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CITY CENTER DEVELOPMENT AND PUBLIC TRANSPORTATION

-- CASE STUDY IN TAIPEI

By

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ABSTRACT

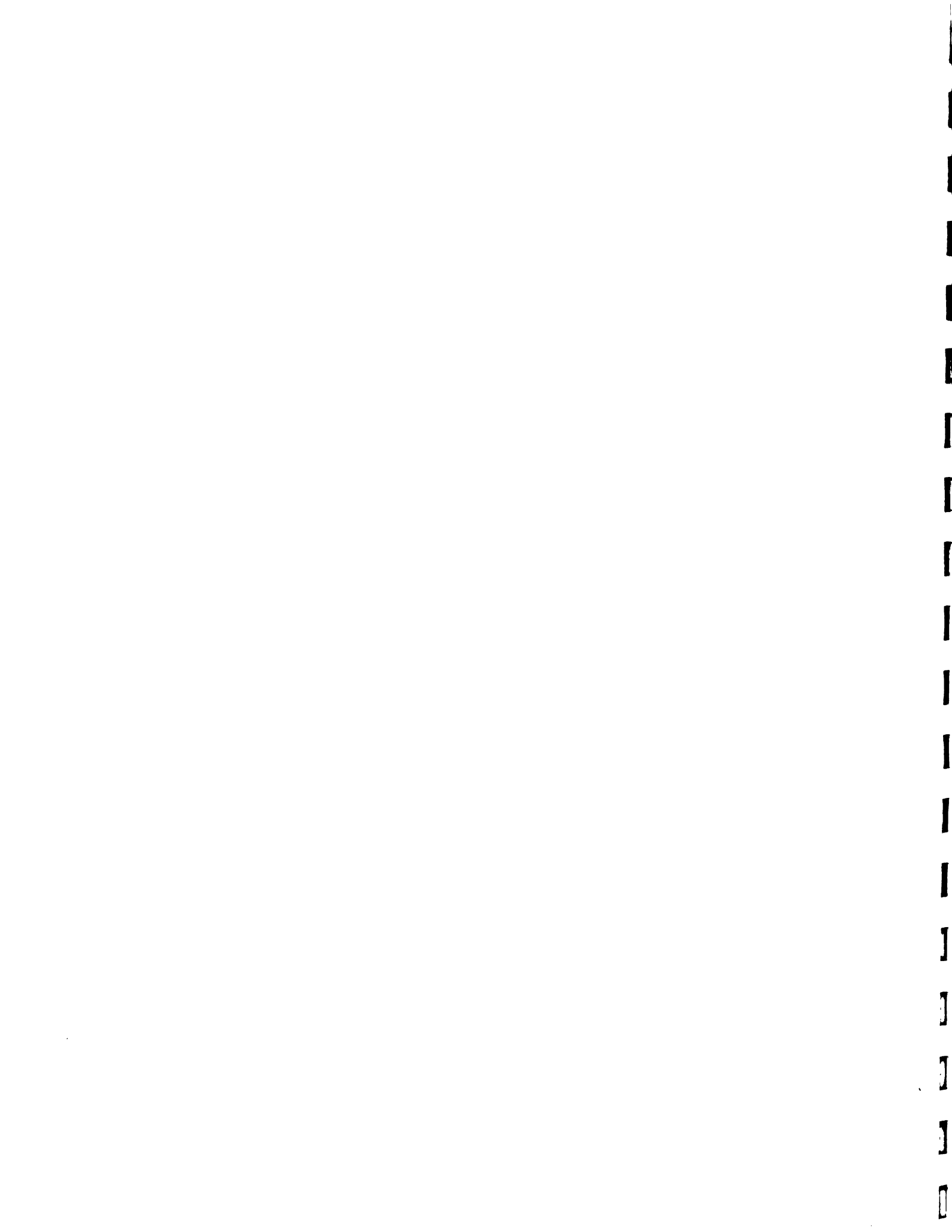
The public transit has faced financial problem these years, and transportation planners try to find the resources of the finance. The city center of developed countries' cities also have faced the declined and economic problems in these years, and city planners also try to revitalize the city. Can these two programs work together and benefit each other?

This paper focuses on the integration of public transit and city center development. It first discusses the dynamic city development--spatial cycle--and the public transport problem. Then it analyzes the benefit sharing arrangements--the techniques to link both programs--by the concepts and examples. Using this analysis to assert the efforts in Taipei transit system and city center development.

Based on these analyses and discussions, the suggestions are presented. It reveals the public transportation and city center development can be implemented together, but needs cooperation between public sectors and private sectors in integrating these two programs.

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I. INTRODUCTION

As long as there have been cities, they have been the locations of services for their surrounding hinterlands areas--serving as markets and places of worship, entertainment and political power, for example. Concentrating these facilities together reduces the distance to be travelled by those who visit all or some of them. Very simply, this is why cities have always had central areas with uses distinguishing them from the rest of the city: a visit to one location gives access to whole range of trading, entertainment and cultural facilities.

But in the past years, the cities' centralization makes the living environment worst and the conflicts of the different social groups increased. Many residences of the city center move out to suburban--decentralization. Many shopping, leisure and commerce activities spread out to suburban areas. And it makes some sorts of service facilities less efficient because of the sprawl of the residential areas. Traffic congestion is hardly a new phenomenon in central cores of our cities. This phenomenon is the major effect of the decline of central cities which without efficient public transportation systems.

The public transportation systems is one of the service facilities which is less efficient caused by the sprawl of urban area. And because of the increase of the automobile users and the spread of the residential areas, the patrons

of public transport decrease very rapidly. According to this situation, the financial problem of public transportation is very serious in these years. In recent years, the planners thought the public transportation would induce urban economic development in certain areas, especially for land development, which will provide high value captured in both sides, land development and public transportation. But in the past, they has just emphasized at station and adjacent area rather than connect the stations to develop a large area. The city center development will be the good example in large area joint development of transit system.

This research paper will illustrate the problem of city center and public transport and discuss the Taipei urban development in the western urban development theory to examine the relation and stage of Taipei development is suitable to redevelop the center city or not. And it will analyze the benefit-sharing arrangements of cooperative financing in center city development and public transportation system. Finally it will provide some suggestions and conclusions in the application of the arrangements in the Taipei Mass Rapid Systems and Taipei center city development.

In all, the objectives of this paper are: 1) Examine the stage of Taipei's urban development in dynamic urban development which indicates the city center developing situation as a opportunity in implementing with transit

system project. 2) Analyze the benefits sharing arrangements on public transit and city center development for cooperative financing. 3) The major objective is to investigate the efforts of benefits sharing arrangements in Taipei transit system and city center development in certain circumstances such as legislation and government which will provide the city development and transit system the best profits.

In general, this research paper try to get two different projects together in financial and planning perspective. By using the benefit sharing arrangements--public/private cooperation, government, private developers and public will all get benefits in different aspects. It hopes that this process will solve the financial problem of transit system and revitalize the declined city center.

II. URBAN DEVELOPMENT THEORY

This chapter describes the western development theory -- "Spatial Cycle" and illustrate the general problems of the declined CBD in developed countries. These ideas will be the tools to examine the urban development of Taipei City is near the stage to revitalize the CBD or not.

THEORY OF SPATIAL CYCLE

Spatial cycle, which is recognized as being linked to the urbanization process, has been widely observed in the developed countries. It implies (a) a decline of large agglomerations and the growth and development of medium-size municipalities, and (b) a decline of the core and population growth in the suburban areas of metropolitan areas, succeeded by a population increase in the core and stagnation and decline in the suburbs.

The starting point of the theory of urban development is the connection between economic development and urbanization, corresponding to the phase of economic development there is a phase of urbanization. Urbanization is conceived as having a 'life-cycle' in which the distribution of population and production units change spatially over time.

The cycle appears from available data (L. Van den Berg et al. 1979) that within urban agglomerations different

parts of the city show different patterns of growth and decline through time; evidence of that can be produced by a study of population developments in the core of cities and the rings. The core in this case is defined as the original, historical city; the ring consists of all municipalities with a commuting rate of over 15 percent of their working population towards the center city.¹

There are four stages in the spatial cycle:

1) Urbanization: fast increase of the population in the center town and the decrease of that in the ring.

2) Suburbanization: the population in the ring grows faster than that in the core.

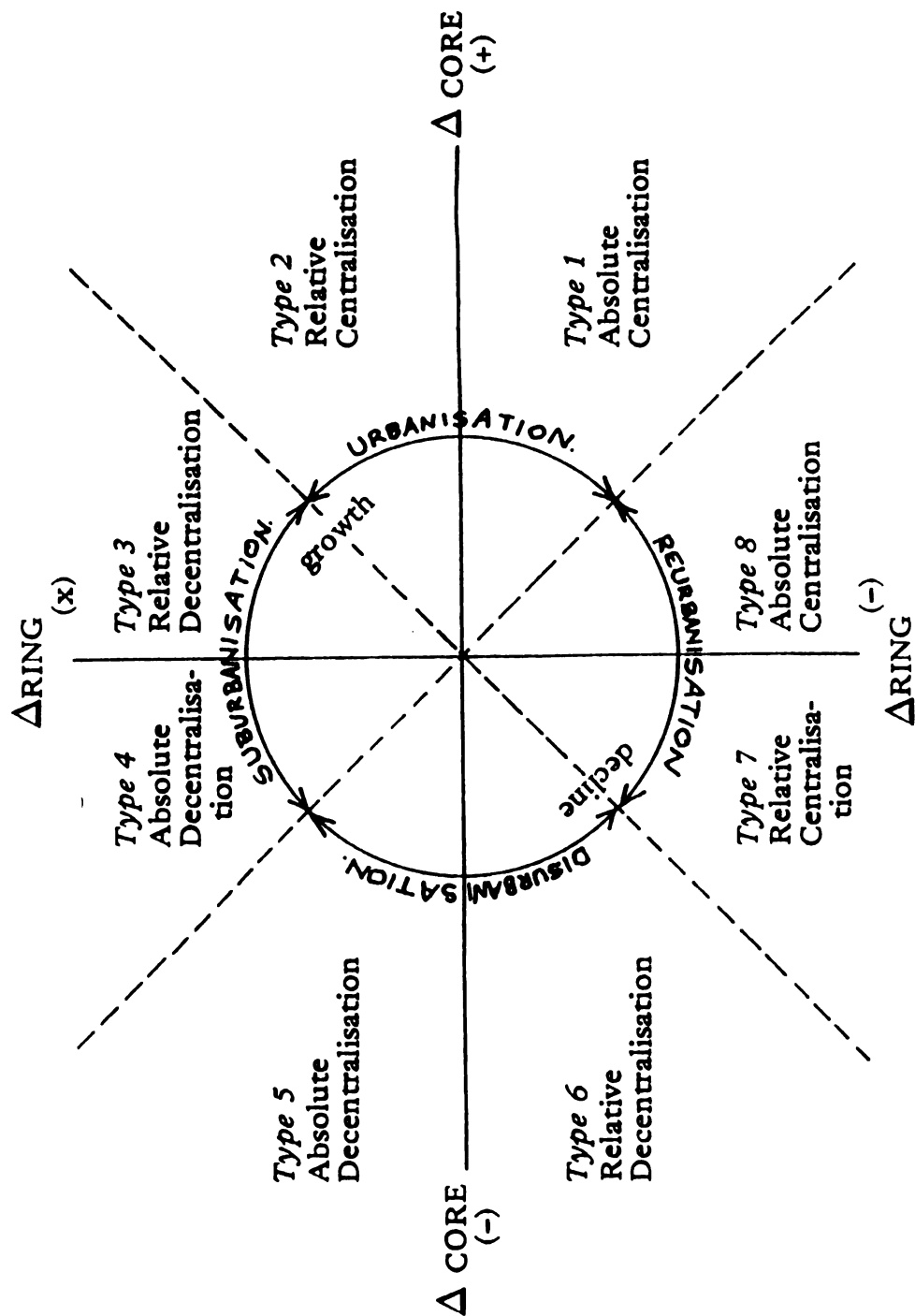
3) Disurbanization: population losses in the core exceed population gains in the ring--the agglomerations population goes down.

4) Reurbanization: population loss is less serious than in the ring or the core even grows while ring declines.

The procedure is quite straightforward and involves plotting positive and negative population changes of the core against such change in the ring. When considered in the context of total functional urban region growth or decline, the balance of change between the urban zones procedures an eight way classification of development types. These relationships are illustrated graphically in Figure 1.

The population change of the core is indicated on the horizontal axis and that of the ring on the vertical axis. Type 1 is the stage of absolute centralization in which the

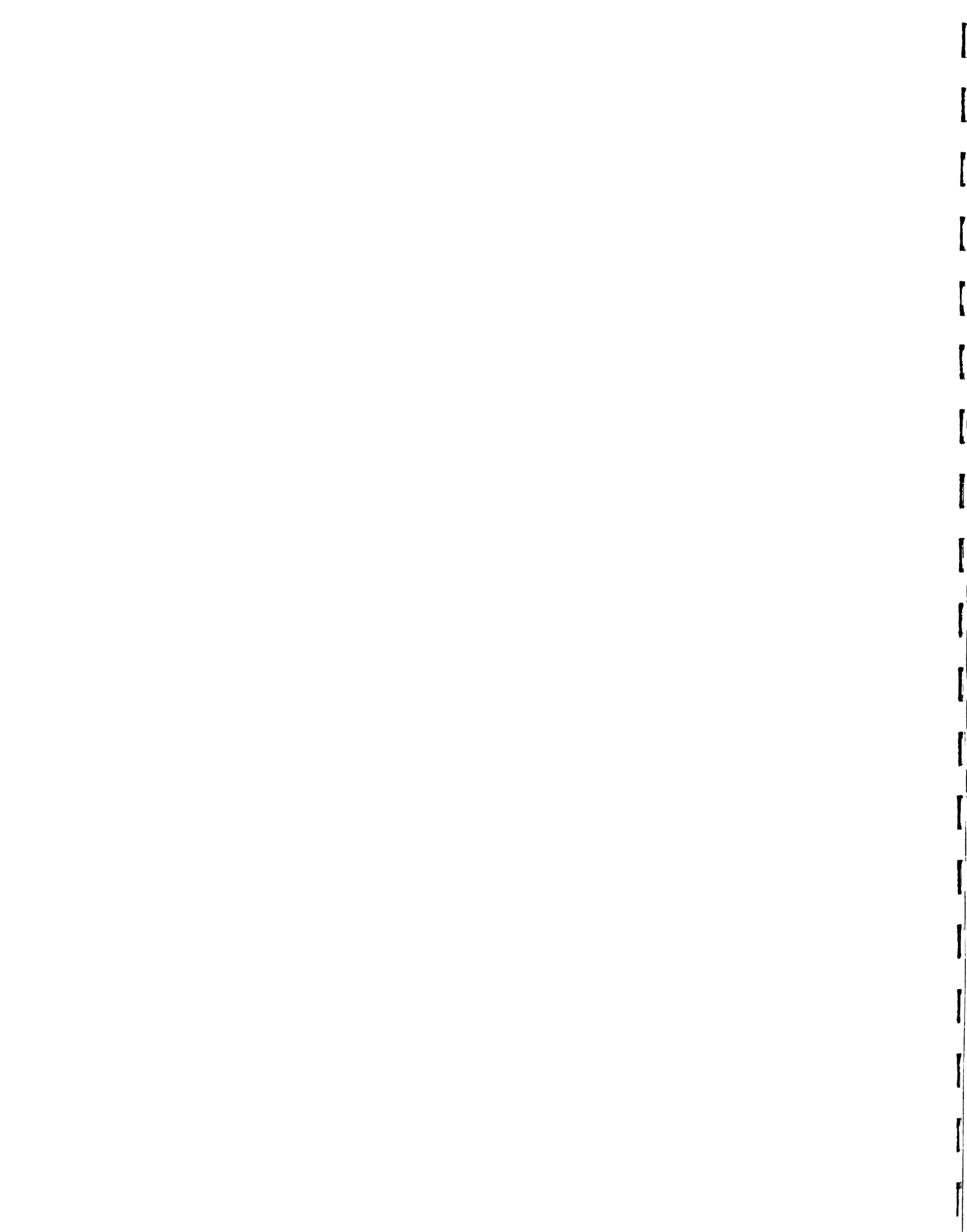
FIGURE 1 SPATIAL CYCLE



core is increasing in population at the expense of the population of the ring. In the next stage the core continues to grow but population increase is also starting in the ring. In the Type 3 development the increase in population of the ring exceeds that of the core (relative decentralization). Absolute decentralization starts in the Type 4 development where the total agglomeration is still growing but the core is declining. In the next stage (Type 5) the decline of the core exceeds the growth of the ring so that the total agglomeration enters the stage of decline. In Type 6 and 7 both the core and the ring decline. In type 6 the decline of the core exceeds that of the ring, in type 7 the reverse is the case. Type 8 describes a possible revival of the city (reurbanization) during which the ring is still declining but the core starts to grow again.²

CITY CENTER REURBANIZATION

During the suburbanization stage the city centers of most developed countries are now facing decline rather than growth. The gradual separation between workplaces and living places brought about by concentrating employment in the central business districts and spreading out the residential function to the outskirts. In all cities this phenomenon led to gigantic traffic problems and to pollution of the air by traffic in general. Efforts of local



government to adjust their cities to car traffic have brought only temporary relief; increased car density combines with the progressive separation of living and working to make the journey to work more and more time consuming, and the function of the city center is in jeopardy. There are some issues facing city centers today:

1) Decline of shopping, offices and commercial activities; decentralization.

Because of the suburbanization of the cities, the shopping, offices, commercial activities follow the population to move out to the suburbs. Most city centers remained small retail business in the city centers. And this reduce the tax base of the center cities which results in the financial imbalance in facilitate general service.

2) Poor physical and social environment; crime against property and person.

Because the financial imbalance, center cities cannot offer facilities more efficiently. Then most middle income population move to suburban location, while low income population stay in city centers. This results in a poor physical and social environment.

3) Traffic congestion due to the private cars enter city center.

Traffic congestion which is caused by private cars impeded the people to coming into city centers. This results in the businesses considering the profit they lost

due to the congestion and the proposal to move out from city centers.

From the spatial cycle, some researchers consider the reurbanization will be the next stage for some cities of developed countries. How to redevelop the city center to provide a good living environment is a big issue in the future. The public transportation may be the major factor in city center redevelopment plan.

III. PUBLIC TRANSPORTATION AND LAND DEVELOPMENT

This chapter profiles the general problem of public transit and the outlines in providing productive and effective public transit. These outlines provide the ideas of the solution in the general public transit problem and these will be the major direction between the Taipei public transit and city center development which will benefit both programs.

PUBLIC TRANSIT PROBLEM

During these years, the automobile users increased very rapidly make the urban structure sprawl out to suburbia. Due to the sprawl of the residential areas the public transportation can not get enough patrons to take public transit. Among the most serious problem facing transportation policy makers in the United States is the continuously deteriorating financial position of urban public transit. Transit deficits are rising precipitously, portending drastic cutbacks in service, extensive subsidies from already overburdened public treasuries, and fare increases so large and so frequent that they will cause riderships to decline further. According to the cost and benefit analysis, the transit systems are already in financial problem, because of the high operation cost and low revenue from the patrons.

How to make public transit survive to keep high profitable finance is a big issue in the future. And from the relationship of transportation and land use patterns, some planners consider that the combination of land development and transit route plan to solve the financial problems by inducing residences around the station or the route. They hope this will make public transportation more effective and productive.

PUBLIC TRANSIT MARKETPLACE: PRODUCTIVE AND EFFECTIVE FACTOR

What does it take for public transportation to be well used, efficient and effective? In essence, transit should use the same principles of market economics that are practiced in any business or enterprise. The enterprise of transit is, quite simply, productively moving people. The more people transit can move per vehicle, per hour or per mile of service, the effective and productive it is. The more densely concentrated those people are when transit pick them up, whether at home, at work or out shopping, the more people the transit system is going to carry per unit of service offered, the more revenue the transit system is going to bring in and the more productive the transit system is going to be.³

The following are three most typical land use development factors that make transit productive and effective.

1) RESIDENTIAL DENSITY

High density residential area will provide enough transit usage. To make the transit system productive when home are not intensely concentrated, facilities like park-and-ride lots should be provided to encourage people to get themselves concentrated, but on their time, not the transit system's.

2) EMPLOYMENT DENSITY

Whether the public will want to ride transit depends more on the density at the other end of the trip away from the home. The real payoff in urban form for a productive transit marketplace is activity centers -- concentrations of employment or college students, whether they are in a downtown metropolitan core or in fringe areas of suburban activity centers.

3) PARKING COST AND PARKING MANAGEMENT

High parking cost and good parking management will reduce car entry into activity centers. This factor varies with high densities of employment. Parking management can be used to minimize the long term parking for employees in the downtown area and any other activity centers that have existing transit service.

IV. BENEFIT SHARING ARRANGEMENTS

Until recent years, costs for right-of-way acquisition were about ten percent of the total highway construction costs. Today, on some urban transit projects, right-of-way costs have increased to 70 to 80 percent of the total construction costs. In addition to the increasing costs of right-of-way there is growing social and political resistance to the further intrusion of transportation into the urban environment. There is increasing concern that transportation systems improve our cities as well as our mobility. In response to these economic and social considerations, increased attention is being directed towards the application of multiple use of right-of-way and joint development projects for transportation systems.

Aside from the fact that joint development tends to make the best use of land and covering activities, joint development is a proven method of obtaining additional financial benefits from the creation of transportation improvements in conjunction with community or urban area improvements. " By using joint development financing options, it is possible to recover as much as 20 to 40 percent of the capital cost of transit improvements."⁴ This quantifiable incentive, with the better use of land and the concentration of activities, can be a significant factor in the integration of the transportation and urban development planning and implementation process.

According to financial benefits incentives, the U.S. federal government intend to courage the local government to evaluate the potential of joint development in order to reduce the great subsidy of transportation. Although federal government can provide the initial incentive for joint development, the major issue is how to attract private developers respond to investment opportunity created through public investment in capital improvements. And the value-captured and benefits sharing option of joint development between public and private sectors has been put more concerns by public and private sectors.

Value capture has been defined as "a means whereby land adjacent to transportation facilities is purchased, managed, or controlled in order for the public to share in potential financial and community development benefits from the facilities that are not otherwise possible". Research work completed by the Rice Center for Community Design and Research team has demonstrated that 20 to 40 percent of the capital costs of transit improvements may be saved by using the value-capture technique in joint development.⁵

The philosophy which holds that public transportation is a social service to be provided by government is being superceded by a philosophy of benefit-based financing transit : those who benefited pay. The list of beneficiaries of public transit service is being expanded to reflect this new philosophy, which identifies not only riders as beneficiaries but also the public at large,

employers, retail businesses and private developers. While this re-examination of public transit finance has focused on techniques for assessing the private sector for its share of the benefits of the transit services and facilities, another approach to private sector involvement is gaining momentum. Public transit agencies are increasingly examining opportunities to involve the private sector in all facets of construction, maintenance and operation of transit services and facilities. These can provide significant cost savings and reduced risk to the public agency.

The value of joint development opportunities is different for each participant. From the transit agency's perspective, the benefits are expanded riderships, increased revenues, and/or savings in construction or the costs of transit. While the transit agency's primary objective is to develop and operate a transit system, its actions affect property values and area development. To capitalize on this potential, it may have to assume a more aggressive role. From the developer's perspective, maximizing a return on investment or improving accessibility to a specific site or area may be the primary objective. Working cooperatively with the transit agency can facilitate this. From a community standpoint, improved transit service and area revitalization may be the objectives. Nonusers benefit through increased local sales taxes. All participants in the process seek to "capture value" that appears with the advent of transit in a locale.

Several techniques for applying value capture to station-area joint development projects were developed by Carl Sharpe and the Rice Center team. These techniques are designed to assist a public agency or development corporation in capturing both financial and community design benefits from integrated station-area development programs. These techniques are defined below.⁶

1. Ad valorem taxation : The transit or development entity taxes the assessed market value of land and improvements within the entity's taxing jurisdiction or the city served by the transit system.

2. Special district taxation : An ad valorem tax would be leveled by the entity on a district in the city adjacent to a transit station. The district's boundaries are set to include the area that receives special benefits from the facility. The transit or development entity would, through the separate tax on the assessed valuation of the market value of the land and its improvements, receive some of the financial benefits created by its facilities.

3. Incremental value taxation : This instrument also sets up special districts, but no new taxes are introduced. The entity receives by agreement all or parts of the ad valorem tax revenues on the incremental difference between the assessed valuation of the land at some future date and the assessed valuation at a point prior to the construction of the transit improvements.

4. Develop and hold real property : The entity constructs transit related facilities around the transit stop and leases or rents them. Public participation in the development of the facilities enhances the potential for community influence over the design, while generating revenue through lease and rental agreement.

5. Development and sell real property : The entity acquires land fee simple and develops transit related improvements and facilities thereon. At completion, the land and facilities are sold. As in the preceding technique, the public participates in the community development process, which yields potential benefits unique to this and the above or last techniques.

6. Hold and sell real property : Fee simple interest and other development rights (air or subsurface) of transit related land parcels are acquired by the entity. In the future, when the development of these parcels meets appropriate public purposes, the rights or land is sold subject to specific-use conditions.

7. Lease of real property : After acquiring land related to the transit facility, the entity enters into long term leases for the ground or air and subsurface rights to the land or related development rights, subject to the terms of specific development programs in regard to community design and public finance benefits.

8. Participation in holding real property : Interest in transit related land parcels or development rights is ceded

to other private or public parties for development around stop locations. Under some circumstances, the transit or development entity may receive a portion of the income thus produced.

The following are mechanisms for public/private partnerships discussed in terms of the following evaluation criteria : revenue impacts, political feasibility, equity issues and questions, administration costs and feasibility, simplicity, riderships enhancements, timing, transit precedents, opportunity costs, and legal barriers. There are many advantages to engaging the private sector in transit development, but to succeed, transit agencies may need to be entrepreneurial. In some joint development efforts, the public transit agency might even be the developer. That is quite different from the mission that most transit agencies assume, which is merely to provide transportation service.

In the same option, the value capture can be thought as "benefit sharing". Benefit sharing is the distribution of public and private costs and benefits associated with transit facility construction, rehabilitation, or operation. The types of benefits extend beyond financial advantages to the realms of urban design, urban planning, riderships, perceptions of the system. The objective is to achieve the broadest benefits for all of the participants, public and private at a reasonable cost to each. The possibilities cover all types of transit facilities from the smallest para-transit, dial-a-ride systems, to big fixed rail

systems; and from small bus shelters and ad benches to the multi-million dollar office development.

And the type and size of the transit system can determine the scale of value capture and the strategies available. The type of development or investment is a factor in terms of scale and expected investment. And the goals of participants in the process --public agencies, private agencies, developers-- will vary with location of the station, guideway or transit facility, and with the character of the neighborhood--residential suburban, neighborhood commercial, urban residential, or downtown.

But there is other factors is important. Market conditions are very important in determining how you negotiate with the private sector, as are the timing of achievable development and the distance of the development from the station. Distance affects benefits can be assessment and the extent of fixed financial contributions. The interest from the private sector in some degree of financial participants through direct or indirect development activity near transit stations is because successful transit stations handle thousands of people every day and begin to perform like freeway interchange. Lots of people and traffic means economic opportunity, and we all see endless examples of the desire for development to be well situate with good access in the vicinity of busy freeway interchanges. However, there is a caution about having great expectations for joint development at station

sites. It is neither certain nor automatic. One must understand and respect marketplace and conditions for economic development and carefully coordinate transit station development with economic and land use realities.

V. CASES STUDY IN BENEFIT SHARING ARRANGEMENTS

The benefit-sharing arrangements concepts have already asserted in the above chapter. In this chapter I take some examples of joint development in transit stations in U.S., Japan, and Hong Kong transit systems to illustrate the value capture in the mass transit stations is economic and financial option for the transit system operation and construction cost. By examining the techniques which was using in these examples, I will conclude the most popular type of the techniques and the circumstances of the application. And these will be the source of the suggestions of the Taipei transit system and city center development in applying these techniques.

Light rail stations -- Portland and San Diego

Riderships has been good on the Portland and San Diego light rail transit systems, even better than originally expected, with just over 20,000 and 23,000 daily passengers in 1987. Neither of these two light rail system has seen the degree of economic or joint development activity at stations that is occurring with the higher volume operations of the metrorail type systems. Tri-Met in Portland reviewed a proposal for air rights development to place a YMCA facility over one of its major stations. Unfortunately, the proposal was shelved due to other financial problems of the

developer and not from lack of interest for the station development. The concept of growth management and its formal state -mandated metropolitan control of land use of Portland generate greater attention and interest in the long run for joint development at stations than other light rail systems in metropolitan areas that typically lack metropolitan land use planning controls.⁷

In San Diego, the Metropolitan Transit Development Board (MTDB) developed its light rail system in a quick, efficient and spartan manner, obtaining little land for the stations or along right-of-way that was not absolutely necessary for immediate system access and operations. While this served the MTDB well in minimizing costs for rapid system development, they now find they have little to bargain with in terms of useful real estate of interest to the private sector at the outlying stations. They want to market joint development at stations and are beginning to see greater interest in the downtown area. The MTDB recently proposed a refined alignment for modest trolley system expansion in the northern part of the downtown San Diego area. During this process, they are working on a package with developers for a significant mixed use building project (around 800,000 square feet) that may include office, retail, hotel and government uses and will enable MTDB to obtain an important station as part of project.⁸ With growing public use and acceptance of San Diego's trolley system, additional opportunities are presenting themselves for joint

development at new stations as plans are being developed for a more extensive north line extension. San Diego's light rail system initially developed minimal park-and-ride lots adjacent to stations and thus will not have access to potentially significant future lease/participation revenues.

Station development -- San Francisco BART

The San Francisco Bay Area Rapid Transit District (BART) had the vision to see financial opportunities related to economic activity in and around its stations and so created a Joint Development Division in 1983-84 to be responsible for pursuing joint development and similar creative financial options. It has found private market interest that parallels the pace of economic development in general in its heavy rail corridors. With a consistent pattern of riderships on the BART system running close to 200,000 daily passengers, it clearly has the volume to attract the private sector. BART was paid one-time fee of about \$300,000 from a developer in downtown San Francisco to allow *direct station access* for the "388 market" high rise development project on Market Street.⁹ In Pleasant Hill with several acres in use for a park-and-ride lot, it is exploring proposals for joint use of this land in conjunction with a major commercial development (1-2 million square feet). At the Concord Station, BART is considering proposals to allow development of a 250-300 room hotel which would involve a long term

lease plus participation rights. This proposal would generate basic ground rent involving the park-and-ride lot property and, consistent with other such BART leases, it would provide BART with a percentage of gross revenue from income of the commercial project.

Station development -- Atlanta MARTA

The Metropolitan Atlanta Rapid Transit Authority (MARTA), the Atlanta's heavy rail rapid transit system, has had a successful record of public patronage, about 180,000 daily rail passengers. MARTA has been experiencing quite a bit of joint development activity at its stations over the past several years. Prior to 1979 opening of the MARTA rail system in Atlanta, the Atlanta Regional Commission (ARC) conducted a series of transit station area development studies that resulted in many changing in zoning and even modified some system alignments and station locations. The ARC is a seven-county, State-created metropolitan planning organization with a history of regional land use planning in the Atlanta region dating back to the 1940s. In the early 1980s, after the start-up of MARTA's rail system, the ARC initiated a major development review procedure to try to help balance and coordinate the growing pressure placed on elements of the local infrastructure that were resulting from major regional developments. Twenty of MARTA's 30 stations are in the city of Atlanta and rezoning incentives

for higher density development around Atlanta's rail stations was undertaken with special public interest zones.

Companies now want to be near direct transit system access, so MARTA has been able to obtain great deal of commercial office space activity around a number of its stations, including a couple of 50-story built its corporate headquarters over a MARTA station, IBM put its regional high rise head quarters (one million square feet) on MARTA air rights, and some major utility companies also have been interested in joint development with MARTA station property. Much of this development did not occur with the original opening of the rail lines , as development commitments seem to typically follow about 3-5 years behind the completion of construction at the station.¹⁰

Some joint development activity is beginning to generate respectable income for MARTA. Lease income for 1987 was estimated at around \$700,000, with a potential increase to about \$900,000 in 1988. Long range lease income projections from joint development are optimistically expected to be greater than \$10 million annually. The only down side of MARTA's otherwise positive success story is that it has not been able to realize development of some of the broader mixed use and residential projects that were originally planned around several stations. Some station area plans assumed that other public improvements like libraries and community centers were being developed that would support

more mixed use and privately developed residential activities.

Stations development -- Washington D.C. WMATA/Metro

Of the newer U.S. heavy or metrorail transit system, the Washington Metropolitan Area Transit Authority (WMATA) clearly leads in joint development efforts and riderships. WMATA, which is called Metro, has daily rail system riderships of well over 460,000 passengers, with a July 1987 peak riderships of about 490,000 passengers.¹¹ Consistent growth in transit riderships has created the beneficial economic climate for WMATA where developers see Metro transit stations as important "selling" components of their commercial projects. WMATA estimates receiving about \$14 million to date in capital contributions towards construction of joint development facilities such as bus-rail transfer areas, park-and-ride lots, elevators, escalator ways, chiller plants for station air conditioning, etc. Metro, like BART, has also been paid for connection agreements that allow *direct underground access* from building to Metro stations. By 1986, these earned about \$1.2 million, and another \$775,000 is estimated for current connection activity in fiscal year 1988. These are a category of one-time capital contributions related to development /connection agreement. Greater long term financial gains for Metro are coming from annual rent and

participation agreement. Although WMATA policies do not allow commercial activity within Metro operation facilities, they do allow commercial enterprises within the broader definition of Metro properties that are outside of their shell operating areas. Metro's annual rental income for fiscal year 1988 is estimated at \$3.6 million.

Additionally, Metro's "participation" agreements with developer using and /or connecting to their property provide for a percentage of profits related to the commercial income. The problem has been that no revenue were coming in with these earlier agreement, as they were pegged to a percentage of net income, and the "net" never seemed to materialize after cost. Metro has now changed to a formula of seeking about 5-8.5% of gross revenue on large scale projects (general building with greater than 100,000 square feet), but even then this income distribution clause takes effect only after the commercial enterprise or development achieves an agreed-upon cash flow level in order to recognize the time needed to achieve successful development. For smaller projects (those that may yield rental income in the \$15-20,000 range), the joint development participation agreement are now simply requiring automatic income escalators of about 4.5% per year. Although the minimum rent aspects of joint development agreement has gone well, the "participation elements" have been disappointing to Metro. It is felt that the recent changes in the newer agreement will reverse the trend over the next few years.

Over the long term, WMATA expects to be receiving \$8-10 million per year through its joint development agreements.

Station development -- Po city, Japan

Po City transit is a subrail system of Tokyo Metropolitan Area which is operated in a classic post-1960 suburban sprawl setting. Po City has been working on the development of its station area, but the land generally is very expensive and the rights of landowners, landrenters and houserenters are very complex. Because of these financial and complex situations, the public agency of the Po City want to find some entrepreneurs to provide the financial assistance. Po City is one of the satellite cities of Tokyo--the Capitol of Japan, the rail riderships in this station are almost 400,000 passengers daily from here to Tokyo to work.¹² Due to the great amount of patronages, the big enterprises are very interested the joint development of the station area. Before the joint development, the entrance of the plaza of the station was very narrow, so when passengers and cars came to the station you can image how congestive and chiao this area was. And the construction of the buildings of this area almost were two stories and old wooden houses. The most serious thing is the land use pattern were mixed use which makes this area look like a slum. According to this condition, the transit

agency want to renew the station area as soon as possible to change the environment of the area around the station.

The joint development of the Po station is based on the Japan Urban Renewal Law--remain the rights of the owners of the certain area and use new construction's floor area to exchange the rights of the landowners and building owners. In this plan, they worked on a package with developers for a significant mixed use building project that included department store, retail, and residential uses. This joint development plan has two important characteristics in the implementation: First is the residents of this area make a great participation in the plan. Second is the involvement of the big entrepreneurs make this plan have better support in finance of this project. Because the benefits of the development of the station is very clearly good for every participants - community, residents, developers, transit agency, so the implementation of the plan was so quick and complete.

Station development - Island line, Hong Kong

Hong Kong government made the Hong Kong Mass Transit Rail Company Law in 1975 and Mass Transit Law in 1978. According to these Laws, Hong Kong government established Hong Kong Railtransit Company (MTRC) and gave the company the authority of constructing transit system and planning joint development. The land of Hong Kong are owned by

government and mass transit rail law defined MTRC can acquire land to work on joint development. So the lands which mass transit system and joint development needs are very easy to get. The requirement is MTRC must pay the land fee which is considering the market price and the Law of Land Donation. Hong Kong government gave the joint development very great zoning bonus and doesn't restrict the land use patterns very strictly. And in the agreement of the MTRC and private developers seems everything is beneficial to MTRC, but the private developers still have the benefits in joint development. Hong Kong already invested 8.5 billion HK Dollar in Island line, one of the Hong Kong Mass Transit system, joint development projects, and the benefits from the developments to MTRC can pay 17% of the construction fee. The development of the Island Line includes 20,400 units housing, 2 million square feet commercial and office use, and 1.4 million square feet related public facilities.¹³

According to the examples of U.S., Japan ,Hong Kong joint development in mass transit station, we can find the techniques for applying value capture to station area joint development projects being used almost the last five techniques - develop and hold real property, develop and sell real property, hold and sell real property, lease of real property, participation in holding real property. We can say the public agency of the examples don't want to lose

the property of the station area or let the station area develop itself. Every public sector and community want his own station area to develop in orderly. So hold and lease the property is the most popular technique in value capture, because the public can control the quality and the density of the development. To make sure the development is based on the agreement of public and private sector.

Leasing and selling development rights by a transit agency is a way of turning surplus or under-utilized property to the agency's advantage; for example, leasing air rights over a station or a transit center, or the development of land held for a park-and-ride facility at a suburban location would fall under this category. The revenue aspects of air or surface development can be substantial for an individual station.

Those techniques which be used in those examples can be regulated but should not be limited in certain techniques. Because the profitability reasons are consist in private and public sectors, different techniques would be used by different developers. If we regulate the techniques it will constraint the flexibility of the negotiation between private and public sectors. So in the regulation of joint development, it should consider the basic regulations such as the urban planning laws and the laws related to the partnership to be the guidelines.

VI. TAIPEI METROPOLITAN AREA

This chapter will describe the urban development of Taipei Metropolitan area and use spatial cycle theory to examine the stage of the Taipei's urban development comparing with developed countries; cities. Also it will illustrate the physical problems in Taipei city.

Taipei, Taiwan's largest city, is located in an alluvial basin in northern Taiwan. Surrounded by hilly land, Taipei itself is only 150 to 600 meters above sea level. The triangular basin enclosing the city is about twenty five kilometers from north to south and encompasses about 400 square kilometers, Figure 2. Taipei is the capital of the Republic of China on Taiwan which is also the center of economics, services and Northern region of Taiwan. During the past forty years, the government considered the political and economic factors that have changed the boundary of Taipei city, the change is presented in Figure 3. Because of the historical development, the concentration of population in Taipei is very rapidly in the past years, Table 1. The Taipei Metropolitan Area is an agglomeration of several administrative units: (1) Taipei Municipality as the central city, (2) the provincial city of Keelung, and (3) several smaller cities and townships of Taipei County which surround Taipei Municipality. The total metropolitan area has an area of 945 square kilometers. Within Taipei

FIGURE 2

TAIPEI BASIN, TAIWAN LAND USE, 1983

by
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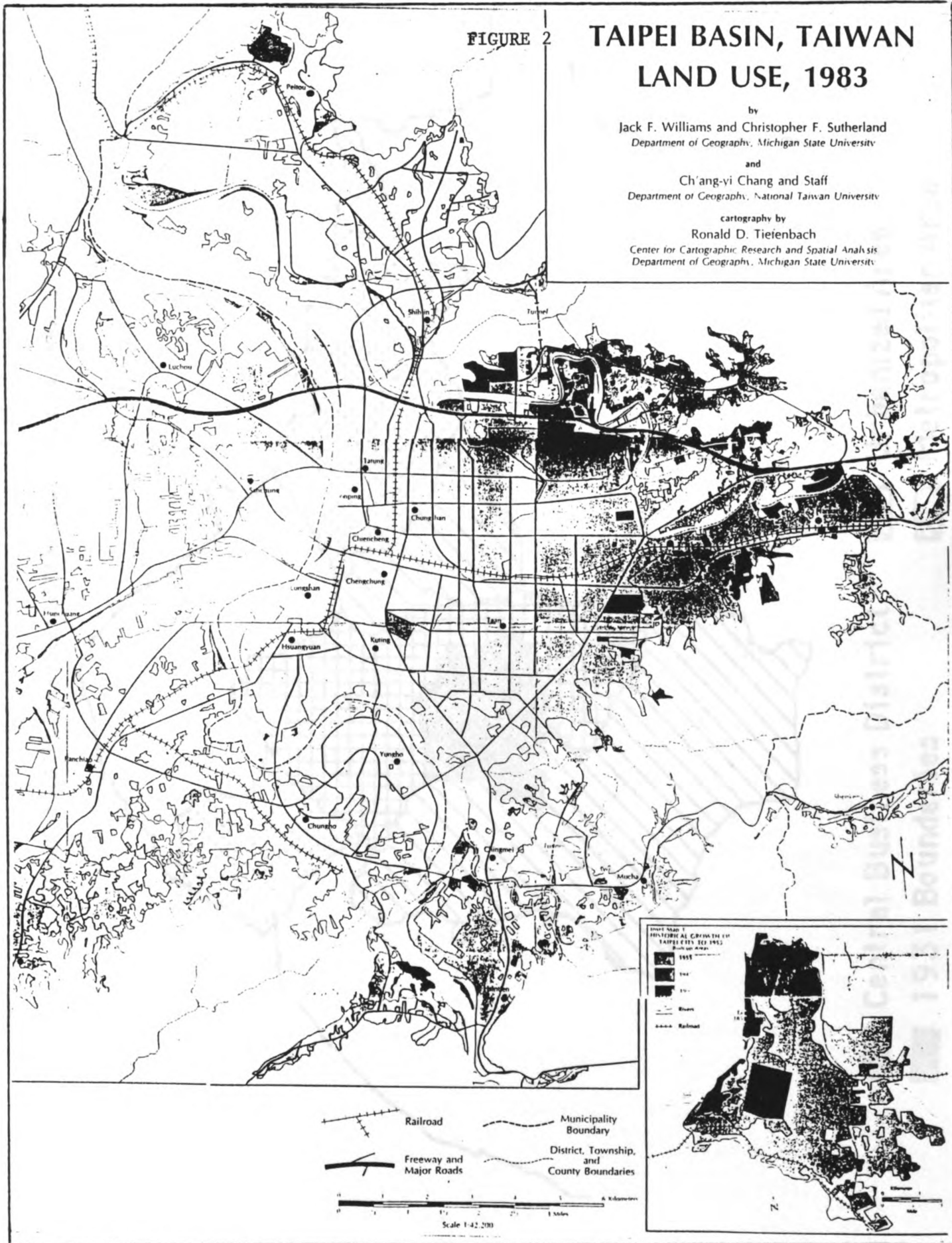


FIGURE 3 TAIPEI METROPOLITAN AREA AND COMPONENTS

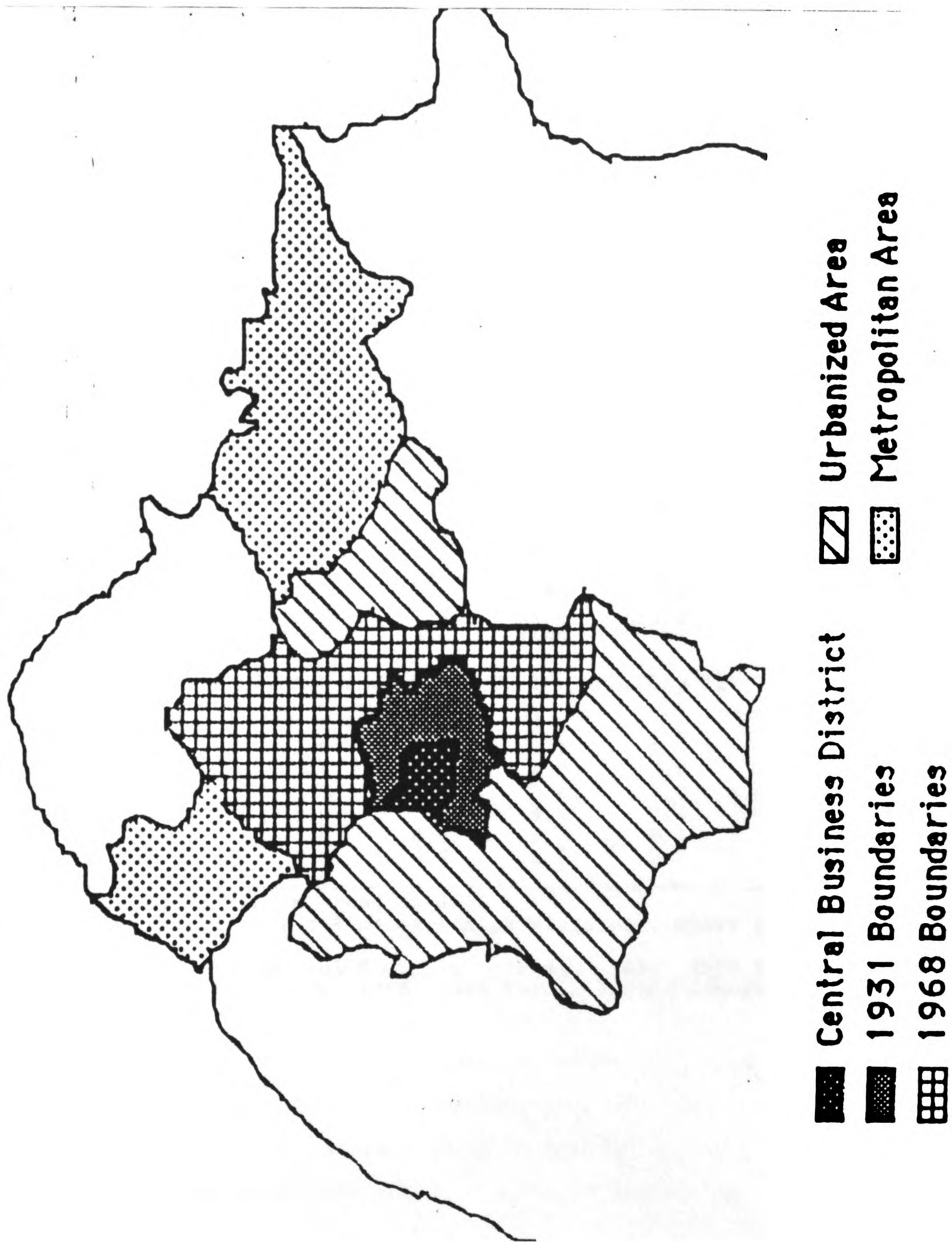


TABLE 1. GROWTH OF THE TAIPEI METROPOLITAN AREA, 1920 TO 1981
(POPULATION (IN 1000'S))

YEAR	CENTRAL BUSINESS DISTRICT	AREAS ADDED IN 1931	AREAS ADDED IN 1968	TOTAL TAIPEI CITY	BEST OF URBAN AREA	BEST OF METRO AREA	TOTAL METRO POLITAN AREA
1920	109	68	49	224	116	89	307
1930	131	115	56	302	128	173	399
1940	*	556	66	392	147	193	540
1950	213	391	112	616	319	297	616
1960	265	644	132	1041	416	324	740
1970	322	1113	281	1516	516	407	923
1980	379	1292	746	2417	654	477	1131
1981	373	1332	928	2633	627	484	1111

PERCENTAGE ANNUAL GROWTH IN PRECEDING PERIOD

1930	1.8	5.7	1.4	5.6	1.6	3.8	5.4
1940	*	2.9	1.6	3.7	1.4	4.1	3.3
1950	*	4.4	5.5	4.6	3.7	1.6	3.7
1960	1.8	8.3	5.9	5.9	7.4	4.2	3.9
1970	0.3	5.6	7.1	4.9	7.1	5.9	3.3
1980	-3.7	1.5	6.6	3.3	8.1	0.6	4.1
1981	0.8	1.5	4.7	3.5	3.7	0.3	1.3

*Combined with population in areas in 1931.

** Based on the formula: $r = 100 * (\exp(\ln(p2/p1)/n) - 1)$, where n = no. of years.

Sources: 1940 to 1970 from Paul K.C. Lin, (1979). 1980: 1980 Taipei-Taiwan Demographic Fact Book. 1985: 1985 Taiwan-Taiwan Demographic Fact Book.

Municipality itself, three rings can be conveniently distinguished according to the history of changes in the city boundaries. The central business district, which comprises four precincts, was the original core of the city. The second ring includes territory which was added to the city in 1931, while the third ring includes territory added in 1968.

Unlike some western cities, Taipei was not structurally formed around a purely commercial central business district. Instead, a primary commercial-cum-residential area which performs the functions of the central business district. Juxtaposition of shop and residence was primarily due to the prevalence of the traditional type of business organization. Throughout most of its history the central commercial area of Taipei city has been densely populated with permanent residents. This situation, however, has been gradually changing in response to the modernization of business organization, improvement in the use of public and private transportation and the rising standard of living. As prosperity of the central district continued, the size of its residential population increased only moderately from 1920 to 1970, and thereafter decreased. And the other areas became the rapid rate of natural increase plus the explosive rate of migration to the middle ring of Taipei metropolis.

Considering the spatial cycle theory, I define the core area of Taipei as the central business district and the ring areas are areas added after 1931. By calculating the rate

of population growth in the core and ring, I drew a trend of the population growth of Taipei in the graphic of spatial cycle, Figure 4. The graphic is clearly showing that the Taipei development is in the urbanization stage and forward to the disurbanization stage. This indicates the CBD of Taipei City began to decline and in the future years the suburban area will get crowded due to the geographical constrains which will cause the destruction of natural resource and financial problems of the government in providing public facilities.

The age-sex selectivity of the movers to and from the different areas of Taipei is demonstrated by net migration for both sexes in Figure 5. It is evident that the central business district experienced the heaviest loss of both male and female population of nearly all ages, except for children 5-9 and young men 25-29. The greatest losses, occurred in the population 30 and over. The rapid rate of natural increase plus the explosive rate migration to the middle rings of Taipei metropolis have not only aggravated the urgent demand for urban services, but have also created and intensified problems of social and economic adjustment to a new way of urban life.

From 1980 the structure of central business district of Taipei has been changed. Lots of businesses have moved outward to the middle ring of metropolitan due to the physical problems which caused by the economic development of Taipei.

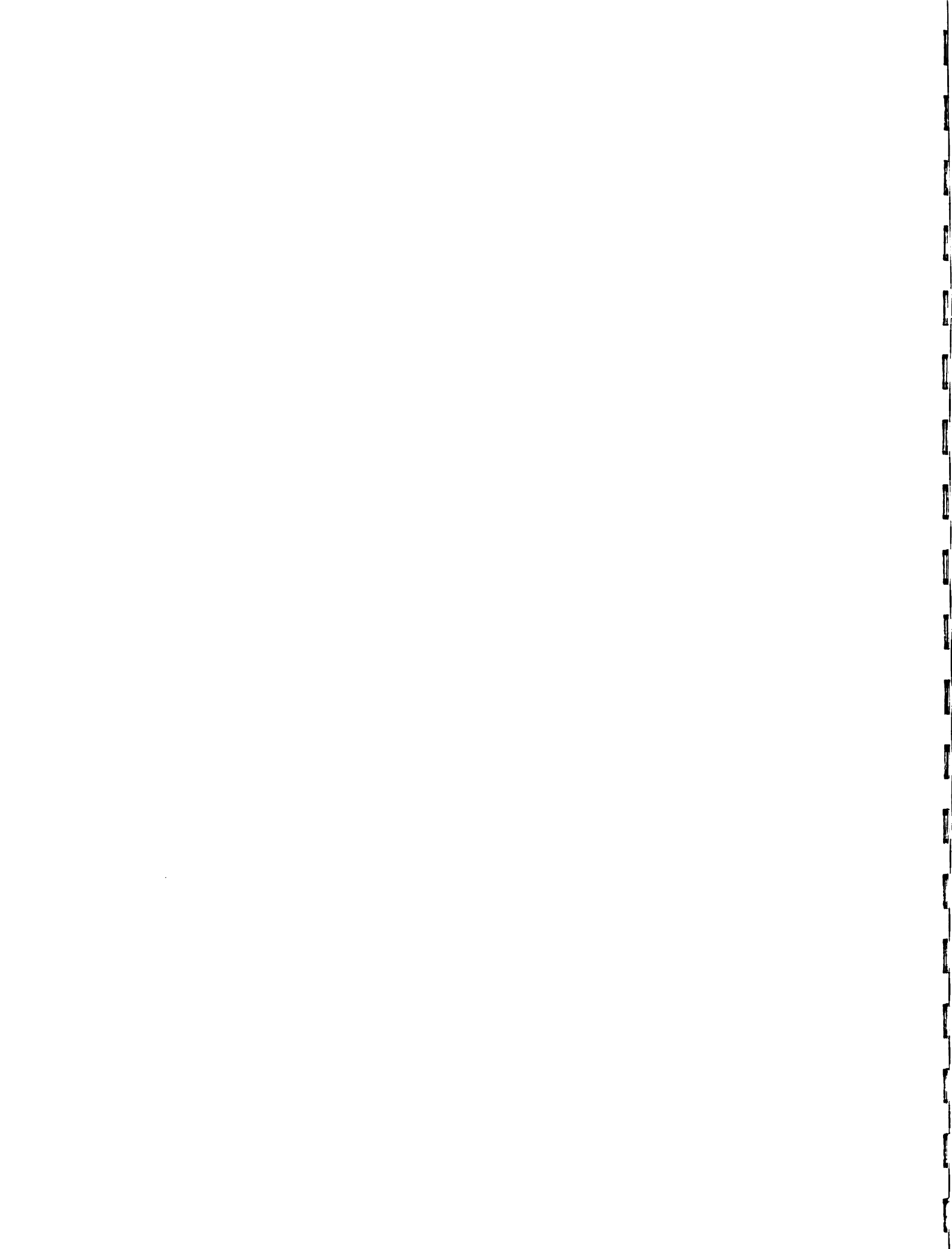


FIGURE 4 SPATIAL CYCLE FOR TAIPEI, 1920-1980

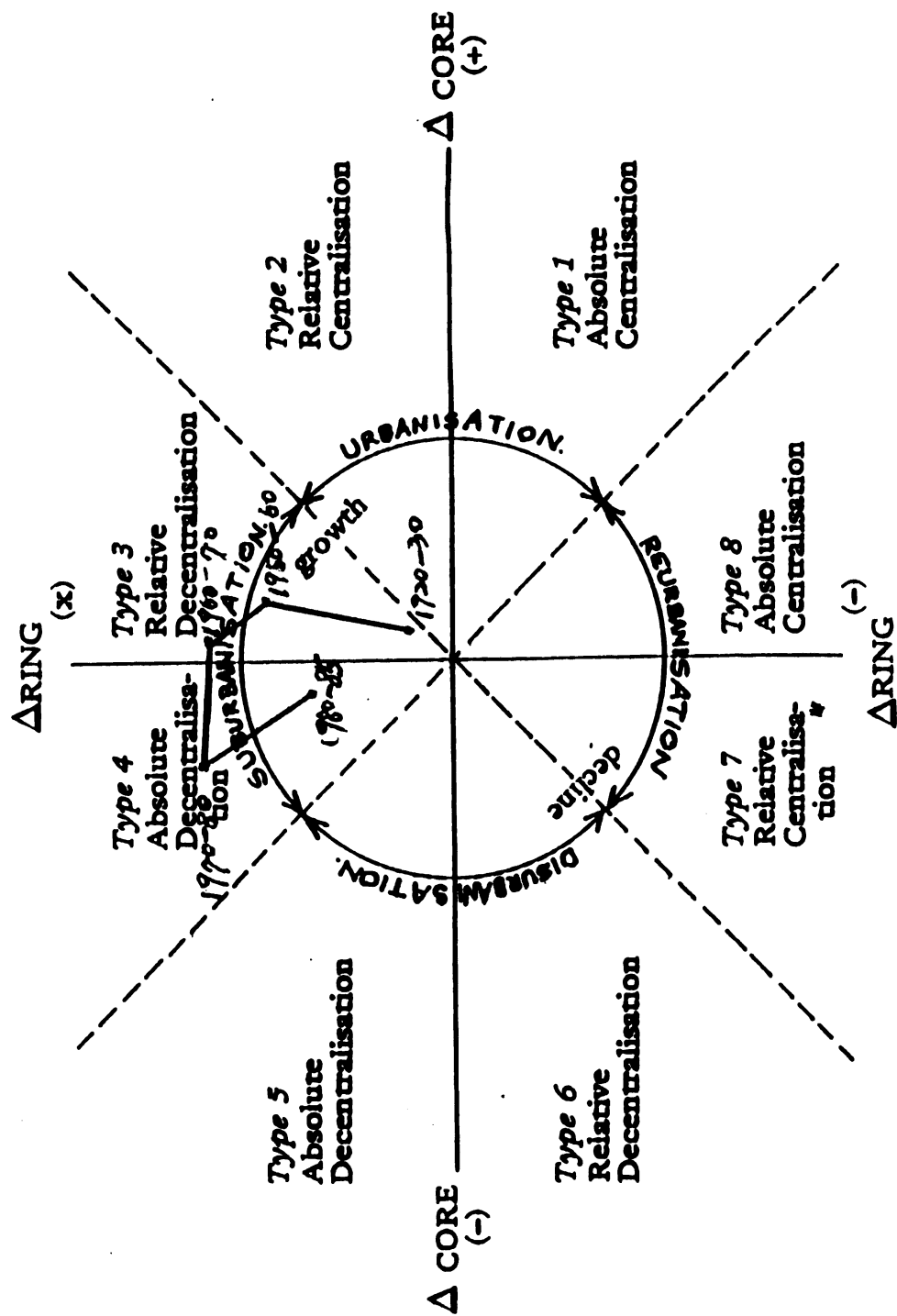
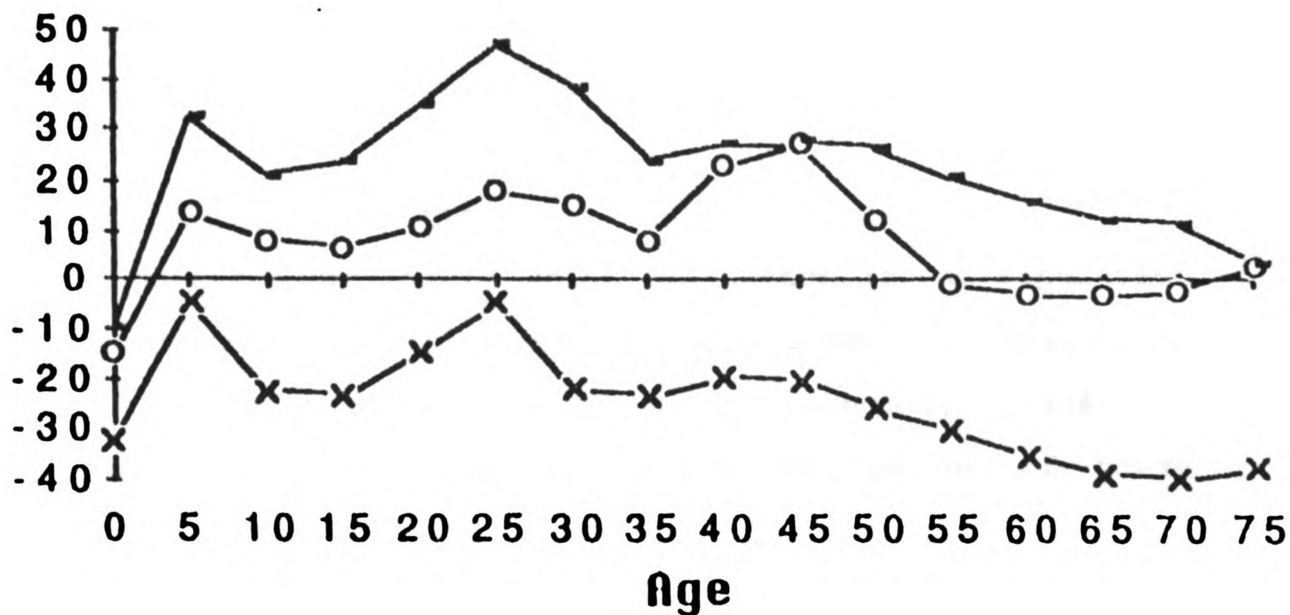
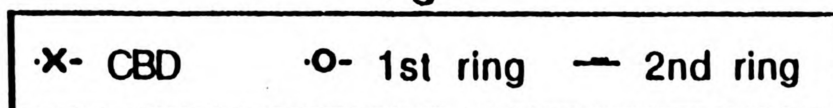
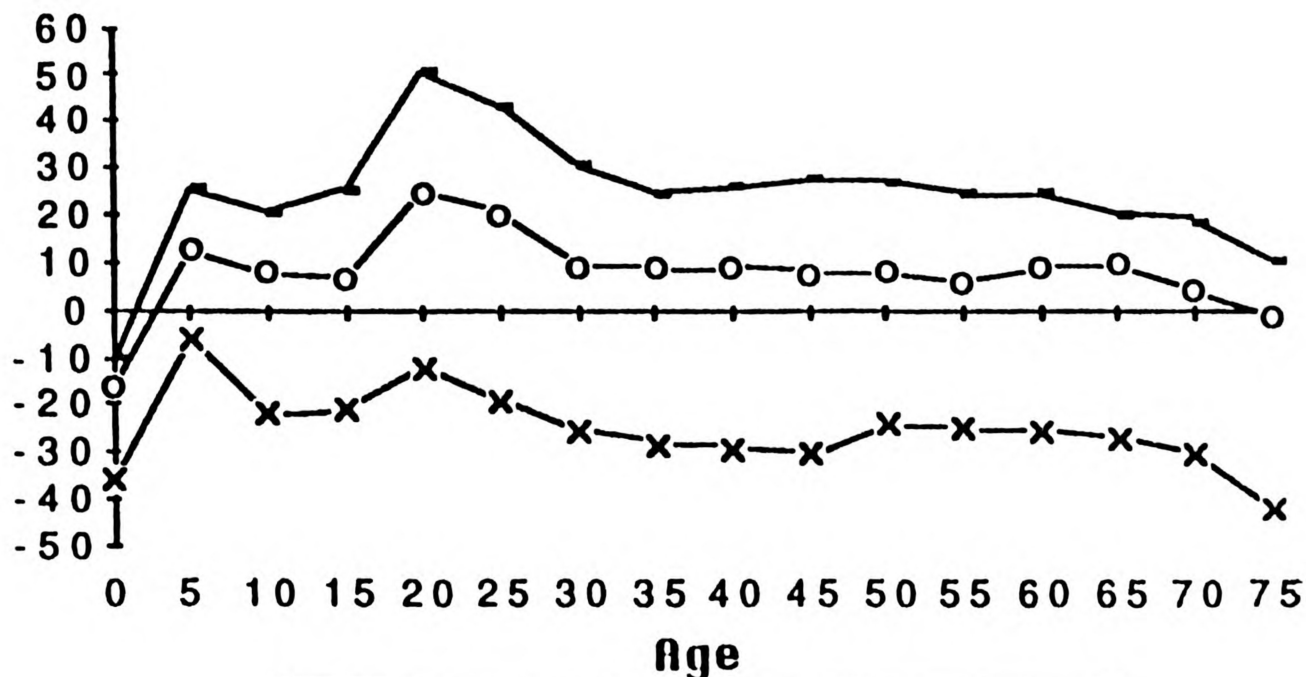


FIGURE 5 NET MIGRATION RATES FOR TAIPEI BY AGE AND SEX

Males



Females



The immediate and urgent problem which confronts the city government of Taipei owing to recent population concentration is how to provide adequate urban services to the population. There are four types of physical problems in the Taipei area:

1). Housing program

Squatter settlements which due to the recent population concentration in Taipei are large located on public and planned for construction of parks, schools, roads and building for urban service. The eradication of these illegal settlements in recent years has caused not only great financial strains on the government, but also social disorders and problem. Housing program sponsored by the city government have been devoted primarily to the relief and the resettlement of those who lost their homes because of squatter and slum clearance. And right now because of the high price and rent of housing makes young couples can not afford the price. They rather than stay cheaper area far away from the work places, this increase the time in transportation and traffic volume into the Taipei city.

2). Public utilities

Although programs for the construction of public facilities have absorbed more than sixty percent of the annual city budget of Taipei in the past two decades, the standards have not far exceeded the minimum requirement.

Parks and green space in the city are few. Schools, markets, public building , parking spaces and roads are all congested. Since the urban area is already densely populated, the construction of urban infrastructure confronts both socio-political difficulties and heavy financial burdens.

3). Transportation problem

In recent years, the rapid growth automobiles have caused a very serious traffic congestion problem in Taipei. And the parking spaces are very insufficient in city center which results in lots of illegal parking along the road-sides. These problems cause the slow traffic flow and affect the commuting time of the residents. Time spent in commuting in Taipei is longer and longer.

4). Environmental pollution

Pollution has become the Taipei's critical problem during these years. Air pollution, water pollution, and solid waste have been at a level harmful to residents health.

These problems already existed in urbanization stage, and also will exist in disurbanization stage but will be worse owing to the sprawl of population. City center development will be the main factor to attract people to come back. But it should need a catalyst to induce the

private developer to work on it. The catalyst is transit system.

VII. TAIPEI RAPID TRANSIT SYSTEMS

Because of the concentration of population in Taipei, The traffic congestion is more and more serious in these years. Insufficient parking spaces, road capacities and inefficient bus system are the major factors in the transportation problem. Every new mayor assuming office has vowed to solve the problem, but the cars, motorcycles, motor scooters, trucks, and buses have multiplied so fast that any plans contemplated have been made obsolete before any action could be taken.

The Rapid Transit Plan had been suggested in 1976 by the Economics Committee of the Administration Yiian (the highest administration department in national government structure). But after the 1979, the rapid transit was put aside because of some economics reasons.

In 1982, the Administration Yiian redesigned the rapid transit plan because the increased congestion and the declined service of bus system. The Economics Committee set up the long term plan and short term plan for the Taipei Metropolitan Area Transit Plan. The outlay was decided that national government provide 60% expenditure and municipal government provide the rest.¹⁴ Both governments will increase the budget on the each fiscal or sell some government bonds, and there's no activity on increasing tax. And this time the government seemed to decide to build the

system. So the government set up a Taipei Transit Department in the Taipei Municipal Government.

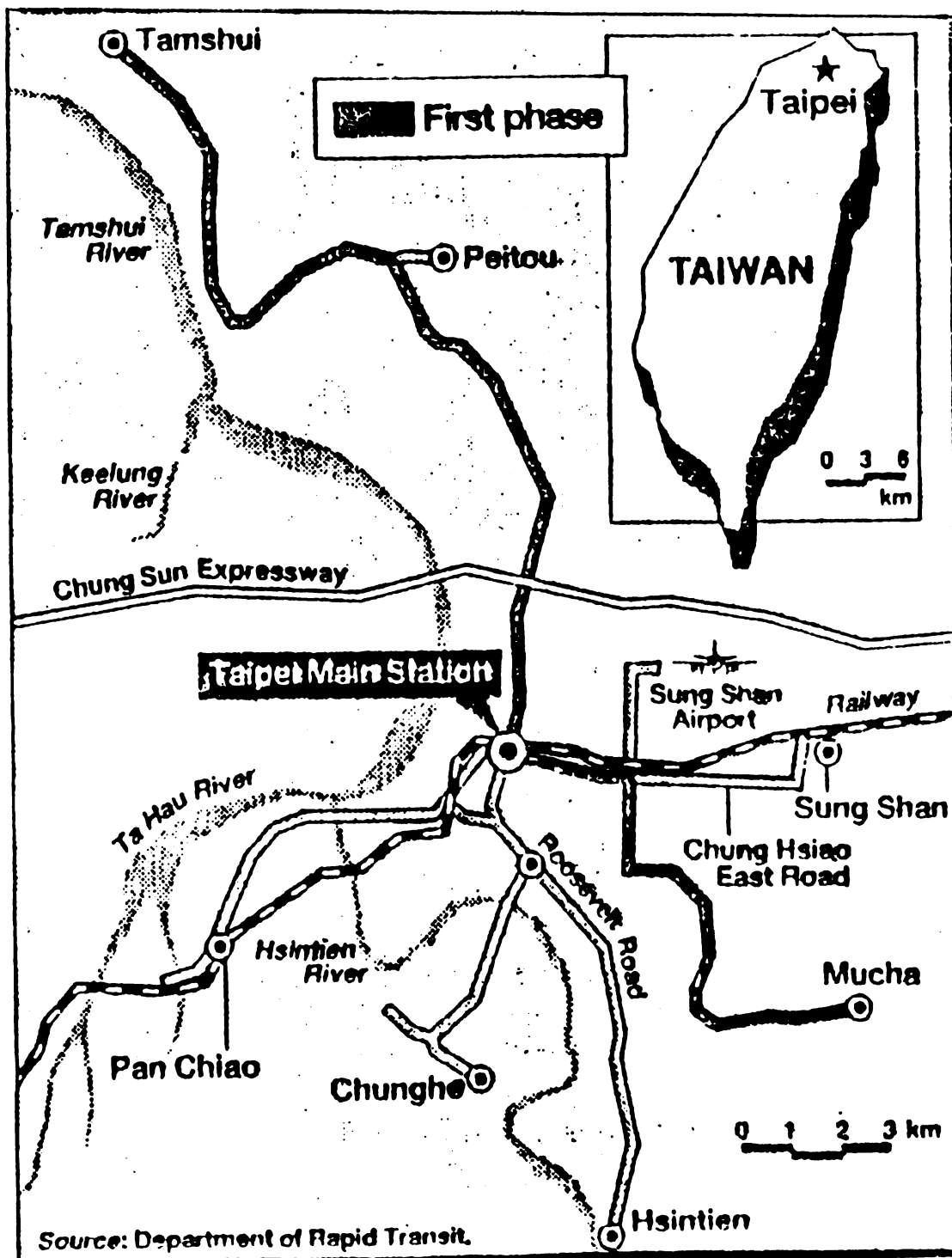
The Taipei Department of Rapid Transit Systems predicted that the population of the metropolitan area will increase to 6.1 million by the year 2001, a 45% increase over 1981. Now the population of the metropolitan area is close to 5.5 million and roads serving 16 surrounding townships are insufficient to handle the traffic. The road system was designed during the 50-year Japanese occupation period (1895-1945) to accommodate a population of 500 thousands. Urban planners then did not anticipate that Taipei would become such a busy metropolis. On top of that, the proliferation of private cars --8,000 per month and counting-- makes things even more difficult. The average speed of the traffic flow during peak hours is 13 kilometers (8 miles), and it is expected that by the year 2001, the speed will be reduced to 6 kilometers (3.7 miles) -- a little faster than walking speed.¹⁵ Because of the traffic congestion, many companies propose to move out from the Taipei center area to the suburban in the present time.

After years debate and off-again-on-again planning, the initial stage of the transit system finally began 1987. The proposed mass transit system in Taipei Metropolitan Area can serve predicted 51% of public transportation needs of this area. The Taipei Rapid Transit System (TRTS) will include four mass rapid transit lines and one medium capacity transit line cutting through the metropolitan's main

transportation corridors(Figure 6). The system will be the first of its kind in Taiwan, and is one of the central government's major 14 Key Projects, a program of construction aimed at improving the living environment in the island. Because of financial restrictions, the city's TRTS will combine three form of construction. In the central downtown areas it will be underground, in periphery areas it will utilize elevated roadway, and in suburban areas, the rapid transit people movers will be constructed at ground level.

According to the opportunity of the transportation in land development, mass transit should provide a good opportunity. How can the planners grasp the opportunity to redevelop the CBD area and attract the people back to the area? From the previous literature review, Taipei city should pass the fourth stage -- disurbanization in spatial cycle. That stage may be a disaster for Taipei development due to the geographical constraints and financial problem. So for the long term urban development of Taipei, mass transit plan seems to be a good factor to develop the better future scenes of Taipei city center area.

FIGURE 6 TAIPEI MASS TRANSIT SYSTEM (FIRST PHASE)



VIII. EFFORTS IN USING BENEFIT SHARING ARRANGEMENTS IN TRTS

From the description of Taipei metropolitan area, Taipei CBD already follow the trend of several big cities of developed city used to pass -- population and activities declined. The mass transit system that the planners of Taiwan conceive is not only to solve the transportation problem but also to renew several worse areas in Taipei City. Because in Taipei city center, there are lots of area still just 4-5 stories and housing conditions not very good.¹⁶ Considering the consistency of the building and the landscape, those areas should be reconstruct to face the change of the Taipei's new phase.

Taipei's transportation habits is not the same as U.S. but similar to Japan, Hong Kong. Most of the residents of Taipei use public transportation -- buses. Very few people use private cars except for business reasons. So Taipei's mass transit system will work is depend on lots of riderships which will support the operation of the system. It is not as San Francisco BART system which was overestimated the riderships by consultant and resulted in the financial problem. And although BART agency considered the resource of financial and development by join adjacent land with station, because of the regulation limitation and the reluctant of the planning made these things failed. As Hong Kong transit system, at first the financial of this system faced the edge of broken due to the construction fees

but right now it is one of the best transit systems in the world. The reasons why Hong Kong transit system will work are the riderships and the financial resource form joint development. Taipei's mass transit has the riderships factor as Hong Kong but still need the efforts in benefit sharing arrangements in land development. And the benefit-sharing arrangements consider the city center development will get both benefits in land development and transit system.

From those examples and the approaches and activities of benefit sharing that can be seen in joint development efforts, the following efforts which should be conducted are based on the above assertion.

1. Taipei Department of Mass Transit Systems should not under estimate land acquisition requirements. To have a future position for bargaining in joint development, public agency must first have the property base. It is far easier to sell surplus land later than to find you have no room for system/station expansion and no bargaining position for air rights/connection access development. Given the dispersed patterns of contemporary urban development and the high costs of labor for feeder services, obtain adequate park-and-ride lot property in suburban areas and develop these lots in phases as demand warrants.

2. Success in joint development activity means greater revenues for the transit system and the private developers. Property can provide a direct physical connection between

adjoining private and public development and a transit station, thereby improving pedestrian access and improving the safety, aesthetics and convenience of the development. Revenue potential could vary substantially, depending on the type of interface, including pedestrian, bus or auto connections such as parking. The private sector could contribute to these costs and benefits with more direct connection and System interface improvement can increase the riderships on the transit station and attract more customer to the development.

3. The private sector should be approached in a businesslike manner. Public agencies must maintain credibility in terms of timing, funding and meeting deadlines, because time is the one element that costs the private sector the most.

4. Usually there are diverse transit and local or regional jurisdictional concerns at stake when looking at joint development interests for a regional transit system. It is essential to structure the respective relationships of all parties before entering into any negotiations with private sector interests. Each party needs to decide what it truly wants; that is, the transit agency should set objectives and priorities for the transit system and the general purpose government or land use control agency should define its objectives for the nature of desired development --local circulation/traffic access at each individual station.

5. The cooperation of the different public agencies is very important in joint development. The development of the station area maybe will make some influence that the land planning agency doesn't want to get. The objectives of the public agency could be very different, and it may spend several times to negotiate. Especially in oriental country, the development project may involve several different agencies, and every agency has its basic concept to the project.

6. The development contract between the private and public sectors is the main part of the benefit sharing arrangements and should be the center of joint development regulation. It should consider the consistency of the landscape of whole area and the city center development and list the techniques it uses. Also the contract should be evaluated by local groups.

IX. CITY CENTER DEVELOPMENT AND PUBLIC TRANSIT PLAN: RECOMMENDATIONS AND SUGGESTIONS

The spatial cycle implies a continuous change in land use and urban structure and so in transportation systems and traffic patterns. Although these four stages should be the necessary cycle for a city development, planners can use such policies to accelerate and support desired urban development or to put a brake on unfavorable urban development.

From the analysis of the spatial cycles in Taipei, it illustrates that Taipei is in the suburbanization stage. Considering the geographical features in Taiwan and Taipei, the stage of disurbanization will make a huge impact on the natural resources and the financial burdens of local government. In this point, Taipei development should shorten or pass the disurbanization stage that means Taipei should go straight to the reurbanization stage. The mass transit is the catalyst to make efforts on it. In the previous chapter, I already assert the efforts in benefits-sharing arrangements in TRTS. In here, the suggestions in the city center redevelopment and public transit system for Taipei will be discussed.

1. GOVERNMENT

1) CENTRAL GOVERNMENT

a. Land use legislation

Because the law of land use plan in Taiwan restricts the lands for transportation use to construct any buildings which are not using for transportation use, the legislation problem of the developments within transportation facilities needs to be solved. Better legislation will contribute a better tools to land development of city center development.

b. Jurisdiction coordination

Taipei Rapid Transit System runs through the metropolitan area which include several different levels of jurisdiction areas, the management of the operation, revenue and cost should be considered in the central level or established committee which concludes those jurisdiction areas to avoid the conflict of benefits sharing. Likewise, the responsibility of joint development of station depends on which jurisdiction it belongs. And the development should consider the needs and hopes of the local area, especially by the local residents.

2) LOCAL GOVERNMENT

a. Housing program

The squatter settlements is the major factor to insufficient public facilities in Taipei. The city center development may consider constructing public housing in certain areas to provide good quality housing. Another

thing is in the last decade the government has provided some public housing to low income groups, but because the government didn't catch the trend of housing demand and didn't consider the preference of the residents several programs failed. So in the coming years, city center development seems not only to focus on commercial but also on housing supply. Those housing programs should coordinate with private sectors which know what the public wants. That is the base of the benefit sharing arrangements to provide the partnership between private and public sectors.

b. Parking management

To minimize long term parking for employees in downtown area that would exist in transit service, this will reduce the number of employees driving automobiles to work and encourage them to use the transit system which will result in reducing the private cars entering the city center.

c. Comprehensive plan

The Taipei City government should develop a comprehensive plan that integrates transportation with transit system, land development, infrastructure and open space agendas. To consider the whole urban development of Taipei City, the plannings should not be separated in the old ways. This is necessary task in the present for Taipei facing the reurbanization stage.

2. PUBLIC TRANSPORT PLANNING

1) SERVICE

The service of the public transport should consider the different public modes. The bus system could serve where the transit system can not reach. But this is a big problem in Taipei city, because there are many private and public bus companies running in the metropolitan areas. The Taipei municipality should manage the bus system in the Taipei transportation system to make the both public system effective by rescheduling and rerouting the bus system.

2) COORDINATION OF LAND USE PLAN

Transportation has big effect in the land use patterns. But in the past years, because the lack of coordination with land use plan and transportation plan in Taipei, the transportation system could not run very efficiently. The coordination of the land use plan and public transportation plan will efficiently guide the development of land use and public transportation network.

3. PHYSICAL PLANNING

1) LAND USE AND DENSITY

Accessibility is a very powerful factor in determining the prices, profitability and intensity of land use. According this, the office and commercial buildings should

locate near the transit station. And in the transit side, the station should be set amongst revenue-producing shopping centers and office blocks or close to very large office development.

2) PEDESTRIAN SYSTEM

In the shopping streets or shopping areas, the pedestrian system should be well planned. Prohibiting cars from entering these shopping zones should provide a good environment for browsing around shops. This not only will attract the adjacent office blocks' employees to the downtown but also residents of the suburban areas who need the high quality goods. And from the mass transit perspective, good pedestrian system will induce the patronages indirectly by attracting the customers to the shopping zones.

X CONCLUSION

Those recommendations maybe are the general ideas of a successful mass transit system but considering the integration of city center development and transit system they will be different from places to places. In all, the city center development and mass transit will be a very close relationship in the Taipei urban development process and provide the best scenes of Taipei City. In order not to follow the disaster of San Francisco BART system, the planners and legislators of Taiwan should conceive the Taipei's future development and work together.

In this research paper there are several accomplishments of its objectives: First it indicates the development of Taipei city center has reached the Type 4 absolute decentralization which means the city center is declining at now and is gradually approaching disurbanization. But considering the geographical constraints of Taiwan and Taipei, the development of Taipei should avoid the disurbanization and jump to reurbaniztion. In this circumstance, the city center development process should be implemented to revitalize the activities of city center of Taipei. And the Taipei transit system project can be the catalyst of Taipei city center development.

Second, it concludes that the benefits sharing arrangements can be used as a method in integrating city center development and transit system project. And the techniques

of benefit sharing should not be limited in one technique, the regulation of the arrangements should have the flexibility between the public and private sectors.

Third, it asserts that the efforts of the benefits sharing in Taipei city center development and Taipei transit system project should concern in (1) land acquisition, (2) improvement of the physical connection such as pedestrian access, parking access, and convenience which can attract riderships, (3) consideration of timing, funding, and deadlines between private and public sectors, (4) definition of the objective of each jurisdictional concerns and interests, (5) cooperation of different public agencies, and (6) development contract between private and public sectors.

From the above assertions, the objectives of this research paper are quite accomplished. But if Taipei Municipal government can not conceive the opportunity of the integration of city center development and transit system project can really help the development of the whole city, the opportunity will fade away and the disaster of developed countries' cities will come to Taipei city pretty soon.

FOOTNOTES

1 Leo H. Klaassen, Transport and Reurbanisation, (Grower Publishing Company Limited, England, 1981), p. 13

2 *Ibid.*, p. 14

3 Wayne Attoe (ed.), Transit, Land Use and Urban Form (Center for the Study of American Architecture, School of Architecture, The University of Texas at Austin, Austin, Texas, 1988), p. 26

4 Stephen A. Carter, Joint Development Potential for Light Rail System, (Special report 182, Transportation Research Board, Washington D.C. 1978.), p. 83

5 *Ibid.* p. 85

6 *Ibid.* P. 86

7 Wayne Attoe (ed.), Transit, Land Use and Urban Form (Center for the Study of American Architecture, School of Architecture, The University of Texas at Austin, Austin, Texas, 1988), p. 182

8 *Ibid.*, p. 183

9 *Ibid.*, p. 183

10 *Ibid.*, p. 184

11 Taipei Municipal Transit Bureau, Joint Development of Tan Shei Line Transit Project -- Cases Study in Japan, Hong Kong, U.S. (Taipei, Taiwan : Taipei Municipal Transit Bureau, 1988). pp. 144-149

12 *Ibid.*, pp. 8-15

13 *Ibid.*, pp. 123-143

14 Taipei Municipal Transit Bureau, Transit Reports,
(Taipei, Taiwan : Taipei Municipal Transit Bureau, XII,
1988), p. 2

15 *Ibid.*, p. 3

16 Taipei Municipal Transit Bureau, Joint Development
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