reveal trends in the data. WMATA's joint development revenues (in the millions) have been relatively constant over the past few years, though ridership has been increasing slightly. These revenues have not been enough to prevent increased need for operating subsidies. In the case of the MTRC, the sporadic investments yielded increasing returns. Indeed, over the 10-year period examined, the MTRC's property development was calculated to have an internal rate of return of 571%. Doubtless, the practice of transit investing in land development can be profitable.

There is much opportunity for future research. Larger studies might provide more insight into the trends presented in this study, and more in-depth statitsical analysis of larger amounts of survey data might reveal new trends. Another interesting area of future research would be a more detailed cost-benefit analysis of several more agencies to affirm that the results presented in this study accurately present the quantities of inputs used to gain a certain level of output. Furthermore, in this study, only three stakeholders in land development (transit agencies, government planning agencies, and land developers) were examined, but future research should be conducted to examine the views and attitudes of the public toward transit agencies investing and participating in land development. Such a study can possibly draw from the TCRP Report 47, "A Handbook for Measuring Customer Satisfaction and Service Quality" (Morpace International, Inc, and Cambridge Systematics, Inc. 1999).

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University Transportation Center for Alabama

Contact Information
University Transportation Center for Alabama
1105 Bevill Building
Box 870205
Tuscaloosa, AL 35487-0205
(205) 348-9925
(205) 348-6862 fax

utca@eng.ua.edu
http://utca.eng.ua.edu