UNIVERSITY OF CINCINNATI

August 8, 2003

I, James T. Czarnecky,

hereby submit this as part of the requirements for the degree of:

Master of Community Planning

in The College of Design, Art, Architecture & Planning

It is entitled Dynamics and the Socioeconomic Potential of Urban Streetcar Connecting Covington, Newport and Cincinnati

Approved by:

DYNAMICS AND THE SOCIOECONOMIC POTENTIAL

OF URBAN STREETCAR

CONNECTING COVINGTON, NEWPORT AND CINCINNATI

A thesis submitted to the

Division of Research and Advanced Studies
of the University of Cincinnati

in partial fulfillment of the
requirements for the degree of

MASTERS OF COMMUNITY PLANNING

In the School of Planning
of the College of Design, Architecture, Art and Planning

2003

by

James T. Czarnecky

B.F.A., Columbus College of Art and Design, 1988

Committee Chair: Dr. David J. Edelman

Abstract

Over the past few years, Cincinnati and Northern Kentucky have been studying various transportation alternatives, one of which is an urban streetcar circulator connecting Covington and Newport, Kentucky, and Cincinnati, Ohio. This thesis looks critically at the dynamic issues surrounding the implementation of a streetcar circulator.

These issues include a retrospective analysis from a historical perspective, the studies conducted to date, and their context in the State and Federal planning process. A forward looking analysis examining the theories on how streetcars can contribute to the livability of cities, in addition to the streetcar's potential socioeconomic influence, based on selected case studies.

Recommendations regarding the strategic implementation of a streetcar circulator in the Central Riverfront Area are made, based on the commonalities of the case studies with the study area. Also a case is made for the advanced study and documentation of the impacts of streetcar systems, to benefit other cities considering their implementation.

Table of Contents

List of Tables

List of Figures

1.0 Introduction

The concept of this thesis is to explore the dynamics and potential socioeconomic influences of a streetcar circulator, connecting the central business districts of Covington, Newport and Cincinnati. This three-city urban area will be referred to as the Central Riverfront, as shown in Figure 4. The dynamics in this project refer to the issues surrounding the modern implementation of the streetcar, including the streetcars local history, its current status in the planning process and its potential role in local urban revitalization. Furthermore, its socioeconomic potential and lessons learned are explored through the study of select, comparable cities where streetcars have been implemented in the not to distant past.

The streetcar was once a very popular mode of public transit, which dominated the transportation industry in urban America. Its impressive rise to fame has only been matched in magnitude by its demise. A few cities have managed to maintain a small portion of their original streetcar service, and some have recently built new urban streetcar systems. Many cities, including the Central Riverfront, are considering the possibility of bringing back the streetcar service in an effort to revitalize the downtown districts.

Where cities are entertaining this concept, planners, engineers and politicians are commonly faced with the recurring question of how and why an abandoned form of public transit would benefit the city now. In order to understand this seemingly counterintuitive trend, this document will provide an overview of the streetcar's history. It will also discuss the changes in

socioeconomic conditions, which will provide some insight on why an old technology may again be beneficial to the Central Riverfront.

In order to determine whether the reintroduction of the streetcar would benefit the Central Riverfront and how to implement it in the 21st Century, a few case studies are discussed where the urban streetcar has been implemented in the not so distant past. Inferences will then be drawn from the case studies and logically applied to the Central Riverfront in regard to the successes, failures, and lessons learned.

Of course, the introduction of a streetcar system, in and of itself, would not provide the desired revitalization effects in any urban setting. With the typical current exodus of jobs and people moving out of the cities and into the suburbs, a comprehensive socioeconomic development plan is required to reverse the decline of any city. However, the streetcar can be leveraged as the catalyst for change, and become an extremely powerful component, which other programs and policies can build upon.

1.1 Structure of the Thesis

Defining the Problem

First a purpose and need or problem is defined in order to provide direction through the coarse of this thesis. The purpose and need is largely driven by prior studies, completed within the last couple of years, where the streetcar had been identified not only as a transportation alternative, but also as an urban redevelopment tool. A review of these studies revealed a consistent

theme; that the streetcar may hold potential for the revitalization for the Central Business Districts within the Central Riverfront. However, due to the nature of these studies, and the requirements of the various agencies, they did not directly address the issues surrounding the overall socioeconomic potential of implementing a streetcar circulator. As a result, the problem identified here, and as stated in hypothesis, is to explore the socioeconomic potential of a streetcar circulator, not only in terms of its development potential, but also in the broader context of history and project evolution.

Literature Review

Once a problem had been defined and the hypothesis had been formulated, a thorough review of existing documentation was warranted to disclose the streetcar's history, its current outlook as it pertains to modern transportation planning, and finally a review of other cities where the streetcar has been implemented.

Historical Perspective

Although the history of the streetcar within the Central Riverfront is somewhat complex, considering the development of chronologically and physically overlapping technologies, a basic linear profile was developed to shed light on what was driving the public transportation market and how it responded to those pressures. Various documents were studied which provided insight into the evolution of public transit in both Cincinnati and Northern Kentucky. The

evolution of the technology, from horse drawn streetcars to electrically powered streetcars, and finally the dismantling of them, was researched and compared on both sides of the river.

The inevitable rise and fall of the streetcar warranted a careful review of the controversial GM conspiracy theory, as well as the alternate theory claiming that market forces alone were responsible for the dismantlement of the streetcar network in the United States. The historical data was drawn from various sources, including the Cincinnati Historical Library, Internet searches, and the local transit agencies.

Definition of the Streetcar Technology

Because of the confusion surrounding the definition of what constitutes a streetcar in modern times, it was necessary to provide a definition to be used in the context of this thesis. Various agencies and interest groups provide different definitions, and often the streetcar is lumped in with the light rail technologies. However, because there can be such a contrast between light rail and streetcars in terms of the vehicles themselves, infrastructure requirements, service characteristics, capital and operating costs, and markets served, a differentiation between the two was warranted, and therefore provided.

Transit and Livability

To help guide the research and discovery relative to the case studies, an understanding of transits roll in socioeconomic development was established. It

was discovered that the socioeconomics of a community are directly relative to is livability and that streetcars can play a major role in creating livable communities. As such, a discussion on mobility choices, pedestrian activity, mobility, safety and other topics are provided to demonstrate the potential influence streetcars can have in making livable communities.

Current Planning Studies

In order to determine what the *real* socioeconomic potential of streetcar is a review of its status in local planning efforts was required. If significant political or public support for a streetcar system were lacking, then, in reality, streetcars would have very little if any socioeconomic potential. This "reality" warranted a review of current planning studies, where the streetcar was considered as an alternative. As a result, included in this thesis, is an overview of the purpose and need, scope and recommendations of the various studies, specifically in regard to the streetcar alternatives. In addition, a brief explanation as to the defeated Hamilton County transit tax is provided, again, in order to demonstrate the streetcars "real" potential.

Analysis

The analysis consists of the documentation of data discovered through research of the case studies. This effort was somewhat open ended and followed streams of limited information. The intention was to find data that could

be used to compare the dynamics of the case studies to that of the Central Area District and to determine if similar socioeconomic results could be expected.

In order to determine the applicability of a streetcar system in the Central Riverfront, specifications of the existing systems had to be defined. The length, cost, frequency of stops, target markets and general operating characteristics were researched in order to provide a basis for comparison to the Central Riverfront. This was done to ensure a fair comparison and/or to highlight the differences of the system envisioned for the Central Riverfront.

Next it was prudent to examine the intended purpose of the streetcar in the case studies. While one can generalize the intentions of urban revitalization or urban renewal, here it was important to find out specifically what was to be accomplished, in order to relate it to unique circumstances of the Central Riverfront. Furthermore, it was needed to examine the strategic planning of the streetcar service in the case studies. An exploration of how the streetcar was implemented and how it fit into other strategic programs was needed in order to draw inferences and relate them to the Central Riverfront.

The availability socioeconomic data is limited, partially due to the newness of the systems, and due to the fact that in some cases it is not tracked and/or recorded at all. The data presented in this thesis is intentionally limited to what can arguably be directly related to the implementation of the streetcar. Therefore, the limitations are primarily driven by geographic proximity to the streetcar alignment and factual data relative to ridership and trip purposes derived from surveys and the relationship between the two.

In part, future plans for the expansion or improvements to the streetcar systems were explored to indicate the perceived success of the existing systems. This qualitative type of data implies weather the communities perceive the streetcar as making a feasible and worthwhile contribution to the quality of life and vibrancy and quality of life in their cities.

Drawing Conclusions and Making Recommendations

The conclusions are based on key issues discovered throughout the entire process. From a historical perspective, one has to first determine if it makes sense to reinvest in a technology that had all but been abandoned entirely in the United States. Then secondly, the question of whether the functional change of the streetcar justifies its renaissance must be examined.

From a transportation planning perspective, questions regarding the status of the streetcar in the planning process are considered. From an urban planning perspective, issues relative to the streetcars roll in making cities more livable and how that relates to the Central Riverfront are discussed.

Inferences regarding the socioeconomic impacts are drawn from the case studies based on commonalities of the case studies with that of the Central Riverfront. Lastly recommendations are made pertaining to the implementation of a streetcar circulator based on the lessons learned from the case studies.

1.2 Purpose and Need

It is widely accepted that a vibrant city center is absolutely necessary to maintain a large economically and socially prosperous region. Like many industrial cities of the Midwest, the Central Riverfront is struggling to reinvent itself in order to counteract the diminishing population and employment from the cities themselves. In 1960, the population within Cincinnati's corporation limits had reached 502,550. By 2000 Cincinnati's population had dropped to 331,285, representing a 34% decline (U.S. Census Bureau, June 28, 2003).

Transportation, through the provision of increased mobility and accessibility, is a major factor in the long term planning strategies of any major city. The Ohio-Kentucky-Indiana Regional Council of Governments (OKI), together with the Ohio Department of Transportation (ODOT), the Transit Authority of Northern Kentucky (TANK), and the Southwest Ohio Regional Transit Authority (SORTA), has devoted considerable resources to study the transportation network in this region. These studies include several highway and transit alternatives, all of which are subjected to the traditional volume, capacity and cost analysis. In addition, the analysis goes beyond the typical engineering oriented analysis, and includes criteria centered on the socioeconomic issues.

One of the transportation alternatives, of particular interest to this project, is the streetcar, which appeared in two recent studies: the Central Area Loop Study, and Metro Moves, both of which will be discussed in Section 2.4. The streetcar alternative first appeared in the Central Area Loop Study where a circulator service connecting Newport, Covington and Cincinnati was explored in

detail. The same concept appeared in the MetroMoves Plan within the context of the Regional Rail Plan. A benefit-cost analysis was undertaken to determine the return on investment and illustrated the benefits of an integrated transit network.

The work of this research project is intended to complement the work of the prior studies and approach the potential benefits from a slightly different perspective. Here, the intention is to look at the potential benefits of a streetcar circulator on its own merits, independent of the full Regional Rail Plan or the improvements proposed for the bus network.

Ultimately, the proposed streetcar service would be interconnected to a larger intermodal network. However, this document will study its potential as a stand-alone transportation project, to be leveraged as the catalyst for urban development. "Urbanists focus on the micro before wrestling with the macro and understand that, in reality, the macro only changes for the better in micro steps...Step by step, essential and natural growth follows and spreads until larger areas prosper over time" (Transportation Research Board 1996b).

This project will begin at "square one" and outline the dynamic planning issues regarding the implementation of the streetcar, including whether it can function as a catalyst for urban revitalization. This project will not focus on the political, financial or engineering details, or with comparisons of other technologies, but rather entertain the fundamental issues of its applicability, and the streetcar's potential ability to create a more livable urban community.

The issues of livability revolve around recurring themes, such as safety, accessibility, social diversity and economic opportunity. What is proposed in the

hypothesis is that the streetcar can be used as a significant tool to develop these characteristics of a livable community. The central business districts have traditionally been the epicenter of our social and financial lives and "it is not a coincidence that the economic decline of these districts has been mirrored in the decrease in transit ridership across the United States" (Transportation Research Board 1996b). The challenge here is to demonstrate the connection, via streetcar.

1.3 Scope and Limitations

This thesis is unique in its analysis of whether a streetcar circulator would benefit the Central Riverfront. It is not restricted by federal, state or local guidelines for conducting a publicly funded transportation study. Instead, this thesis will focus on the more fundamental issues surrounding the streetcar's justification. To address these issues, the research will include a study of the streetcar's history, its function and its status in the local planning efforts. This thesis will rely heavily on case studies of other cities, where urban streetcars have been implemented, and assess whether they had contributed to the socioeconomic development of their respective urban areas.

There is a considerable overlap of issues between what is being addressed in this research project, compared with the requirements of the more traditional State and Federally sponsored transportation studies. In order to clarify the distinction, an overview of the typical Federal and State sponsored studies is provided below with some of the differences highlighted.

New Starts

The New Starts program is sponsored by the U.S. Department of Transportation's Federal Transit Administration (FTA), and is designed to provide federal financial resources for the study and construction of fixed guideway public transit systems. In order to obtain the funding, communities must demonstrate the feasibility of the proposed systems. Not all fixed guideway transit systems require federal funding for implementation, however, if the federal dollars are desired, specific requirements must me met.

The New Starts program evaluates and recommends funding for new and expanded fixed guideway systems. The funding itself comes from the Transportation Equity Act for the 21st Century (TEA 21), enacted in 1998. TEA 21 requires that the New Starts projects receive FTA approval to advance from Alternatives Analysis to Preliminary Engineering, and then to Final Design and Construction. The approval is largely based on the New Starts criteria as outlined below:

- Project Justification Criteria
    - Mobility Improvements;
    - Environmental Benefits;
    - Operating Efficiencies;
    - Cost Effectiveness;
    - Transit Supportive Existing Land Use and Future Patterns; and
    - Other Factors.

- Local Financial Commitment
    - The proposed share of total project costs from sources other than Section 5309, including Federal formula and flexible funds, the local match required by Federal law and additional capital funding ("overmatch");
    - The strength of the proposed capital financing plan; and
    - The ability of the sponsoring agency to fund operation and maintenance of the entire system as planned once the guideway project is built (FTA b, July 13, 2002).

It is important to note that the New Starts criteria outlined above focus not only on the impacts of a specific fixed guideway project, but also on how the project would impact the entire local transportation system. Planners often incorporate the FTA New Starts requirements and evaluation criteria into a regionally sponsored Major Investment Study, in anticipation of applying for federal funding.

Major Investment Study

A Major Investment Study (MIS) is a study of local or regional transportation alternatives. They are typically conducted for local planning agency, when federal funds are required for major public transportation projects. The MIS defines the problems and suggests alternatives to solve them,

evaluates their effectiveness and recommends a preferred course of action (ODOT 1999).

The focus of a MIS is to build consensus on a Locally Preferred Alternative (LPA), through the direct participation of the general public and regional stakeholders. An MIS is intended to provide the region's decision makers with an evaluation tool to determine how to solve the problems and achieve predetermined goals (Gad 1999).

Benefit-Cost Analysis

Often included in a New Starts Application and/or a MIS is a Benefit-Cost Analysis, which includes the quantification of several categories of benefits and disbenefits. It is typically associated with an economist's approach to return on investment, based on a quantitative assessment, where all benefits and costs are assigned a unit value. Traditionally these fall into the following categories, based on broad public policy:

- Mobility and Access Impacts;
- Economic and Financial Impacts;
- Environmental and Energy Impacts;
- Safety and Security Impacts;
- Social Equity Impacts; and
- Intangible Impacts and Factors (Transportation Research Board 1996a).

The most pronounced criticism of the traditional benefit-cost analysis is its inability to quantify the full range of benefits and disbenefits as they pertain to the language of public policy and goal statements, which are often an extension of the public's and decision maker's intuition. Another criticism of the typical benefit-cost analysis is that it fails to fully account for all of the long-term benefits. As a result, such studies often compare long-term benefits to short term costs, thereby distorting cost-effectiveness.

This thesis, in contrast to the traditional cost-benefit analysis, will focus on the more qualitative impacts, and place the emphasis on a quality of life orientation. This inverted approach, as suggested by the Transportation Research Board, places issues directly relative to one's well being as the highest priority, where they are designated as "Fundamental" benefits rather than "Intangible". The concept is that one's quality of life goes up when one has a safe and secure place to dwell, when one has improved financial stability, and when one lives in a healthy environment. Other issues, which have been traditionally assigned the highest priority in estimating benefits, such as mobility and accessibility, are now categorized as secondary or "Intermediate" benefits. This approach suggests that the ease of movement is of little value unless the network provides access to major destinations (Transportation Research Board 1996a).

This project will not include a public involvement component as required in a MIS. It will not provide new ridership estimates, capital costs or operating costs. It will not quantify and assign new monetary values to the benefits of a

streetcar system or to determine a new return on investment and the associated risk because these issues have already been addressed in prior studies, referenced in the Literature Review section of this document.

Conversely, this research project explores the broad socioeconomic impacts of a stand-alone streetcar system. The conclusions are based on case studies where similar systems have been built and operated. The evidence is based on a mix of qualitative and quantitative data, taken from various resources, as it pertains to the case studies. Finally, the evidence and "lessons learned" are applied to the Central Riverfront based on similarities and differences noted, and recommendations are then presented accordingly.

1.4 Statement of the Hypothesis

A hypothesis is a concept to be tested, and the results serve as the climax of this document. First, the statement is put into context by providing the framework of the issues surrounding the problem. Then evidence relative to the hypothesis is documented, and conclusions are drawn as to the validity of the hypothesis. The following hypothesis will be tested in this document.

The implementation of a streetcar circulator, connecting Covington, Newport and Cincinnati, can act as a catalyst for socioeconomic development in the Central Riverfront.

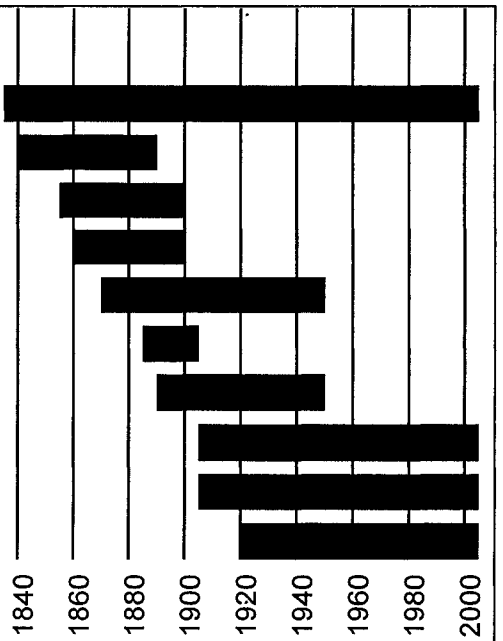
2.0 Literature Review

2.1 History of Urban Streetcar Transit

The history of the electric streetcar in Northern Kentucky and Cincinnati chronologically overlapped the horsecar era and the cable car. In addition, the incline, which is a device used to carry people and vehicles up and down steep slopes, provided local service for the horsecar, electric streetcar, and the bus.

Table 1: Timeline of Transportation Modes in the Riverfront District

Mode	Beginning Year	Ending Year
Railroads	1836	NA
Omnibus	*1840	1890
Horsecar	1859	*1900
Steam Dummy	1860	1897
Inclines	1872	1948
Cable Car	1885	1902
Streetcar	1890	1951
Jitney/Taxi	*1915	NA
Bus	*1915	NA
Automobile	1920	NA



* Indicates an approximation

Source: (Lehmann 2000; Brell 1976; Wagner 1997; Wagner 1968)

Cincinnati was the fastest growing city in the country in the 1850's and was known as the Queen City of the West. In 1860, Cincinnati was the largest

city west of the Allegheny Mountains, and the fourth largest in the country when its population reached 161,000 people. Across the great Ohio River were two modest Kentucky cities, Covington and Newport, with populations of 16,471 and 10,046 respectively. At the time, everyone seemed to be headed to Cincinnati. However, it was the Ohio River that was holding back the growth of Northern Kentucky. The only way to cross from Covington or Newport was by ferryboat, which was unreliable at best, and made it difficult for people in Northern Kentucky to hold jobs or otherwise conduct business with Cincinnati on a daily basis (Lehmann 2000).

Cincinnati and Northern Kentucky benefited from transportation links from all directions provided by roads, canals, rivers and railroads. This diverse transportation network contributed to the manufacturing and distribution industries and perpetuated the cities' growth.

The Omnibus

During this time of phenomenal growth in the 1850's, the omnibus lines were providing the first form of mass public transportation around the city and to the outlying areas (Wagner 1997). The omnibus was a popular public transportation service in 1858. It was simply a horse drawn bus with the driver riding on top and the passengers. The bus had wooden seats and floors. If a passenger wanted to get off the bus he or she would signal the driver by tugging on a rope, which ran from inside the bus, through a hole in the roof with the end tied around the conductor's leg (Brell 1976).

Some of the routes served downtown Cincinnati, while others served the suburbs. The omnibus typically traveled over cobblestone streets where the uneven surface caused a rough ride for the passengers, sometimes to the point of passengers being thrown out of their seats. Because of this, Fuller Davidson and Company introduced a system where the horse drawn passenger cars would travel on steel rails, which provided a smooth ride. This idea was opposed by the owners of the omnibuses, but eventually gained the support of the city leaders who endorsed a citywide system of streetcars (Brell 1976).

The Horsecar

The new horse drawn streetcar, running steel flanged wheels on steel rails in the street, became known as the horsecar. On July 1st, 1859 the City of Cincinnati passed an ordinance governing the implementation of the new horsecar lines. The law required the consent of the city council to construct a street railroad system. It also required the horsecar operators to purchase the omnibus lines if their business was injured as the result of the new horsecar service. The law further mandated the use of cars in good condition, a sufficient number of cars to adequately serve the public and a five-cent fare limit. The speed limit was restricted to six miles and hour and "no faster than a walk" around a curve. Also cars running in the same direction could not run any closer than 300 feet from one another (Wagner 1968).

Cincinnati's first horsecar system began service on September 14, 1859 and served Walnut and Vine Streets in the center of the city and beyond and was

built by the Cincinnati Street Railroad Company. By 1860, Cincinnati had five horse drawn streetcar lines in operation, built by four different companies. Over a dozen lines where in service, or under construction by 1880 (Wagner 1997). Virtually every route was being built by a different company, most of which were under capitalized and sometimes politically motivated. The problem was that the operations were not very profitable, largely due to the short service life of the horses and the limited capacity of the cars, which could only carry about twenty people at a time.

During the same period, Northern Kentucky also was experiencing the same problems relative to the operating the Omnibus. Their approach to the problem was the same as Cincinnati, and they also implemented the new horsecar technology. However, the Ohio River still posed a formidable obstacle to making the connection with Cincinnati.

This began to change in February of 1864 when the Covington Street Railway Co. was incorporated. The intent was to establish a horsecar line extending to Cincinnati, by way of the Suspension Bridge. The Bridge opened in 1866 and on August 5th, 1867 the Madison Street Line (later known as the White Line), began providing service from Madison, Third, and Greenup Streets in Covington, to Front Street in Cincinnati. (Lehmann 2000).

Newport also developed horsecar service. The Newport Street Railway began operations in 1867. What was known as the Blue Line, provided service from Newport to Covington, by way of the Fifth Street bridge over the Licking River, and shared track with the White Line over the Suspension bridge to

Cincinnati. In 1881, Newport established a direct connection to Cincinnati via the Pennsylvania Railroad Bridge. Another operator joined the horsecar arena in 1870 when The Newport and Dayton Street Railway began providing service from Dayton Kentucky, through Bellevue and on to Newport (Lehmann 2000).

Up until 1879 the horse drawn streetcar services were still experimental in nature, and the idea of learning as you go was the typical mentality for the builders and operators of the lines. However, in 1879, an ordinance was passed which attempted to standardize and regulate the development, construction and operations of the horse drawn streetcar lines in Cincinnati (Wagner 1968). Newport also passed ordinances, which provided explicit regulations for the establishment of a route and the right to operate it, in addition to ensuring that their infrastructure was compatible with Cincinnati's.

Despite large mergers of independent lines, and the standardization of the infrastructure and operating procedures, the growth of the city and the demand for mobility was exceeding what the streetcars alone could provide. In 1868, the White Line, operating from Newport to Cincinnati carried over 600,000 riders (Lehmann 2000). The rising demand for increased mobility spawned the development of other technologies to complement the horse drawn streetcars.

The Inclines

The topography of Cincinnati and the surrounding suburbs proved to be a formidable transportation obstacle. The high plateaus and steep hills surrounding the city did not permit direct access to the neighborhoods on top of,

and beyond the hills. The relatively flat terrain of the Mill Creek Valley was the only path out of the basin over which horses could provide public transit service. To solve this problem, inclines were designed and built to carry the horsecar, and the new streetcars, up and down hills too steep for them to climb on their own. The cars would be driven onto a level platform mounted to a frame with steel wheels. The platform would be pulled up the hill on fixed railroad tracks by cables. A cable formed a continuous loop and was pulled by a stationary engine at the bottom of the hill. The inclines proved to be a successful complement to the transportation system and carried horsecars, electric streetcars, autos and busses up and down Cincinnati's steep hills for over 70 years to provide service to the outward expansion of the city.

Cincinnati's inclines were built between 1872 and 1892. The first of five built was the Mt. Auburn Incline. It was regarded as highly speculative before its debut, but proved to be so successful that four additional inclines were built. All of the inclines were built during the horsecar era and all but one was designed to accommodate the horsecar. The Fairview was the only incline originally designed and built to accommodate the newly introduced electric streetcars.

Ironically the success of the inclines caused their own demise. Largely due to the increased accessibility, the city grew into Walnut Hills, Mt. Auburn, Avondale, Clifton and Price Hill. The growth of the outlying areas eventually caused the demand for mass transit to exceed the capacity of the inclines. The inclines were eventually abandoned after 70 years of faithful service, due to the

huge popularity of the new railways being run by electricity. The Mt. Auburn Incline, the last incline in Cincinnati, closed in 1948 (Wagner 1968).

The Steam Dummy

The limitations of the "horse powered" public transit system were magnified with the increasing demands of mobility. In search of an alternative to the horsecar, self-propelled, steam powered streetcars were developed. As early as 1860, one year after Cincinnati passed its first ordinance regulating the implementation of the horsecar lines, a steam-powered streetcar, known as a steam dummy, was tested in the streets of Cincinnati. These self-propelled streetcars were not put into regular service in the city because the noise terrified the nearby horses (Wagner 1968).

However, the idea of steam propulsion did not die. Beginning in 1866, the owners of the Cincinnati and Columbia Street Railroad used the steam cars to reach places that were impractical to reach with cars pulled by horses or mules. Early steam cars contained passenger compartments and the engines on a single unit. The later steam cars required more power and the larger engines were then used to pull a separate passenger car. The steam car lines were eventually converted to electric powered streetcar lines and the last Steam Dummy was abandoned on July 4th, 1897 (Wagner 1968).

The Cable Cars

A more successful alternative to the horse car was the cable car. The cable car was pulled by a cable, which ran through a small tunnel or conduit under the pavement. The cable formed a large continuous loop, which ran through a series of underground pulleys and was driven by a stationary engine. The cable car would grip the continuously moving cable through a slot in the surface of the street with a jaw like device to pull the car forward. The motorman simply released the cable and applied the breaks to stop. Possibly the most famous cable cars are still operating in San Francisco.

The first of three cable car lines in Cincinnati was completed in 1885 and was known as the Gilbert Avenue Cable (Wagner 1968). Horses would pull the streetcar to the bottom of the hill where the horses were unhitched and a cable would then pull the car up the steep hill. At the top the cable was released and horses again were hitched to pull the car the rest of the route. Eventually, the Gilbert line yielded to the success of the Mt. Adams incline, do to the inefficiencies associated with having to transfer the car from the horses, to the cable, and back again.

The Mt. Auburn Cable Railway was the second cable car operation in Cincinnati. It was built in 1886 and utilized a separate grip car, followed by a trailer car for the passengers. These cars were designed to carry 40 passengers. It was common, however, for the cars to carry 80 passengers at a time during rush hours. The line had two sections of cable to allow for faster

speeds outside of the city because an ordinance restricted the speed within the city. It took about 65 minutes to make the 8.7-mile trip from one end to the other. Eleven cars ran at five to six minute intervals carrying 600 to 700 passengers a day, and it took some fifty-five men to operate the line. The Mt. Auburn Cable was closed permanently on June 9, 1902. It was the last of the three cable cars to operate in Cincinnati (Wagner 1968).

The Vine Street Cable, built by the Cincinnati Street Railway in 1887, was the last cable car line built in Cincinnati. The line ran from Fountain Square on Fifth Street and then went up Vine to Jefferson and made another loop in Clifton near Ludlow. This route was built with two separate cables and required a transfer at the power house. It was 7.5 miles long and took about 25 minutes to ride end to end. In 1893, the Vine Street cars were very popular and dependable. They operated at average speeds of 10 M.P.H. in Clifton and 8 M.P.H. in the city due to speed restrictions. The Vine Street cable line was converted to electricity in 1898 (Wagner 1968).

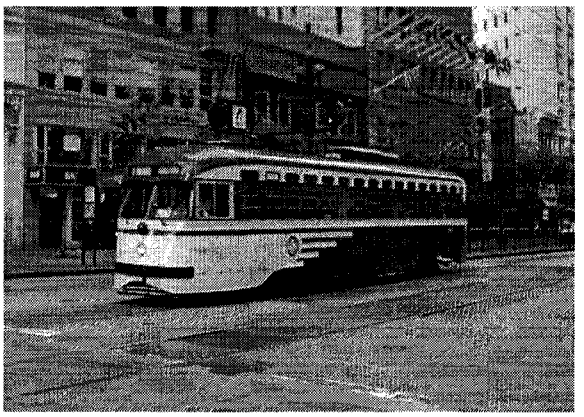
Electrification of the Streetcar

The introduction of electric streetcars overlapped the use of horsecars, steam dummies and cable cars. The early cars were four wheeled vehicles and later evolved into the more popular PCC cars as described below. By the late 1800's, it was being recognized that the mules and horses were too slow for modern society. They proved to be too expensive to maintain and operate and still provide a profitable venture. In addition, the abuse of the animals used to

pull the horsecars was causing public resentment. The cable cars worked well but were very expensive to install. It seemed that the new electric streetcar system was the answer, despite the initial reluctance of the operating companies to use electric lines because of the general lack of understanding of how electricity worked.

Electrically propelled streetcars eventually proved to be a feasible alternative for the growing demands of speed, flexibility and comfort. The first electric streetcars used in Cincinnati, were operated by the Mt. Adams & Eden Park Incline Railway and began operation in 1888 (Wagner 1968).

Figure 1, Historic PCC Streetcar. San Francisco Municipal Railway



Source: Author. February, 2002

On September 21, 1890 the first electric streetcar began providing revenue service in Covington on the Madison Line to the foot of the Suspension Bridge. Electricity had not been provided on the bridge due to a legal dispute over fares. Despite this shortcoming, the electric streetcars in Covington were a huge success and were "packed the entire day". By March 1891, full electric service had been established from State and Madison Avenue in Newport to Fountain Square in Cincinnati. It was reported that this improved line carried 40,000 more people than it did the previous year (Lehmann 2000).

In 1892, the Newport to Covington Blue Line was also converted to electric power from the original horse-power. This line had been extended to provide direct service to Cincinnati by way of the newly opened Central Bridge and was renamed the Newport and New Bridge line.

As technology advanced and the cars became more efficient and comfortable, eventually all of the lines in Cincinnati were converted to electric. They enjoyed tremendous popularity throughout the 1920's and 30's. These improvements and popularity were largely due to the efforts of the Electric Railway Presidents' Conference Committee (PCC). This Committee was formed in 1929 by 25 U.S. and Canadian transit companies, who wanted to standardize the streetcars and improve their performance and comfort (Valentine 2003). As a result, in 1939, the PCC cars represented the best technology and comforts available.

During World War II some new streetcar tracks were laid, and the electric streetcar had reached it peak in ridership. Although competing buses had been introduced, some of the bus routes were cut to save fuel for the war effort and the streetcars benefited in terms of ridership as a result (Wagner 1968). After the war, gradually all of the lines were converted to trolley bus or motorbus service. The streetcars themselves were transferred to other divisions or scrapped as they came off line (Wagner 1997).

July 1, 1950 was the last full day of service provided by electric streetcar in Northern Kentucky. Car number 511 of the Green Line went out in style with a parade in downtown Covington (Lehmann 2000). The last revenue trip by an

electric streetcar in Cincinnati occurred the following year on Sunday, April 29, 1951. It made its last stop at Fifth and Main in downtown Cincinnati at 5:55 a.m. (Wagner 1997).

The Demise of the Streetcar

The 1920's were truly the peak of the electric railways. Almost every town of 2,500 people or more had one, totaling 1,200 different electric railways nationwide, including the streetcar and interurban systems. The streetcar systems primarily provided service within the cities themselves. The interurban type streetcar service provided access to the outlying suburbs en route to the city-to-city connections. This consisted of 44,000 miles of track, and $1 billion of income. At this time, 90 percent of all trips were made by rail (primarily electric), which resulted in 15 billion passengers a year. Only one in ten Americans owned an automobile (Snell 1995)

What caused the fate of the streetcar? Clearly, the popularity of the automobile led to the demise of the streetcar, but the extent to which this was deliberate or of natural economic consequence, is still debated today. Some believe that a massive conspiracy lead by General Motors (GM) deliberately destroyed the streetcar transit system in order to sell more automobiles and buses. On the other hand, some believe that the succession of normal economic pressures had caused the streetcar's demise.

The GM Conspiracy Theory

The theory that GM deliberately destroyed the streetcar transit system, for its own financial gain, is hotly debated even today. In 1974, Bradford Snell, a young government attorney working for the United States Senate, published a report called American Ground Transport. This report was part of The Industrial Reorganization Act as presented to the Subcommittee on Antitrust and Monopoly of the Committee of the Judiciary in Washington, D.C. in 1974 (Snell 1995). This report, together with Mr. Snell's testimony in the Senate hearings, was largely responsible for the widely publicized conspiracy.

Snell contends that the demise of the streetcar was a deliberate business strategy created and implemented by a MIT trained genius named Alfred P. Sloan (Snell 1995). Snell also contends that the objective of the strategy was to increase auto sales and maximize profits through the elimination of the streetcars.

In 1921 GM lost $65 million. Sloan concluded that the automobile market was saturated and believed that those who desired to own an automobile already had one. In order for Sloan to restore the profitability of the company and expand its market, he targeted the automobiles greatest competitor, the electric railway. According to GM files, in 1922 Sloan established a special task force within the company "with the task of replacing America's electric railways with cars, trucks and buses." (Snell 1995)

For decades, GM was the largest freight rail customer in the nation and began to use this position as leverage to persuade the rail owners to abandon their electric rail subsidiaries. In some cases such as in Minneapolis-St. Paul, GM, together with known mobsters, purchased street railways and then scrapped them. GM's special unit proceeded to approach the owners of the largest electric railways and convince them to convert their electric railway operations to buses. To accomplish this, they would threaten to send their rail freight business to rival carriers.

GM also leveraged its position as the largest depositor in the nation's leading banks. The electric railway relied heavily on these same banks for the capital required for their operations. According to U.S. Department of Justice files, GM visited banks used by the railway in Philadelphia, Dallas, Kansas City and others, and offered them millions in deposits in return for convincing the electric rail operators to convert to motor vehicle services (Snell 1995).

Where these tactics were not successful, GM had yet another approach. They would form holding companies to buy the railways directly and then convert them. As part of this strategy GM helped to form and finance subsidiaries such as United Cities Motor Transit, Grey Hound, Rex Finance, Omnibus corporation, National City Lines, Pacific City Lines, American City Lines, City Coach Lines, Manning Transportation and several others. These companies acquired rail systems across the country including operations in New York, Los Angeles, Chicago, Philadelphia, Baltimore, Washington, St. Louis, Salt Lake City,

Sacramento, San Diego and Oakland. Once the railway was acquired GM would abandon, dismantle or convert the service to buses.

Where rail systems were publicly owned or otherwise could not be bought, like the municipal railway of St. Petersburg, Florida, GM bought the officials instead. According to FBI files, they would provide Cadillacs to those who converted to buses. Court documents reveal that GM admittedly targeted over 1000 electric railways by the mid 1950's and that 90 percent of these had been successfully converted to motorized service (Snell 1995).

The Economic Pressure Theory

A number of equally reputable people believe the bus replaced the streetcar due to the changes in the market, and GM's activities were irrelevant. Simply put, they insist that the streetcar's demise was the result of economically superior buses. In fact, people such as Cliff Slater contend "under a less onerous regulatory environment, buses would have replaced streetcars even earlier than they actually did" (Slater 1997).

During the Senate hearings, UCLA's Professor George Hilton, one of the nation's most authoritative transportation experts who challenged Snell's conspiracy theory, gave testimony. In one instance he stated that parts of the Snell report were "so completely oversimplified that it is difficult to take seriously" (Slater 1997).

Other well-respected authorities such as the U.S. Federal Transit policy analyst, Brian Cudahy, Historian Scott Bottles and the pro-rail New Electric

Railway Journal also challenge the conspiracy theory and claim that the demise of the streetcar was simply the result of natural economic pressures. In addition, Slater claims that "virtually every single academic transportation economist" believes that "the replacement of streetcars by buses was a normal economic event" (Slater 1997).

The first threat to the streetcars by the automobile industry occurred during the "Jitney Craze" between 1914 and 1916. It was during this time that the jitneys successfully captured a good proportion of the streetcar patrons. Jitneys were originally regular automobiles that would carry passengers for a nickel, typically along a fixed route, and usually parallel to an existing streetcar route. The slang term for a nickel during this era was a "jitney". Eventually service was provided by bus, and likewise the term "jitney bus" was coined. The appeal of the jitney was that it was faster than the streetcar because it often provided direct service with few or no stops along the way and it provided service more frequently. However, the owners of the streetcars countered this with legal action, which put most of the jitney services out of business (Slater 1997).

From their introduction in the middle of 1914, licensed jitneys reached an estimated peak of 62,000 in service in the United States in 1915. Their impact on the streetcar operations was devastating; some of the operators lost as much as 50% of their ridership. Streetcar companies across the country began to lay off their employees, and many thought the day of the streetcar was over (Slater 1997).

In response to their dwindling market share, the streetcar companies lobbied for legislative action. They claimed that the jitneys had an unfair advantage because they did not have to run the full length of routes, they did not have to be bonded and that they often would only provide service during rush hour. As a result, local and state governments passed legislation to reduce these unfair advantages, in some cases seemingly overcompensating in favor of the streetcar. The newly implemented high cost of liability bonds, the minimum operating hours and other restrictions put most of the part time jitneys out of business. By January of 1916 the jitneys were reduced in number to 39,000. By the end of 1916, their numbers were reduced to only 6,000 and the era of the "jitney craze" was over (Slater 1997).

Although the jitney and the jitney bus had met their demise, the potential of the modern bus had been recognized. During the 1920s, the streetcar had made no significant technical advances, whereas the bus had, and this redefined the vehicle entirely. Significant improvements in its chassis and engine resulted in better speed, handling and comfort and, likewise, made buses even less costly to operate. In the meantime, American cities were paving their streets. These changes coupled with the advent of the balloon tire and improved service, boosted bus ridership (Slater 1997).

The public perceived buses as safer because they could pull off to the curb to let passengers on and off, whereas the streetcars typically boarded in the center of the street. The public also began to favor the bus over the streetcar during this era, because they saw the bus as the middle ground between the

streetcar and the status of the automobile. The flexibility of bus routing and the more widespread service began to give the bus an edge in popularity over the streetcar.

Streetcar ridership declined from 13.8 billion riders in 1920 to 11.8 billion riders during the pre-depression year of 1929 (Slater 1997). Two primary factors are responsible for this decline. The first was a shift in riders to buses as a result of the technical advances discussed above which contributed to the efficiency of the bus operations. The streetcar lines with low ridership were vulnerable to the buses taking over because they cost less per passenger to operate. This was particularly apparent when the streetcar companies were faced with having to resurface streets and replace the aging rail or electric infrastructure.

The second factor was the increasing popularity of the automobile. While the popularity of the streetcar originally declined because of the bus, eventually the private automobile eroded the ridership of both the bus and the streetcar. Ownership of the automobile nearly tripled in less than a decade, from 8.1 million in 1920 to 23.1 million in 1929. This was largely due to the fact that the price of the automobile declined from $850 in 1908 to just $269 in 1923. Logically, many of the new car owners preferred to take their car to work, shop and socialize rather than take public transit (Slater 1997).

Interestingly, those who believe that the economic forces, rather than hostile corporate monopolies, are responsible for the demise of the streetcar, note that a similar phenomenon occurred in Britain where GM was not involved. Britain's streetcars reached the height of their popularity in 1920, and at the

same time bus ridership exceeded that of the streetcars. Eventually, buses began to erode the popularity of the streetcars in Britain, within a few years of the trend in the United States (Slater 1997). Although, the streetcar, and other rail technologies remain a critical part of Europe's transportation system.

The Combined Effect

It may always be debated whether GM or natural economic forces caused the demise of the streetcar. Looking at the facts some 50 years later gives one the advantage of hindsight. Having explored the involvement of GM, the rise in automobile ownership, and the socioeconomic pressures faced by the streetcar and its operators, it is within reason to conclude that all had a tremendous impact on the fate of the streetcar, and that the combined effect was swift and devastating.

The records show that GM was "...convicted of conspiring with others in the automotive industry, to monopolize the sale of supplies used by the local transportation companies controlled by the City Lines defendants" (Slater 1997). The generally accepted interpretation of this conviction, as expressed in Microsoft's popular Bookshelf CD-ROM, is that GM was "...convicted of criminal conspiracy to replace electric transit lines with gasoline or diesel buses" (Slater 1997). One cannot deny that GM was either directly or indirectly responsible for the closure of several electric rail operations. The facts speak for themselves. What may still be debatable is if the closures were merely premature.

What may be universally understated are the status individuals placed on the different modes of transportation and how it has changed over time. Early on, the streetcar competed with and eventually replaced the horsecar. Riding the streetcar was not only practical, it was fashionable and it was the preferred means of getting to the suburbs, where many of the middle and upper income residents lived. The streetcar system in Cincinnati was also complimented by the construction of the inclines. These provided access to entertainment facilities, which became social centers for the middle and upper income citizens.

Eventually, the automobile became more affordable and naturally became a status symbol. Virtually everyone wanted a car to provide the perceived infinite personal mobility. In some ways, the bus became the next best thing to riding in a car. The new comforts, safety and service provided by the bus captured the hearts of the transit riders. It became fashionable to ride in a bus and enjoy all the benefits of the latest technology rather than in an old rickety streetcar that needed repair. By this time the infrastructure and cars themselves were in need of rehabilitation or replacement due to age and wear and tear.

In summary, the combination of these factors caused the demise of the electric streetcar. The sole influence of any one of these factors could not have had the same effect as their historically documented collective impacts. The real loss may lie in the fact that our capitalistic society yielded a definitive winner and loser. The possibilities of having one mode complement the other were lost in the competitive spirit of free enterprise and arguably the illegal activities of an industrial giant.

2.2 Definition of the Technologies

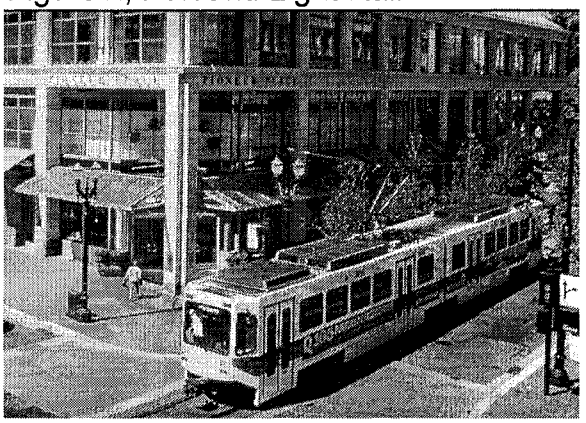
The identity of an urban streetcar is often unclear, particularly in places that do not have existing rail transit services. Even professional publications provide conflicting definitions on what constitutes a streetcar system. The historic trolley and modern streetcar are very similar, with the most notable difference being the type of vehicle being operated. Light rail, on the other hand, can function like a streetcar, but the vehicles and infrastructure requirements can be very different.

The streetcar is considered a type of light rail vehicle, and often no distinction is made between the two when reporting data to the FTA. Streetcars and the larger traditional light rail vehicles can both operate in mixed traffic in a dense urban setting. However, there are some distinguishing characteristics.

One of the problems with a common definition for both streetcar and light rail is that there can be substantial differences in the infrastructure and associated cost. Another is the differenced between the vehicles themselves. While many authorities lump streetcar under the definition of light rail, the Free Congress Research and Education Foundation has demonstrated the need to differentiate the streetcar from light rail by acknowledging the fact that streetcars can negotiate tighter turns and more sudden grade changes and that they are designed specifically for shorter inner-city trips that are to far too walk and too close to drive.

Light Rail

Figure 2, Portland Light Rail



Source: Metro 2002

Light rail is the most common form of fixed guideway transit that can travel on streets and in an urban setting. It is desirable to operate these vehicles in a dedicated right-of-way, separated from automobile and other traffic, but they can, and often do operate in mixed traffic as well. Light rail is designed to provide a reliable mode choice to travel from neighborhood to neighborhood or from suburb to city. Usually light rail operates within a 20-mile range (Metro 2002).

Light rail often is installed in underutilized railroad corridors, and along highways and interstates. The vehicles are electrically powered by overhead centenary wires and are very quiet and environmentally friendly as a result. One reason for the rising popularity of the light rail transit services is the air quality standards imposed by the federal government.

Light rail provides a high-capacity alternative to the automobile. One car can carry about 150 passengers. One train can have up to a 3 cars and carry about 450 passengers. The newer light rail vehicles have low floors and enable boarding from platforms that are only 14 inches above street level, making travel much easier for the disabled (Metro 2002).

The stations outside the city are typically spaced about a mile or two apart. However, the stations in the dense urban areas are spaced closer

together. The spacing is largely dictated by potential ridership based on origins and destinations along the route and other factors. Light rail stations can be leveraged to provide accessibility and enhance activity centers thereby contributing to an identifiable sense of place as discussed on Section 2.3.

Light rail trains normally run every 5 to 10 minutes during morning and evening peak rush hours and every 15 to 30 minutes in the afternoon and evening hours. Often the entire line will be scheduled to shut down for a few hours in the middle of the night for maintenance.

Light rail operates at speeds of up to about 60 miles per hour in dedicated right-of-way. However, speeds may vary dramatically along to allow trains to operate safely through at grade intersections, mixed traffic conditions and neighborhoods. The impressive performance characteristics of light rail vehicles, such as their operating speeds, acceleration, deceleration and turning radius, give these vehicles the unique ability to provide mass transportation service in both high speed settings as well as navigating city streets among traffic.

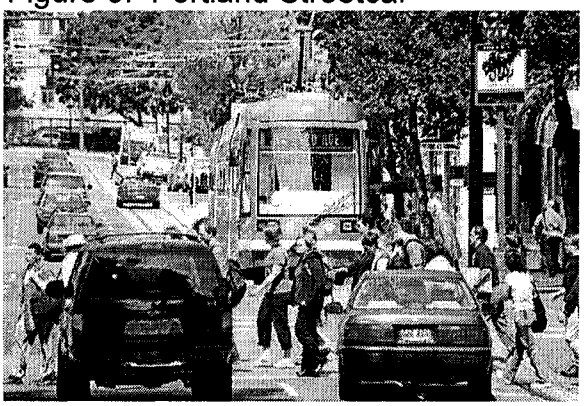
Streetcars

Streetcar service is specifically designed to operate in mixed traffic in an urban environment. These vehicles are narrower than a bus or a light rail vehicle and travel as a single unit rather than multiple units linked together. The modern streetcars are articulated, i.e., they have a hinge point built into the center of the vehicle, to enable them to navigate sharp turns in the urban setting. This mode is conducive to circulating people in and around high activity centers in the city.

Streetcars provide a clean and quiet transit alternative to automobiles and buses. The relative permanency of streetcar lines tends to promote and enhance the concentration of activity along their routes.

Overhead electric catenary wires supply power to the streetcars. The tracks are embedded in the street with the top of the steel tracks flush with the surface of the pavement, enabling the streetcar to intermix with automobile traffic. Because the streetcars weigh less than a typical LRV, the substructure of the streetcar can be thinner and less expensive to install than tracks designed for LRV service. As a result, track installation is less disruptive to business operations and residences due to the potentially shorter construction schedule compared to light rail tracks.

Figure 3: Portland Streetcar



Source: Metro 2002

Because they serve dense urban areas, streetcar stations are typically closer together than light rail stations and are spaced every few blocks. The streetcar stops are similar to bus stops with limited amenities and function as circulation points rather than destinations with specific associated activities. Streetcar stations would not normally have park and ride lots except at intermodal stations or hubs where transfers to other modes are provided.

A modern streetcar can reach about 40 miles per hour and can carry about 50 passengers at a time. Streetcars typically provide service about every

5 to 15 minutes during peak hours or special events for the convenience of the patrons. Vintage streetcars and modern replicas typically have high floors, which require the stations to provide ramps and steps to access the cars. Alternately the cars or platforms can be outfitted with lifts. The modern streetcars have low floors making the more convenient and less expensive curbside access possible (Metro 2002).

2.3 The Role of Transit in Making Cities Livable

It is generally accepted theory, that in order to have sustainable socioeconomic growth, a region must have a healthy and vibrant CBD. This requires activity beyond the nine-to-five employment period. Given the trend of people choosing to live in the suburban and exurban areas, rather than near the inner city, it has become increasingly difficult to generate vitality in the Central Business District (CBD). There is the exception of special events, such as a ball game, concert, or circus, but these activities are not enough to support the required diversity to make the cities center a desirable place to live, or to promote economic growth. It is increasingly obvious that it is becoming more and more difficult to keep any type of business in the CBD due to higher rents, higher taxes, parking costs, longer commutes and lack of business.

The critical mass required to attract more activity is missing. Few would be satisfied or comfortable, walking down the city streets with a friend or two, particularly at night, on otherwise empty streets. To attract foot traffic, people need a reason to be there. Entertainment is an obvious choice, but a city needs

more. A city needs all the things it once had. It needs variety, uniqueness, vitality, security; it must be fashionable.

Great cities are created by attracting a diverse population with a variety of housing options, activities, and amenities including entertainment, dry cleaners, salons, hardware stores, grocery stores, parks, organized activities, churches, schools and a variety of transportation choices to get you from one activity to the next.

To get people to spend time downtown, or to live downtown, one needs to make it attractive and livable. This document suggests that the implementation of a streetcar circulator system can be used as the backbone of a comprehensive socioeconomic plan, designed to set the stage for a livable environment, and attract the critical mass needed to sustain it.

The permanency of a fixed guideway system, with rails embedded in the streets, communicates the commitment to place making. As a prospective home buyer or entrepreneur who values proximity to transportation, it stands to reason that one may be more inclined to invest near a streetcar system, knowing that the property value is more secure, and that other like-minded people are making similar investments.

A livable city means different things to different people, and as a result is very difficult to define. Most are familiar with the livability ratings published by popular magazines. Each year the outcome is challenged, and is of great concern to the local citizens, politicians and business owners because of its economic implications. The published results can influence tourism, and the

establishment and/or relocation of residences and businesses. The problem is that often the results of these studies are predetermined due to their nature. If two different groups studied the same communities, each would come up with a different result because of the differences in methodology, and because perception is such a powerful indicator of livability. For example, if the majority of people, living in a particular neighborhood think it is a great place to live, than by default it is.

In spite of the inconsistencies in defining and ranking livability, a few reoccurring themes are entrenched in what makes a community more livable. Included in the discussion of these issues is the proposition that a streetcar can become a catalyst for downtown and neighborhood renewal. The evidence of the streetcars' contribution to revitalization efforts is covered in the Analysis chapter of this document, but the role of the streetcar in making cities livable is introduced below.

Livable communities inherently have a sense of place, where people come together to socialize. These centers of public life reinforce a sense of common purpose among the members of a community. They provide areas unique to the community and are indicative of the community's values and social structure. Streetcars can play a role in creating these public places by linking together activity centers where public social interaction is encouraged (Transportation Research Board 1996b).

These desirable communities offer economic opportunities for their residents. They encourage entrepreneurship and economic development. They

provide an equitable distribution of economic opportunities for all members of the community. Streetcars can contribute to this by providing the foot traffic required to support small local business and by providing affordable access to jobs and educational opportunities (Transportation Research Board 1996b).

Attractive communities are places where people feel safe in a public environment. Safety and security are perhaps the most critical element of making a community livable. These are constantly at the top of the list in public opinion surveys as to what is most important in the community. Streetcars can provide the perception of a safe environment by attracting a culturally diverse mix of people using the transit system including "choice" riders who are not transit dependent. Streetcars can also contribute to providing a safe environment by generating the pedestrian activity in the CBD, which discourages crime due to the heightened exposure (Transportation Research Board 1996b).

These communities provide a range of transportation choices where the automobile and bus, are not the only modes available. Here the core function of a streetcar, as a means of mobility, contributes to the growth patterns and policies of a community (Transportation Research Board 1996b). By making communities and activity centers conveniently accessible, they become more attractive to more people. Streetcars can be an attractive alternative to the automobile in urban areas, because it is often difficult to find parking, and walking is sometimes not practical because of the distance between origins and destinations. Taking the bus is not always a popular alternative, because of the perceived status, or lack thereof. Buses are generally stigmatized with a

reputation of being slow, bumpy, noisy and smoky, and intended for those who cannot afford an automobile. On the other hand, many believe that the streetcar is not stigmatized, and that it attracts people that otherwise would not use public transit.

Finally, livable communities are places where growth enhances the community and does not threaten to destroy it. Mismanaged growth can ruin the qualities of a livable community by haphazardly displacing the focal points of social interaction and development. The streetcar can help to maintain the focus of growth by influencing the market to invest along its corridor and build upon the focal points of social interaction and activity centers. Housing, retail, office and entertainment projects are more likely to be built adjacent to the streetcar service because of the long-term commitment to the corridor (Transportation Research Board 1996b).

It is for these reasons that the implementation of a streetcar system can be leveraged as the backbone for the socioeconomic growth of the Central Riverfront. It is generally believed, and proposed in the hypothesis of this thesis, that the activity generated by the streetcar will attract retail, entertainment and employment opportunities, followed by the attraction of the middle and upper classes to reside in the city. Accordingly, these circumstances will contribute to the urban economy and vitality, and subsequently the central business district and surrounding region will become more sustainable.

2.4 Existing Planning Documents

A substantial amount of work has already been completed regarding the feasibility and implementation of streetcar services in the region. OKI's 2030 Plan identifies two of the most recent studies prepared for OKI, TANK and Metro as part of their long-term transportation planning efforts. A summary of OKI's 2030 plan, specifically as it pertains to the potential implementation of the streetcar, is provided below in addition to two other projects.

The first of these studies was the Central Area Loop Study sponsored by OKI, which addressed transportation issues specific to the greater central business districts of Cincinnati, Ohio and Covington, Kentucky and Newport, Kentucky and included a streetcar alternative to connect the three cities. A more recent study, sponsored by Metro, is the MetroMoves Plan. It addressed transit from a regional perspective and included the Central Area (streetcar) Loop, and a second streetcar line serving uptown, in addition to light rail, commuter rail and an expansion of the bus network.

OKI 2030 Regional Transportation Plan

The OKI Regional Transportation Plan addresses the transportation issues in the greater Cincinnati region through the year 2030. It is intended to provide guidance for the community as well as the policy-making boards and agencies responsible for implementation of transportation investments. Of particular relevance to the hypothesis of this thesis is the notation in the Long Range Plan (LRP) that "changes may need to be made to ensure that

transportation investments support regional development patterns and enhance existing communities through a continued cooperative effort between the Land Use Commission and the OKI Board" (OKI 2001b).

The specific goals of the plan are as follows:

- Improve mobility for people and goods;
- Protect environmental quality;
- Develop new transportation funding sources and strategies;
- Improve travel safety;
- Provide transportation opportunities in an equitable manner; and
- Strengthen the connection between land use and transportation planning (OKI. 2001).

The LRP encourages public agencies and private employers to embrace new initiatives in order to change traditional travel behavior. The desired affect being a reduction in the use and reliance on single occupant vehicles to reduce congestion, improve air quality and preserve the natural resources. "The transportation system envisioned for this metropolitan plan. is an intermodal system that expands travel options" to support economic vitality, increase mobility options, protect the environment and "contribute to a better quality of life" (OKI 2001b).

Major Investment Studies (MIS), or Corridor Studies provide unique problem solving tools to identify appropriate transportation solutions in corridors

identified by the LRP. The results of the Corridor Studies are then fed back into the LRP and provide a Locally Preferred Alternative (LPA), as well as identify issues requiring further investigation. The local transit authorities' strategic plans also provide recommendations for transit improvements throughout the Region and are incorporated into the LRP (OKI 2001b).

Following are summaries from the Central Area Loop Study and the MetroMoves Regional Transit Plan (2002) relative to the streetcar. Both studies are identified in the LRP but neither was completed until after the LRP was written, and, therefore, their conclusions could not be included. However, the expressed interest to develop rail transit service is included in the LRP, and appears to be consistent with the identified goals and objectives.

The Central Area Loop Study

The Central Area Loop Study was conducted by OKI, and a final report was issued in December 2001. This project focused on improving the transportation connections between the cities of Covington, Newport and Cincinnati. Among other issues, it studied in detail several alternative technologies and alignments to connect the three cities, based on the major trip generators, existing infrastructure, and future development plans of the three cities. The conclusion of the study was the approval of a Locally Preferred Alternative (LPA) by the project's Advisory Committee. This committee consisted of representatives from the three cities, in addition to other state and local agencies (OKI 2001a).

The scope, goals, and purpose of the Central Area Loop Study were somewhat different than what is being explored in this thesis. The objectives of the Loop Study focused on the traffic and accessibility issues relevant to the implementation of a circulator system. It studied in detail, the technicalities of implementing the various alternatives in addition to examining the interface with other planned transit systems.

The scope of the Loop Study was based on three definitive issues including, "the analysis of a loop circulator system between Cincinnati, Covington and Newport; the evaluation of traffic congestion on 4th and 5th streets in Newport and Covington and determination of the feasibility of constructing a light rail link to Newport from the proposed I-71 Corridor Light Rail Transit (LRT) line" (OKI 2001a).

The first goal of the Loop Study was "to provide an efficient, convenient and easily accessible transportation system to link the cities of Cincinnati, Covington and Newport" (OKI 2001a). Problems associated with this goal revolve around the inefficiencies of the existing infrastructure and its inability to provide sufficient accessibility between the three urban areas. It was also noted that an alternative to the roadway network was needed to link the three communities.

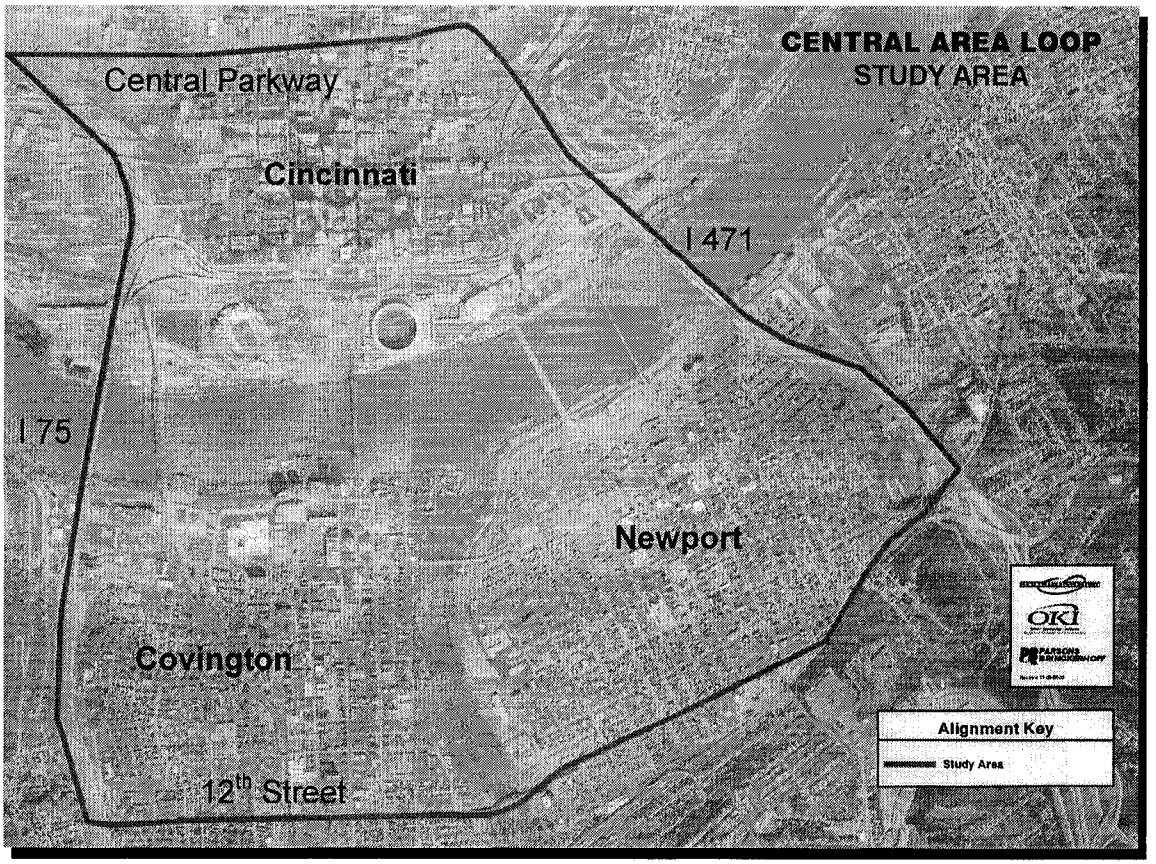
The second goal was "to improve the east/west flow of traffic in the 4th and 5th street corridor between I-75 and I-471 in Northern Kentucky" and was concerned with almost daily automobile congestion problems. The third goal was "to evaluate the need for and to demonstrate the feasible alignments for a

light rail link from the I-71 Corridor light rail line to the City of Newport." This goal was driven by the desire to extend the proposed I-71 light rail alignment to serve the City of Newport (OKI 2001a).

The fourth goal was "to optimize the Region's existing and future investment in transportation infrastructure". This goal recognized the need to develop new transportation alternatives while maximizing the use of existing infrastructures and called for any new transportation investments to include intermodal options (OKI 2001a).

The goals and problems addressed in the Study primarily revolved around accessibility and the traffic problems in the Central Riverfront and are consistent with the technical nature of the report. However, only the goals regarding the loop circulator system itself are of particular relevance to the themes of this thesis project. Of particular interest, is the call for an alternative to automobile transportation, as discussed in goal number one, and the call for investment in intermodal transportation systems as addressed in goal number two.

Figure 4: Central Riverfront Area



Source: OKI 2001, 1-5

The Central Area Loop Study encompassed the greater central business districts of the three cities and is bounded on the north by Central Parkway, on the east by I-471, on the south by Eleventh Street in Newport, and Twelfth Street in Covington, and on the west by I-75 as shown in Figure 4 (OKI 2001a).

The Central Area Loop Study examined a range of alternatives including: the No-Build, Transportation Systems Management (TSM), Streetcar, and

Personal Rapid Transit options. This report is primarily concerned with the expansion of the Southbank Shuttle Bus Network (TSM) and the Streetcar.

Although not directly evident in the goals and objectives, it was mentioned that the circulator loop was intended to promote activity by focusing on the mitigation of the congestion problems (OKI 2001a). It was estimated that the number of average daily weekday trips on the streetcar would be 6,994 and on the Enhanced Southbank Shuttle Buses it would be 6,042 (OKI 2001a). With such a small relative difference in daily ridership numbers, one may argue that improvements to the existing Southbank Shuttle system would be a better investment. However, what is not taken into consideration are the other effects that streetcars may have on the revitalization of the CBD's, such as increased home ownership, increased densities of businesses and increased property values.

The proposed Central Area streetcar would operate on ten-minute headways, meaning that a car would arrive at any given station every ten minutes. The route length is approximately eight miles long and takes about 30 minutes to travel the entire length. The streetcar is proposed to operate in both directions simultaneously and serve a total of about 40 stations (OKI 2001a).

The total construction cost estimate, in second quarter 2001 dollars, is $212 million for the streetcar, and $1.3 million for Option One and $1.3 million for Option Two of the expanded shuttle bus service. The annual operating cost is $4.2 million for the streetcar, $2.0 for Option One and $2.2 million for Option Two for the expanded bus alternatives (OKI 2001a).

It should be noted that the proposed alignment is in its conceptual stages and is subject to significant revisions throughout the design process and it is not the intention of this report to critique the alignment.

The criteria to identify the locally preferred alternative was developed by the Advisory Committee, based on the goals and objectives of the study, and on the Federal Transit Administration's guidelines. They included, cost effectiveness (cost per passenger), Equity (Environmental Justice), Safety/Access, Effectiveness in regard to speed and mobility, Environmental, System Flexibility, Utilization of Existing Infrastructure, and Implementation Obstacles (OKI 2001a).

The conclusion of the Central Area Loop Study identified the TSM Alternative as the Locally Preferred Alternative. The Advisory Committee resolution included the expansion of the existing Southbank Shuttle bus services and to extend service to the urban core of Cincinnati, Covington and Newport. It also called for a formal link with Southwest Ohio Regional Transit Authority (SORTA) shuttle service in addition to dedicated transit lanes and signal priority (OKI 2001a).

A resolution was also passed to conduct additional studies of the surface rail alternatives to connect the urban cores of Cincinnati, Covington and Newport. It also stated that it should be incorporated into a proposed Regional Rail Plan, which will be discussed within the context of the Metro Moves Plan (OKI 2001a).

MetroMoves

The MetroMoves plan was completed in 2001 and proposed an expanded intermodal transit system throughout the OKI region. This study was conducted on behalf of Metro and its constituents, including The Transit Authority of Northern Kentucky, Hamilton County, and OKI.

"Clean, safe, and efficient public transportation is another important piece of the foundation of any great city – one integrally related to other key building blocks of success." This statement, found in the overview of the MetroMoves plan reflects what may be considered the premise of the study. The study recognizes that over 70% of the region's jobs are now located outside of the city and that the existing system needs to be updated in order to provide the community with affordable transportation options (Metro 2002). All of the modes and alignments proposed in the MetroMoves project are interconnected, to provide convenient transportation throughout the region and beyond.

These options included the expansion of the existing bus service and the development of a hub network system. Light rail was also included to provide service along the most heavily traveled corridors from community to community, as well as to and from the city. Commuter rail service was also a component of the plan. This was envisioned to provide a link to other cities outside of the region, such as Indianapolis, Chicago, and Cleveland. In addition, the streetcar was a key component of the MetroMoves plan, designed to provide localize service in key urban areas.

The MetroMoves plan proposes two interconnected streetcar systems. One alignment connects the Cincinnati CBD with the Uptown area, including the University of Cincinnati and the Medical Complex on Martin Luther King Boulevard. The second alignment is known as the Central Area Loop as previously discussed. MetroMoves proposed using modern type streetcars to operate in the dense urban environment.

The streetcar operations would provide service from 5:30 AM. to midnight. During peak rush hours, the streetcars would run at 10-minute headways with less frequent service off-peak. Special events would be accommodated with additional service as required (Metro 2002).

The concept of the Central Area streetcar alignment was for it to be fully integrated with the other modes of the transit plan. This is clearly evident in the fact that it shares track with the I-71 light rail river crossing, by way of the Clay Wade Bailey Bridge from Covington and various other segments along the riverfront.

The alignment was estimated to cost $132 million for capital improvements. It consists of four miles in Hamilton County, two miles in Kenton County and two miles in Campbell County, for a total of 8 miles with 31 stops. Total capital cost comes out to about $16.5 million per mile. Ridership was estimated at 7,000 trips per day (Metro 2002, 48).

The timeline for the construction of the various components of the MetroMoves plan shows the Riverfront Line, (the Cincinnati portion of the Central Area Loop), being constructed and opened in 2005 (Metro 2002).

The study concluded that, "the economic and social value of a light rail network stems from the benefits relating to congestion management; mobility – including affordable mobility for low-income households; and community economic development" (Metro 2002). The report emphasizes that the benefits are extracted, in large part, by the estimated ridership, and that a "network" benefit would greatly increase the ridership. The network benefit was not factored into the ridership estimations or benefits identified in the MetroMoves plan.

The benefit cost analysis is based on three individual categories. The first being congestion benefits, which are derived from the travel-time savings, for both transit and roadway. Another category is the mobility benefits. Mobility benefits are derived from the increased availability of transportation to low-income people and from the reduced social service agency costs associated with home-based services like Meals-on-Wheels, and home health care (Metro 2002).

The third category is community economic development benefits. These are based on the "positive socioeconomic impacts on the vitality of communities" resulting from transit-oriented development. These impacts include an increase of walking and bicycling and a decline in automobile dependence and use; increased demand for commercial development; increased property values; and cultural diversity (Metro 2002).

Over the course of 30 years, it was estimated that the development around the stations would generate over $2.8 billion and create over 36,000 jobs (Metro 2002, 69-70). However, the benefits of a stand-alone streetcar system

were not broken out individually and will be the burden of this project to predict what benefits may be expected.

3.0 Methodology

The overall methodology used to produce this thesis is rather straight forward and somewhat a matter of form following function. Because the streetcar was once very popular in the Central Riverfront, and later was dismantled in favor of other technologies, logic suggests that a chronological approach be used to determine weather a streetcar has socioeconomic potential in modern times. Consistent with this approach, the research began with an analysis of the streetcar's history in the Central Riverfront, followed by its present status in the local planning efforts, and concluded with speculation of its potential in the future, based on case studies.

The only component of this thesis, which appropriately falls under the context of methodology, is the selection of the case studies. The case studies are used to make inferences regarding the applicability of the streetcar in the Central Riverfront. Following is the rationalization used in selecting the case studies.

3.1 Identifying the Potential Case Studies

The list of potential case studies, as shown in Table 2, is limited to existing streetcar systems within the United States, and matches the streetcar definition provided in the Definition of the Technologies section of this document. This inventory of systems resulted in a total of nine to choose from, of which, only three will be used as actual case studies, where detailed research and comparisons to the Central Riverfront will be made.

Table 2: Comparison Matrix Potential Case Studies

Potential Case Studies	Criteria					
	Population of MSA/CMSA in 2000	Population of City in 2000	Population Density of City in 2000	Began Operation	Miles of Line	General Character of Service
Dallas, Texas	5,221,801	1,188,580	3470	1989	3.6	Connects downtown with Uptown Neighborhood
Detroit, Michigan	5,456,428	951,270	6855	1976	1	Connects downtown attractions
Kenosha, Wisconson	9,157,540	90,352	3795	2000	2	Circulator for downtown, neighborhoods and shopping
Memphis, Tennessee	1,135,614	650,100	2327	1993	4.5	Transit circulator system
New Orleans, Louisiana	1,337,726	484,674	2684	1893	7	Commuter and Tourist Transit Service
Portland, Oregon	2,265,223	529,121	3939	2001	2.3	Circulator linking Downtown with neighborhoods
San Francisco, California	7,039,362	776,733	16634	1988	5.8	Public transportation with historic PCC cars
Seattle, Washington	3,554,760	563,374	6717	1982	2	Connects downtown, waterfront and Amtrack
Tampa, Florida	2,395,997	303,447	2708	2002	2.3	Circulator linking Downtown with tourist attractions
Cincinnati, Covington and Newport	1,979,202	391,703	4606	NA	8	Connects CBDs, Waterfront and Neighborhoods

Sources: (City of Portland 2002; Free Congress Foundation 2003; Metro 2002; Smatlak 2003; U.S. Census Bureau 2003)

Only streetcar systems within the United States were considered to avoid unfair comparisons, due to the argument that other countries' culture, social structures and standards of living are not comparable to the United States, particularly when it comes to personal transportation choices. It could be argued that the funding of rail transit projects in other countries provides their streetcar systems with a competitive advantage to succeed, in comparison with those in

the United States. One could also claim that disincentives, such as substantially increased automobile and fuel taxes, unlikely to be implemented here, are used in other countries to encourage transit use. For these reasons, potential case studies were limited to existing systems within the United States. However, while there are lessons to be learned from other countries approaches to public transit, they will not be included in this analysis.

The systems listed in Table 2, only include those, which operate as a true transit system rather than as a museum ride. Functioning as a true transit system, in the context of this thesis, means that it provides service to the daily local riders in addition to the tourists. Naturally, with this targeted market, the lines serve different areas in and around the central business districts as a minimum. Some extend into residential areas and mixed-use areas to support urban residences and businesses.

The true transit type streetcar service provides service on a regular, daily basis. There are several additional lines, not shown in Table 2, which provide limited service. Their service may be restricted to seasonal operations, weekends, or peak travel times in the afternoon. This limited service would make it very difficult to achieve the type of urban revitalization envisioned for the Central Riverfront, and therefore, comparisons to such systems are excluded herein.

A brief explanation is proved below regarding why, or why not, each of the nine potential case studies is included for comparison to the Central Riverfront. Ideally, all nine of the systems listed in Table 2 would be researched,

documented, and "lessons learned", applied to the Central Riverfront. However, due to the practicality of such an undertaking, the number of case studies was limited to three, as follows.

3.2 Potential Case Studies not Selected for Detailed Research

Dallas, Texas was not selected as a case study primarily because Dallas is a much larger city than the Central Riverfront. The population in the Metropolitan Statistical Area (MSA) is over 2.5 times as large. The population within the city shows even more disparity, being over three times as large. On the other hand, the line has been in existence long enough to witness economic trends, and the population density within the city is somewhat comparable. In any event, other systems appeared to offer more useful "lessons learned", as discussed in the context of the other potential case studies.

Kenosha, Wisconsin was not selected as a case study because it is much smaller in the size of its population. The population within the city limits is just above 90,000 as compared to the Central Riverfront's population being over 390,000. On the other hand, the population of the Combined Metropolitan Statistical Area (CMSA), which encompasses Kenosha, is over nine million, compared to almost two million for Cincinnati's, illustrating that there is an extreme difference in the size of the overall regional market. Another reason Kenosha was not chosen for a case study is the fact that its service has been intermittent. At one time, it was suspended and then service was limited to weekends only. Current service is unknown.

New Orleans, Louisiana will not be used as a case study. This is the oldest continuously operating streetcar system in the world and provides true transit service for locals and tourists alike. It currently has over seven miles of streetcar service and has plans for expansion. The New Orleans streetcar service began operating in 1893 and has become part of the cultural and historic personality, unique to that particular city. Because of its world-renowned history, the city has become a prime tourist destination, and as a result, caters directly to the tourist industry. Because of New Orleans uniqueness, a comparison of the streetcars socioeconomic impacts between it and the Central Riverfront would not be legitimate.

San Francisco, California was not selected as a case study for many of the same reasons New Orleans was not chosen. San Francisco is also a worldwide tourist destination, and its socioeconmics are arguably unique onto itself. It is also known as a socially liberal city with a rich history of streetcars and cable cars, which are still in operation today. The size of San Francisco in terms of the metropolitan area is 3.5 times larger than the Central Riverfront and it has a vibrant central business district comparable to other first tear cities, such as New York and Chicago. The population density in San Francisco is also more than 3.5 times greater than that of the Central riverfront. While San Francisco's streetcar system is very successful, some would rightly argue, that the tourism and social dynamics of this giant, west coast city, are not comparable to the Central Riverfront.

Seattle, Washington was not selected to be a case study for this thesis primarily because it's streetcar service has been tailored to satisfy the tourists rather than the local transit market, although some of the locals use the line. This line was designed to connect the tourist attractions along the waterfront and does not tie together the variety of destinations typically visited in daily life, such as residential areas, schools, service industries, office complexes and shopping. Seattle's metropolitan area and city are about 1.5 times more populous than the Central Riverfront and its density is about 1.5 times greater. Because of these differences in size, density and intended function of the streetcar, Seattle was not chosen for detailed study.

Tampa, Florida was not selected as a case study because its streetcar operations are so new. Its streetcars began operating in 2002, and it is premature to measure the effectiveness of the system. Similar to New Orleans and San Francisco, the tourism industry in Tampa could also be grounds for an unfair comparison to the Central Riverfront. The population within the statistical area and within the city is somewhat comparable to the Central Riverfront, but the density is about half. All things considered, the primary reason Tampa was not selected as a case study is due to the fact that the streetcar system is so new, and because it is such a popular tourist destination.

3.3 Potential Case Studies Selected for Detailed Research

Detroit, Michigan has been selected as a case study because of its relatively close proximity to the Central Riverfront. Both cities experienced a rise

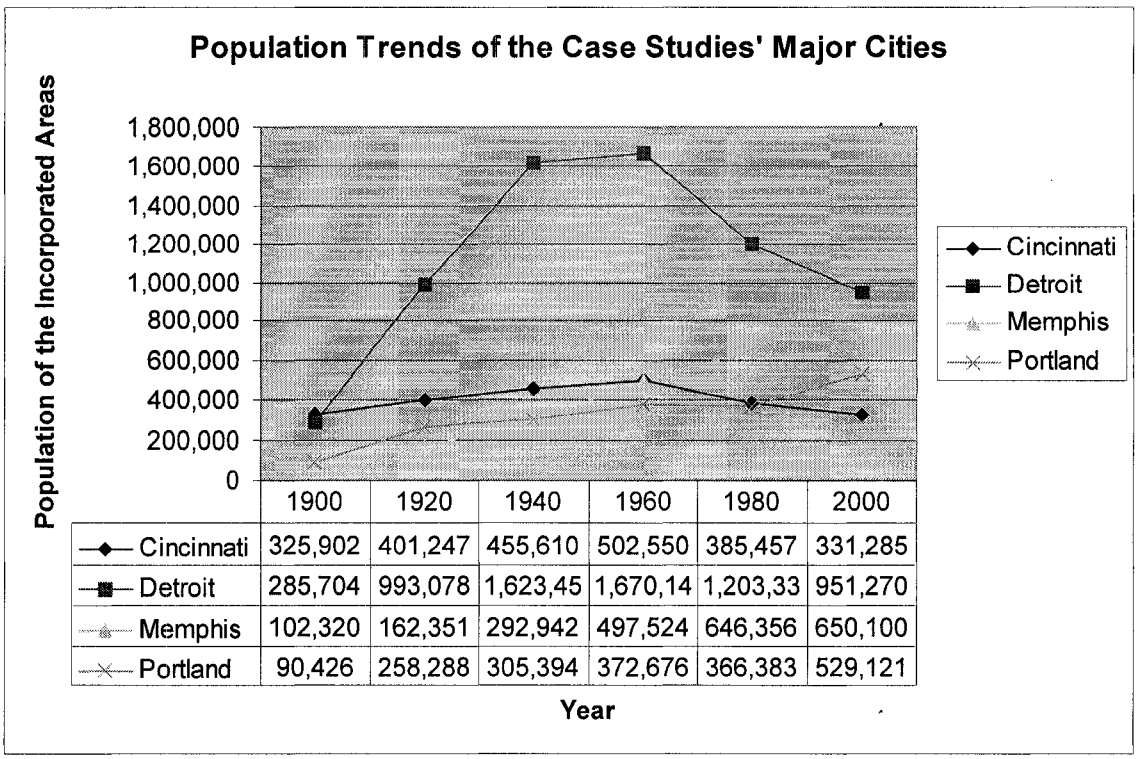
and fall in population at about the same time. Both are Midwest cities with similar social values, built on the merits of the industrial age, with currently declining cities in terms of jobs and population. Admittedly, Detroit is vastly larger than the Central Riverfront in both population and population density. One could also argue that the Detroit streetcar alignment is only a fraction in length compared to what is envisioned for the Central Riverfront, so why would one be interested in any comparisons between the two? The answer is simply, that Detroit provides a good example of what not to do. The Detroit streetcar, not to be confused with the People Mover, was built for revitalization purposes, by connecting downtown attractions. The intention was similar to that of the Central Area Loop. The Detroit line was once very popular and provided daily service. However service has all but been eliminated, and ridership is now almost non-existent. Certainly there are some lessons to be learned here, hence it was chosen as a case study.

Memphis, Tennessee will be used as a case study. This system is located in the South Central United States, in somewhat close proximity to the Central Riverfront in the Midwest. The Memphis streetcar was implemented with the intention of revitalizing the central business district and a failed pedestrian mall. The population of the metropolitan area, and that of the city itself, is loosely comparable to the Central Riverfront when judged by comparison with the other potential case studies. It should be noted, however, that its population density within the city is about half of the Central Riverfront. The Memphis streetcar was originally implemented in 1993 and should provide a solid history regarding its popularity and influence on the central business district. Memphis' streetcar is

generally considered a success, plans to expand the system are being developed, and its size is relatively comparable to the Central Riverfront, therefore it was chosen as a case study.

Portland, Oregon has been selected as a case study because it is comparable in size and density to the Central Riverfront. In many respects the envisioned plan for the Central Riverfront has been modeled after the modern Portland streetcar system. Portland has successfully integrated the streetcar into its mass transit network, and has focused on urban development to make its downtown more attractive to businesses and residences alike. Portland is known as a frontrunner in the United States, for urban planning and policy, in support of controlled growth. This approach, including the success of the modern streetcar, has drawn considerable interest in the Central Riverfront communities. Its street level activity in the Central Business District, the intermodal approach to transportation, and its smart-growth policies have become somewhat of an icon to some, in leadership positions within the Central Riverfront, and is therefore included as a case study for detailed research.

Table 3: Population Trends of the Case Studies and Cincinnati



	1900	1920	1940	1960	1980	2000
Cincinnati	325,902	401,247	455,610	502,550	385,457	331,285
Detroit	285,704	993,078	1,623,45	1,670,14	1,203,33	951,270
Memphis	102,320	162,351	292,942	497,524	646,356	650,100
Portland	90,426	258,288	305,394	372,676	366,383	529,121

Source: (U.S. Census Bureau 2003)

Table 3 illustrates the population trends of the selected case studies with that of Cincinnati. This data, as they pertain specifically to the impacts of the streetcars, may be of little or no value because of the scale of a streetcar projects, relative to the size of the city's corporation limits. It does, however highlight growth patterns of Memphis and Portland, as compared to the declining patterns of Detroit and Cincinnati. This contrast as you will see, is consistent with the success of the streetcar programs in Memphis and Portland and the failure of the streetcar in Detroit. Any correlation between the streetcar and the

overall growth of the city may be dismissed as coincidental, but it gives credibility to using Portland and Memphis as role models in regard to urban planning.

4.0 Analysis

This chapter includes the documentation and comparison of the case studies with the Central Riverfront, in an effort to ultimately make a determination as to the validity of the hypothesis. The analysis includes a range of qualitative and quantitative data as it are available.

4.1 Documentation of the Case Studies

The emerging pattern as to why streetcar systems are being built in modern times revolves around economic development and revitalization of the central business districts and surrounding areas in our cities. History reveals, as discussed earlier in this document, how the streetcar was originally implemented primarily as a transportation alternative. This modern inverted rationalization for implementing streetcar, begs to question whether the revitalization efforts are successful or more specifically if it would be successful in the Central Riverfront. In order to answer this question, three case studies are discussed below in regard to their socioeconomic impacts.

4.2 Detroit Downtown Trolley

Specifications

The Detroit Downtown Trolley is operated by the Detroit Department of Transportation and began service in 1976. Originally it was a ¾ mile long alignment and was extended an additional ¼ mile in 1980. It is a European narrow gauge (900 mm or 2'11-7/16"), single-track configuration, with two

passing sidings. The total cost of the system was $2.72 million and was financed by a variety of Federal, State and City Sources (Smatlak 2003).

Its fleet consists of nine single truck trolleys built in the United States, England, Germany and Portugal between 1895 and the 1920's. Two are open-air vehicles and the remaining seven are closed. One car built in England in 1904 is and open air double decker, and is the only one of its kind in the world in service (DDOT 2003).

The trolley operates weekdays from 8:00 A.M. to 5:00 P.M. and from 10:00 A.M. to 5:00 P.M. on weekends. The fare is 50 cents during the week and (presumably) free on weekends (DDOT 2003).

In its peak in 1979 the system carried about 75,000 riders annually. The ridership dropped dramatically to about 3,350 annually by 1998. By 2001 the operations were intermittent with only one car in service providing one-hour headways (DDOT 2003).

Strategic Planning

The Detroit Downtown Trolley provides service downtown on Washington Boulevard and Jefferson Avenue and connects downtown attractions such as the Grand Circus Park, Cobo Hall, and the Renaissance Center. This project was the first purpose-built vintage trolley system implemented in the United States. It was part of an effort to rehabilitate a five-block stretch of Washington Boulevard into a pedestrian mall. The original ¾ mile segment connected this area to the Cobo Hall convention center. The additional ¼ mile segment ran along the river

and connected the Renaissance Center and Hart Plaza, where multiple major festivals are held each year (Smatlak 2003).

Socioeconomic Impacts

While this project was intended to revitalize downtown, the area where service was provided continued to deteriorate and caused tourists to avoid the area. One of the recurring comments regarding the trolley is that there are so few people downtown to ride it (APTA 2003a). Virtually no data is available regarding the Downtown Detroit Streetcar, possibly because it is perceived as a failure. The Detroit Department of Transportation, who operates the line, has very little information available on-line and was unaware as to where other information may be found.

Future Plans

The tracks and the fleet are currently undergoing extensive rehabilitation. The newly refurbished service is promised to be "a wonderful attraction for tourists and citizens", although no details could be provided (DDOT 2003).

Integration with Other Strategic Plans

Unfortunately, for the vintage trolley system, a competing, parallel, $500 million elevated People Mover was opened in 1987 in downtown Detroit (American Public Transportation Association 2003).

The downtown Detroit Vision is primarily designed to improve mobility downtown, yet its key components do not include mention of the vintage trolley system. It does include and enhanced People Mover and a "new shuttle service" using rubber tired trolleys running on natural gas (DDOT 2003).

The Downtown Detroit Trolley may be the best example of what *not* to do if considering building a streetcar line and the lessons learned are discussed in greater detail in the Conclusions chapter. As one may gather, data relative to the Detroit streetcar are sparse and difficult to obtain. The Downtown Detroit Trolley web site has even been discontinued, likely due to lack of funding and/or lack of interest. The Detroit Department of Transportation and the Economics Department were either unwilling or unable to help, or both. This was made apparent by the continuous loop of transfers, from one person to the next, until finally coming full circle to the operator via the telephone. There was even a plea for additional information regarding the Detroit streetcar on one of the more "informed" transit websites.

All was not lost, however. I did manage to speak with someone at the Detroit Department of Transportation regarding the People Mover. It turns out; the $500 million automated People Mover had become the center of attention. The People Mover was now seen as the answer to the economic woes of the city. This new, completely elevated system was designed to circulate to the various entertainment and office buildings around the central business district (Detroit Transportation Corporation 2003).

It was tempting to use the People Mover as a case study, because of its functional similarities to the streetcar. However, the differences in technology, its perception, and how it may or may not affect street level activity overruled the temptation, and therefore it was not used as a case study. In part, the low streetcar ridership was blamed on the "bad neighborhoods" along the route, and may explain why the new circulator system is elevated.

The "lessons learned" from the Detroit Streetcar will be discussed in the Conclusions Chapter, but one of the problems created with the advent of the People Mover was that it provided a directly competitive alternative to the streetcar, with a parallel route, precisely one block away. The deterioration of the streetcar line, the dwindling intermittent service, and the construction of the People Mover clearly indicated a shift in priorities regarding downtown development. Through the unanswered phone calls, emails and overall lack of information, it is obvious that no one, or very few people, really care about the streetcar line.

4.3 Memphis Trolley

Specifications

The Memphis trolley system is owned and operated by the Memphis Area Transit Authority (MATA). The Main Street line opened in 1993 and is 2.5 miles long. It utilizes a combination of exclusive right-of-way through a pedestrian mall, as well as in-street operations with mixed traffic. The Riverfront Trolley Loop was built in 1997, which connects the two ends of the Main Street Line, by utilizing a

railroad right-of-way shared by Amtrak. Amtrak uses one of two tracks in the corridor, and the streetcar uses the other exclusively by providing a one-way operation around the entire loop. This addition created a 4.5-mile loop (in total), with 12 stations, although the trolley stops about every other block to serve the city's tourists and residences (Smatlak 2003).

The total capital cost of the two lines was $46.4 million, including the trolleys and a North End Terminal, which provides transfer facilities between buses and the trolleys (Smatlak 2003). The infrastructure for both lines is impressive, with patterned paving stones, lighting, shelters and information kiosks, making for an attractive pedestrian setting.

The fleet consists of 14 rehabilitated cars, 12 of which were imported from Portugal and Australia. One car, (a replica), was manufactured by Gomaco, and the remaining car was from Rio de Janeiro and rebuilt by MATA. The entire system is ADA compliant, meaning it satisfies the requirements outlined in the Americans with Disabilities Act, with high-level platforms on the Riverfront Loop and lifts at the stations on Main Street. Additional cars have been purchased for yet another expansion of the system as discussed below (Smatlak 2003).

The streetcars operate seven days a week for about 16 hours a day. Service begins at 6:00 A.M. on weekdays for work-oriented trips and runs to about 1:00 A.M. on Friday and Saturday, to accommodate evening activities (Fox 2000). Service is provided every 15 minutes on the riverfront line and every 5 minutes on the Main Street line (APTA 2003a). A one-way fare is 60 cents with a reduced lunchtime fare of 30 cents (Smatlak 2003).

Strategic Plan

The Main Street trolley was conceived as a rehabilitation tool to reverse the downward trend of a downtown pedestrian mall built in the 1970's. The mall itself was an attempt to reverse the declining trend of the city and had failed. A few of the major reasons for its failure were determined to be that the mall itself was too long to walk, it had inconvenient parking, and there were not enough people to support the businesses. The mall itself was deteriorating structurally due to an unstable sub-base, and it was in need of major repair (Fox 2000).

City leaders decided that the solution to many of the problems could lie in the provision of improved transit service. Originally, rubber-tired buses were proposed to operate in a transit way, but city leaders rejected this idea because they felt that it was "environmentally and aesthetically incompatible with the pedestrian-oriented setting of the downtown area." Alternately, in 1989, MATA and the City of Memphis accepted a recommendation to use electrically powered heritage trolleys (Fox 2000).

While the first leg of the system was centered on linking the mall, logical extensions providing service to other major activity centers and development opportunities were part of a larger plan demonstrating the incremental approach to a larger vision.

To the north, it provided a downtown link to the Pinch District, which was in the midst of redevelopment. The Riverfront line provides a scenic route along the river, a connection to the Pyramid Sports center, and it provides service to

new residential development. Because of the connectivity provided, and the frequent service, the streetcar is viewed more as a true transit service, rather than a tourist attraction (APTA 2003).

Socioeconomic Development

The Memphis streetcar, from its very beginning, as discussed above, was a strategic urban development tool. Here, one will gain a better understanding of exactly what had occurred as a result of its implementation combined with other strategic initiatives by reviewing qualitative and quantitative data relative to the development of the CBD.

This was not approached as a stand-alone project. It included other initiatives to complement the improved mobility. The downtown area in Memphis can be divided into four geographic markets or areas with different development opportunities and consist of the CBD core, South Main neighborhood, Pyramid/Pinch area and the Riverfront (Fox 2000)

The core CBD area has been successful in attracting ridership and increasing activity by connecting the points along the pedestrian mall and other attractions that are too far to walk, but too short to drive. These trips are generally made by workers going from office to office and to lunch. Tourists also make use of the trolley for trips to and from hotels and to the various downtown activities including the convention center (Fox 2000). The streetcar alignment not only provides convenient mobility choices, but it was used as a catalyst for

joint development opportunities for venture capitalists and offered amenities to the customers, which complement the activities of their everyday lives.

On the south end is the Central Station. This is a renovated historic train station, which provides connections for the streetcars, MATA buses, Amtrak trains, and has a park and ride facility. Equally important here is the fact that it houses mixed-use joint development tenants including 63 apartments and 12,000 square feet of commercial space and a police precinct (Fox 2000). Partially due to the increased interest generated by the streetcar, numerous historic buildings are being renovated and converted into apartments and condominiums, upscale single family homes are being built, and the construction of the National Civil Rights Museum was constructed in the South Main neighborhood. This area is becoming an arts district with the opening of several galleries (Fox 2000).

The North End Terminal, located in the Pyramid/Pinch Area, also created opportunities for socioeconomic development. In terms of mobility, there are intermodal possibilities via bus transfers, a park and ride lot and, of course, the trolley service itself. In addition, quality of life amenities are provided, including a welfare-to-work career center, a day care facility and a police substation. With the Pyramid Arena and St Jude Children's Research Hospital acting as major trip generators, this area has seen some modest growth in shops and restaurants (Fox 2000).

The riverfront is currently undergoing redevelopment. The loop already provides service to the Tennessee Visitor Center and residential development. A

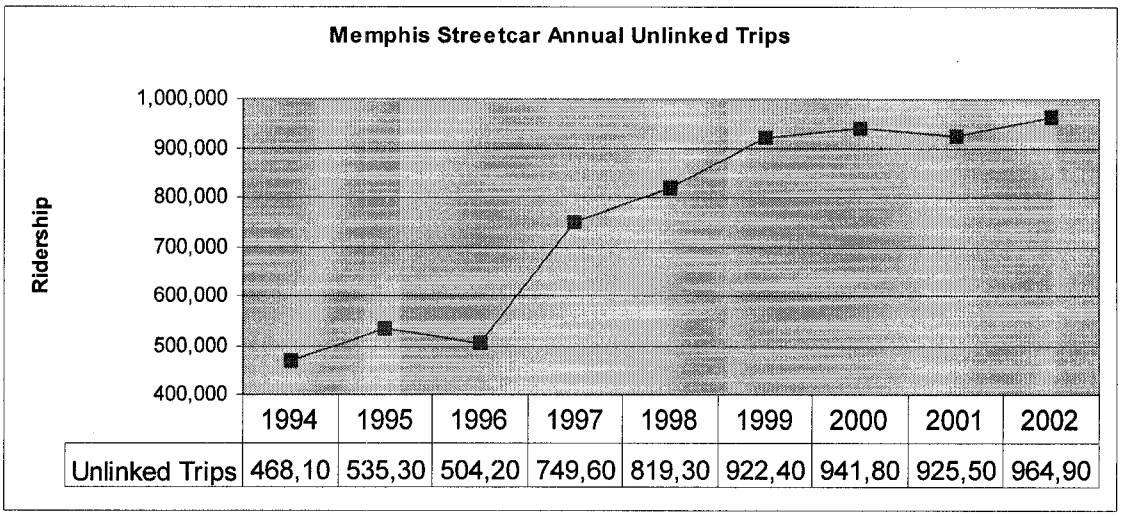
mixed-use development is underway, with public facilities, restaurants, and entertainment (Fox 2000).

One way to determine if the streetcar is contributing to socioeconomic development is to look at its ridership in terms of volume and market profile. It stands to reason that there is a direct correlation between ridership, pedestrian activity and the general vitality of the CBD. In support of this theory is the result of an on-board survey conducted in 1994 on the Main Street Trolley, which provided the following statistics:

- 51% were riding for transportation-related reasons and for entertainment-related reasons;
- 17% "normally get around Memphis" by public transit;
- 61% had "eaten at restaurants along the trolley line";
- 34% had "shopped at stores along the trolley line"; and
- 36% had incomes over $50,000 and 14% had incomes below $20,000 (Fox 2000).

The trolley system has experienced a steady increase in popularity since it opened in 1993. The total number of people riding more than doubled; from 468,115 trips taken in 1994, to 941,011 trips in 2000 (Weyrich 2002). As shown in Table 4 below, there has been a steady increase in ridership since the streetcar's inception and would lead one to conclude that the ridership must have some relationship to the activity in the city near the line.

Table 4: Memphis Streetcar Annual Ridership



	1994	1995	1996	1997	1998	1999	2000	2001	2002
Unlinked Trips	468,10	535,30	504,20	749,60	819,30	922,40	941,80	925,50	964,90

Source: (APTA – a 2003)

Interestingly, and in support of the theory that the trolley attracts activity to the CBD beyond the realm of jobs, is the fact that the highest per day ridership occurs on Friday and Saturday. This coincides with the fact that special events rely heavily on the trolley to move masses of people to and from Autozone Park for baseball games, concerts and basketball games at the Pyramid Arena, and other activities at the Cook Convention Center (Fox 2000).

The detailed interpretation of these statistics will be left up to each individual. However, a few observations are undeniable. People are using the trolley for entertainment activities and are therefore, spending time and money in the CBD beyond the scope of their jobs. Furthermore, trolley riders who normally do not use other forms of public transportation, represent "choice riders" who have other means of transportation to choose from.

One of the common arguments against rail is that the bus can provide the same service for a lot less capital investment. After all, the streetcar does not provide a competitive advantage regarding travel time, since it generally runs with mixed traffic and abides by all of the traffic signals. In Memphis, we see that a bus does not equal a trolley. In 1999 the trolley carried 4.8 passengers per revenue mile. This represents almost three times the rate for the bus system (Fox 2000).

"The system has been successful in connecting points of activity along a pedestrian mall in the core of the CBD; helping transform the South Main neighborhood into a prime location for residential development, commercial ventures and art galleries; improving access to the 20,000 seat Pyramid Arena; and making the riverfront more attractive to visitors and residents" (Fox 2000).

"The MST/RL is a strategic public investment that has helped spur unprecedented new development in the CBD core and expand redevelopment to nearby areas. At the present time, the downtown area includes about 80,000 employees and 24,000 residents, and is visited by six million tourists per year" (Fox 2000).

Future Plans

Due to the success of the existing lines, MATA is in the midst of engineering an additional 2.5-mile extension to connect the downtown system with a Medical Center Complex. The Medical Center represents the second largest employment center in the city. This likely will operate in mixed traffic

generally in the inside lanes with six new stations and one small park-and-ride facility (Smatlak 2003).

A unique characteristic of this extension is that it will be converted to light rail as a broader light rail expansion system is scheduled to begin in 2004. In the meantime, streetcars will operate on the Medical Center Extension (Smatlak 2003).

It is estimated that the extension will generate 2,100 riders per day in the opening year and increase to 4,200 by 2020. The estimated cost of the extension is $69 million. Eventually, there are plans to mix the use of modern rail vehicles with the heritage trolleys and to build out three light rail corridors with intermodal connections at the terminals (Fox 2000).

4.4 Portland Streetcar

Specifications

Portland actually has two streetcar systems in place. One is a vintage trolley system, which operates on two miles of the light rail alignment. The other is a modern streetcar system operating within its own dedicated alignment and functions as a downtown circulator (APTA 2003a).

The vintage trolley system opened in 1991 and shares a portion of a relatively high-speed portion of the light rail line. Specially reinforced cars were designed because of the mixed operations with the light rail service. The vintage trolley system was driven by a campaign led by Portland retailers along the proposed route (APTA 2003a).

This route is targeted towards visitors so they can, "enjoy a free ride through the pages of Portland history". The route connects downtown Portland to the Historic District, and a retail district know as the Lloyd Center, via a scenic Willamette River crossing. The system is operated by Tri-Met, the local transit authority, and is promoted by Vintage Trolley, Inc., who is responsible for corporate sponsorship. The ride is free and runs every half hour from June through December. A major drawback to the system is that its service is dictated by the light rail operations, and as light rail ridership increases, the operating "windows" of the vintage trolley system decrease (APTA 2003a).

Because the vintage trolley system overlaps the light-rail service and its operations are restricted accordingly, and because it targets the tourist market almost exclusively, this thesis will concentrate on the impacts and lessons learned from the modern downtown circulator system.

The Portland Streetcar began operations on July 20, 2001 and is the first streetcar system in the United States to operate with modern equipment since World War II. The service operates on a 2.4-mile loop (4.8 miles of track) with five Skoda, Czech built streetcars. The cars run from 5:30 A.M. to midnight Monday through Thursday and to 1:30 A.M. on Friday and Saturday. Typically, the cars run on 15-minute intervals (Weyrich 2002).

Strategic Plan

A downtown "circulator" system has been part of the city's growth management strategy as far back as 1972, when Portland's Downtown Plan

formally established a circulator as one of the city's goals. The idea was to enhance the livability of the city and take pressure off of the growth boundaries by attracting new housing and business into the Central City. The streetcar was considered key to meeting these goals by providing a variety of transportation choices for people to move from one place to another within the city. These goals were a direct reflection of the value placed on livability by Portlanders, and their determination to curb sprawl and provide mobility while sustaining good air quality (APTA 2003a).

Regarding the evolution of the downtown Portland streetcar, Vicky Diede, the city's project manager for the streetcar, put it in perspective by saying that without the River District development, there would be no streetcar, and without the streetcar there would be no River District development. The public/private partnership between Hoyt Street Properties and the City of Portland was the only way to make either of the projects a reality (Diede 2003).

Socioeconomic Development

The downtown circulator connects a high-density neighborhood, a hospital complex, Portland State University, the River District and the West End. In the first full year of operation the downtown streetcar ridership reached 1.366 million, and it is estimated that the ridership will exceed 1.5 million in 2003. A report prepared by the Office of Transportation and Portland Streetcar points out that, "As important as the ridership is-fewer auto trips, less demand for parking in the

neighborhoods – it is the development along the alignment that is the most rewarding" (Office of Transportation and Portland Streetcar, Inc. 2003).

The two major areas of development along the streetcar loop are the River District and the West End. The River District is just north of downtown Portland and contained 34 acres of abandoned railroad yards. The development plan for this property calls for mid and high-rise condominiums with retail space at ground level, together with parks and several other cultural amenities. The West End is beginning to see investment, after being stagnant for several years. Most notable is the construction of the Museum Place South, which is a major mixed-use development in the heart of the West End (Office of Transportation and Portland Streetcar, Inc. 2003).

Numerous developments within the Portland Streetcar Local Improvement District are apparent. The Improvement District is a defined area around the streetcar alignment, which varies from about one to four blocks from the location of the tracks. Within this district, over $1 billion has been invested since 1997. It is important to note that these investments began upon the approval to go into final design, before construction of the system had begun. The new investment includes over 3600 housing units and more than 2 million square feet of office, institutional, retail and hotel construction. "With the streetcar capital budget of $56.9 million, the development to transit ratio is 18:1" (Portland Development Commission 2003). A detailed list of each investment, its value, number of units, amount of commercial floor space, and project descriptions is included in the report referenced above.

Another interesting caveat to the public/private partnership, and an indicator of social equity, was to not only meet pre specified mixed use, and residential density requirements, but also to provide affordable housing. The city's Housing Implementation Strategy was built into the development plan, particularly in the River District, in order to provide a specific number of units that are affordable to specific income ranges. In fact, more than 60 percent of the housing units must be affordable to households with earnings of 80 percent of the average family income or less (Portland Development Commission 2003).

Within the River District alone, a few of the greater accomplishments are noted below, which demonstrate the socioeconomic developments as a result of the public/private development:

- 3,524 new housing units;
- Remediation and development of 70 acres of contaminated rail yards;
- Beginning construction of a nine-block pedestrian boardwalk;
- A doubling of assessed property values, from $358 million to $719 million in four years;
- Three new urban parks; and
- Preservation of the District's architectural and cultural history through rehabilitation programs (Portland Development Commission 2003).

Future Plans

Construction to extend the streetcar service from Portland State University to the banks of the Willamette River is scheduled in 2003 and service is

scheduled to begin in 2004. This will provide transit service to a mature urban renewal area with mixed uses, which is currently identified as "transit deficient". The Gibbs Extension is included into the South Waterfront/North Macadam District and has been adopted by the City Council. This district has about 128 acres of land that is either vacant or prime for redevelopment. A third extension is being considered for the eastside. The Lloyd District Business Improvement District and the Central Eastside Industrial Area are currently evaluating whether the streetcar could benefit their planning efforts for development on the eastside as well (Portland Development Commission 2003).

5.0 Conclusion

5.1 Validity of the Hypotheses

The short answer regarding the validity of the hypothesis is "yes, if." A streetcar circulator connecting Covington, Newport, and Cincinnati, can successfully act as a catalyst for socioeconomic development, *if* it is integrated with other strategic planning initiatives. On it's own, as witnessed in Detroit, without a fully integrated major development or redevelopment project, and without it being part of an overall urban renewal plan or strategy, a streetcar may very well fall short of expectations and have little, if any, effect on growth.

On the other hand, as witnessed in Memphis and Portland, it can become a major factor in the development of the central business districts, when it is combined with other major development projects. When a critical relationship is created between the projects in terms of function and purpose, streetcar can help to make a more livable community in the urban areas and influence land use patterns and socioeconomic development as discussed in section 2.3.

5.2 Central Riverfront Implementation Strategies

History shows us that in many ways we are dealing with the same problems in regard to connecting Northern Kentucky and Cincinnati. The most formidable obstacle remains the Ohio River. Socially and economically this hampers regional synthesis. One of the themes stressed at the OKI Annual Luncheon this year was the importance of regional cooperation in order to be competitive in the emerging regional economies. The bridges do provide

connections primarily for automobiles, and the Southbank Shuttle, operated by TANK, provides a valuable transit connection. However, neither provides the catalyst for large-scale urban renewal as the streetcar has been credited with. On one hand the convenience of using an automobile for frequent short trips comes at a price, and is limited to some degree by parking opportunities. On the other hand the Southbank Shuttle does not provide the volume or diversity in terms of ridership, or the permanency required to induce private investment near the line.

Transportation, as important as it may be, is only one component in a much larger package required to stimulate the revitalization of a city. The "build it and they will come" theory has limited merit when it comes to creating a successful transit system, intended to provoke urban renewal.

Studies have shown that the number one concern of the city is safety. Memphis dealt with this issue head on, with the creation of a police precinct at on end of the streetcar line. Other amenities for residents in the city are required as well, such as the daycare and job training programs integrated into development of the streetcar line in Memphis, as well.

Links to an intermodal network are also critical to the success of a streetcar line. The Portland streetcar is tied directly into their light rail network. The latest extension of the Memphis streetcar, currently in progress, is a prelude to light rail. Not to overlook the importance of the automobile, the streetcar line has park and ride facilities and connections with the bus routes via a transit hub. The plans for a streetcar circulator system in the Central Riverfront were carefully

planned to include intermodal facilities and it was integrated with a larger region-wide intermodal system. However, consideration should be given to incorporate parking facilities for those who want to drive into the city and "park once" for the day or evening. Perhaps a discount to "park once and ride" would be an appropriate program to encourage streetcar patronage.

The case studies suggest that the streetcar should not just target tourists, but local residents, and employees, as well. One of the criticisms of the Detroit streetcar is that it only connects entertainment and retail, and not enough residences and businesses, the same holds true with the People Mover. During events, the People Mover is utilized, but sometimes lacks ridership otherwise. The Cleveland Waterfront Line providing service to the Flats and the Rock-n-Roll Hall of Fame and the Brown's football stadium, had good ridership numbers when the Flats were trendy. Now the Flats are struggling, and the light rail ridership on that particular line is, also. The same problem exists where there is a deficiency of daily home-base work trips or home-base other trips to keep ridership up or, more importantly, to maintain the vitality of the area.

In the Central Riverfront, the case studies lend credence to making the connections into the residential areas of Covington, Newport and Cincinnati, in addition to the entertainment and special event trip generators. Ideally, the daily local riders would create the critical mass required to begin the revitalization process, and the special events and entertainment districts, drawing occasional riders and tourists, would be the "bonus" in creating a vibrant, diverse, attractive place to live, work and play. After all, streetcars are more about "place making"

than about transportation, although their function is inseparable from the purpose, if it is to be a success.

The core transit market (ridership) required to justify the investment and utility (passenger trips) of a streetcar circulator, as demonstrated by the various studies sponsored by OKI, appears primed, and adequate within the Central Riverfront. What is more important, however, is the potential development that can be stimulated through the strategic implementation of a streetcar transit system. As Vicky Diede so eloquently put it, "My own feeling is the ridership is what the ridership is. What's really important is what kind of development is occurring along or near the line; and, does it support the City's goals for new housing and economic development? If it does, the ridership will grow, all other things being equal" (Diede 2003).

As we have seen in Memphis and Portland, their streetcar programs were made successful by implementing them in conjunction with specific urban renewal projects. The urban renewal projects became the cornerstone of the streetcar project, and they became mutually critical to the success of the other. This intrinsic link demarks an extremely high concentration of investment in a relatively small area, and triggers investment by others based on the magnitude of the original commitments. These kinds of commitments on behalf of the taxpayers and private investors demonstrate the fact that streetcars are more about urban renewal than transportation, but be aware the power of the catalyst lies in its permanent utility.

When it comes to urban renewal, the real beauty lies in the breadth of the beneficiaries from a streetcar investment when linked with a cornerstone project. This may be why, once the original commitment is in place to build the system, other development is triggered, even before the streetcar is operational. Unlike stadiums, high tech office complexes, and even trendy nightclubs, where their primary markets and primary beneficiaries are well defined, the streetcar has almost an unlimited market profile. It not only provides a valuable service to those who are transit dependent, but it also appeals to those with discretionary income, as demonstrated by the trip and ridership statistics. As far as an equitable return on investment, at least in terms of its primary beneficiaries, it appears that a streetcar system can be a good investment.

While connectivity plays a crucial role in the functionality of a successful streetcar alignment, connectivity in and of itself is not enough. The case studies demonstrate the need to connect a variety of trip generators in order to create meaningful and sustainable connectivity, which contributes to livability. These connections must include links to residential areas, mixed use areas, employment districts and areas where additional development opportunities exist, above and beyond the cornerstone project identified to support the original partnership.

The cornerstone in the Central Development District may be the riverfront development in Northern Kentucky or the Banks in Cincinnati, or a combination of the two. The Banks refers to an area between the new Paul Brown Football Stadium and the new Great American Ballpark where there is envisioned to be

downtown parking facilities below with mixed-use development at street level and above. There are great hopes for this area of development to include mixed uses such as restaurants, nightclubs and condominiums.

In either case, a public/private development agreement, such as the case in Portland, can mutually benefit from a streetcar and the mixed-use development. This may be a rare occasion where transit can actually directly influence new land use patterns while building upon existing conditions. Unlike the expansion of bus service, the permanency of rails embedded in the street, demonstrate a substantial commitment to a neighborhood. This financial commitment attracts investors, entrepreneurs, and homebuyers because it lessens the risk of private investment. Unlike a bus route, the streetcar alignment is not subject to change unless drastic, unforeseen circumstances reshape the land use patterns entirely. This commitment to a neighborhood is entirely consistent with the three rules of real estate: Location! Location! Location!

Many would argue that the investment required to build a streetcar line is exponentially higher than providing the same level of service with a bus, and the increase in rail ridership does not justify the capital investment. To this end, the author defers to the primary reason for building the streetcar lines. It is more about urban renewal and creating livable cities than it is about ridership. With buses one does not achieve the full effects of creating a livable city, as discussed in section 2.3. Fighting the stigma of the bus in the United States appears to be a loosing battle. Streetcars are acceptable in terms of social status; they are

"hip", and they contribute to achieving clean air goals. Also, unlike buses, they can achieve an 18:1 return on investment, as was the case in Portland when streetcar was strategically implemented within the framework of a comprehensive plan.

The existing conditions of the Central Riverfront seem ideally suited for creating a livable city. There are semi-dense residential neighborhoods in Newport and Covington, and the entertainment district's growth in Northern Kentucky is newsworthy almost on a weekly basis. Downtown Cincinnati has major league sports and an urban office with the capacity to accommodate substantial employment growth, while there is easy access to I-75, I-71 and other major roadways. So what is missing?

In The Rise of the Creative Class, Richard Florida suggests that in order to create an economically thriving city you need "the three T's": technology, talent and tolerance. Furthermore, he argues that you need all of these things simultaneously, and that the creative class no longer follows jobs, rather jobs follow the talent. The talent, he claims, prefers places like Boston, Seattle, San Francisco and Austin, where great social diversity and stimulating activity are abundant. The factors, which go into the creative class' decisions on where to locate, lies in the "quality of place" rather than the once traditional quality of life reference. The quality of place refers to "the unique set of characteristics that define a place and make it attractive" and includes what's there, who's there and what's going on (Florida 2002).

How does this relate to streetcar? The streetcar, if strategically paired with a cornerstone project, as we have seen in Portland and Memphis, can provide a catalyst to create the livable, socially diverse and vibrant city that attracts the creative class. It can contribute to the perception of safety, attract a broad demographic cross section, stimulate development and provide a walkable community by providing a practical way to connect the various assets of the Central Riverfront that are too far to walk and too close to drive.

No matter how compelling of an argument one can provide, for or against the implementation of a streetcar service, ultimately it is a political decision. The real socioeconomic contribution of a streetcar in the Central Riverfront lies in the decisions of our elected officials. Evidence suggests the streetcar, when combined with other strategic initiatives, can inspire significant growth by helping to create a more livable city, but the reality is, without political support the streetcar's potential will remain hypothetical.

5.3 The Case for Advanced Documentation and Research

In the grand scheme of things, the information available regarding the socioeconomic impacts of streetcars is very limited and may be part of the problem concerning a lack of political support. There are plenty of data relative to the growth of cities, as defined by corporate limits, but because of the smaller area of primary influence impacted by streetcars, buffered areas as established in Portland, need to be established with a tracking system monitoring the cause and effect relationships within the buffer. This would prove to be beneficial to

places entertaining the idea of implementing streetcar service. This information may reduce the political risk of endorsing a somewhat unique concept in urban renewal, and would also serve to inform the citizens who ultimately pay for the endeavor by providing a factual track record of the streetcars impacts in other cities.

As the case studies were being researched, a number of independent efforts to document the socioeconomic effects of streetcars have been discovered in various stages of development and sophistication primarily by the operating agencies, planning agencies or consulting firms. The problem is there is no continuity, because everyone is working independently and for various objectives and literally making it up as they go along. Clearly this is a case where an orchestrated collective effort to standardize the collection and recording of the data would save an enormous amount of time and energy, and more importantly help guide the decision making process and ultimately, provide some insight on the return on investment and the associated risks.

Data to illustrate a "before and after" socioeconomic profile of a buffered area, derived from the streetcar alignment, would be most helpful in the decision making process. The "before profile would ideally have a 10 to 20 year window to expose any abnormal patterns caused by extraordinary influences. The statistics of the buffered area would ideally include all of the information gathered for the U.S. Census. In more practical terms, data relative to jobs, income, age, race, property values, new businesses, home ownership and the perception of livability would be helpful.

Table 5: Expansion Status of Existing Streetcar Systems in the U.S.

Existing System	Planning/Building Significant Expansion
Charlotte, NC	Yes
Dallas, TX	Yes
Detroit, MI	No
Galveston, TX	Yes
Kenosha, WI	Yes
Lowell, MA	Yes
Memphis, TN	Yes
New Orleans, LA	Yes
Portland, OR	Yes
San Francisco, CA	Yes
Seattle, WA	No
Tampa, FL	Yes
Tucson, AZ	Yes

Source: APTA 2003a. *Existing Systems*

There is a spreading, renewed interest in implementing streetcars in the United States, for the explicit purpose of socioeconomic development. The utility of streetcars is being seen as a secondary function, predicated by the success of urban renewal. Table 5 is a testament to the success of the existing systems by virtue of the expansion of the systems. These systems are defined as medium to large, in terms of size and scope of operation, of which, eleven out of the thirteen are either planning for, or constructing a significant extension of streetcar services.

Table 6 illustrates the lines that have received at least enough funding to begin serious planning, four of which are now under construction. There are seven lines that were previously studied and are inactive at this time, and an additional eighteen are currently being studied.

Here is a case where 29 cities, considering new streetcar systems, in addition to the 13 cities where they are considering or actually expanding their existing systems, would have benefited by having access to socioeconomic data relative to the implementation of streetcar systems. Inevitably there are other cities interested in urban streetcar systems that are not listed in either Table 5 or 6 that would equally benefit.

Table 6: Status of Future Systems

Under Construction	Under Active Planning		Previously Studied-Inactive
Little Rock, AR	Birmingham, AL	Omaha, NE	Fort Worth, TX
San Pedro, CA	Chicago, IL	Richmond, VA	Lancaster, PA
Philadelphia, PA	Cincinnati, OH	Sacramento, CA	Los Angeles, CA
Tacoma, WA	Colorado Springs, CO	St. Josephs, MO	Aspen, CO
	Columbus, OH	Salem, OR	Eureka Springs, AK
	Corpus Christi, TX	San Antonio, TX	Minneapolis, MN
	Dubuque, IA	Santa Cruz, CA	Wilmingon, DE
	Madison, WI	Savannah, GA	
	Miami, FL	Sioux City, IA	

Source: APTA 2003a. *Future Systems*

There is without a doubt, an ongoing heated exchange between what is referred to as "anti rail" groups and "rail advocates". Much of the dialogue is centered on whether fixed guideway transit systems are wise investments of

taxpayer dollars, based on the historical and projected cost and ridership numbers, and how they relate to mobility. Rail advocates argue that fixed guideway systems, such as streetcars are not only transportation alternatives, but contribute to creating a more livable urban environment, which in turn stimulates growth. The problem is, there is an abundance of hard data relative to cost, ridership and other mobility issues, but very little on the streetcars influence on socioeconomic development. If a socioeconomic database is established now, with a standardized collection and reporting system for the jurisdictions which have existing streetcar systems, it would save those considering expansions or new systems a tremendous amount of time, effort and money in trying to determine if such an investment is appropriate for their particular communities.

6.0 References

American Public Transportation Association (APTA). 2003a. APTA Heritage Trolley Site. Available at http://heritagetrolley.org. Last Accessed on June 26, 2003.

American Public Transportation Association (APTA). 2003b. *APTA Ridership Reports Statistics—United States Light Rail Agencies Index.* Available at. http://www.apta.com. Last accessed on July 17, 2003.

Bekka, Khalid, Ph.D. 2002. Vice President, HLB Decision Economics, Inc. Silver Spring, Maryland

Brell, Bridget. 1976. *Mass Transit Systems in Cincinnati, Ohio.* Cincinnati: The Cincinnati Historical Society

City of Portland, The. Web page available at http://portlandstreetcar.org/index.html. Last accessed on May 29, 2003.

Detroit Department of Transportation (DDOT). Available at. http://www.ci.detroit.mi.us/ddot/main.htm. Last accessed June 25, 2003.

Detroit Transportation Corporation. Available at *http://www.thepeoplemover.com/bypassinfo.htm*. Last accessed June 29, 2003.

Diede, Vicky L. June 25, 2003. Project Management, City of Portland Office of Transportation Engineering and Development. Portland, Oregon

Eidlin, Mike. 2002. Vice President, Parsons Brinckerhoff, Ohio. Cincinnati, Ohio

Federal Transit Administration (FTA a). *Glossary of Transit Terminology as Defined for NTD Reporting.* Available at http://Ntdprogram.com. Last accessed on July 14, 2002.

Federal Transit Administration (FTA b). *New Starts Evaluation and Rating Process*. Available at http://Fta.dot.gov.htm. Last accessed July 13, 2002

Free Congress Foundation. *The New Electric Railway Journal*. Available at http://trolleycar.org/railinfobytype.htm. Last accessed on June 31, 2003.

Florida, Richard. 2002. The Rise of the Creative Class. New York: Basic Books

Fox, Thomas D., PhD., AICP. June 25, 2003. Director of Planning and Capital Projects, Memphis Area Transit Authority. Memphis, Tennessee

Gad, Suzann S. 1999. Inter-Office Communication: Regarding the Outline and Guide to Preparing a Major Investment Study (MIS) Report,· Columbus: Ohio Department of Transportation

HLB Decision Economics Inc. 2001. *The San Antonio Downtown Circulation Alternatives Analysis: Economic Development Impact Analysis*. San Antonio: The San Antonio-Bexar County MPO/VIA

Lehmann, Terry W. 2000. *The Green Line: The Cincinnati, Newport & Covington Railway.* Chicago: Central Electric Railfans' Association

Metro. 2002. *Metro Moves Regional Transit Plan*. Cincinnati: Metro

Ohio Department of Transportation (ODOT). 1999. *Outline and Guide to Preparing a Major Investment Study (MIS) Report*, Columbus: Ohio Department of Transportation

Ohio-Kentucky-Indiana Regional Council of Governments (OKI). 2001 a. *Central Area Loop Study*. Cincinnati: OKI

Ohio-Kentucky-Indiana Regional Council of Governments (OKI). 2001 b. *OKI 2030 Regional Transportation Plan*, Cincinnati: OKI

Office of Transportation and Portland Streetcar, Inc. 2003. *Portland Streetcar Development Oriented Transit.* Portland

Portland Development Commission. 2003. *The Emergence of the River District – A New Urban Community (DRAFT): An application for National Achievement in Smart Growth in the Category of Overall Excellence.* Portland

Slater, Cliff. 1997. *General Motors and the Demise of Streetcars.* Availible at Http://Lava.net.htm. Last accessed on July 20, 2002

Smatlak, John. North American Vintage Trolley Systems. Available at http://www.railwaypreservation.com/vintagetrolley/trolleylist.htm. Last accessed on May 29, 2003.

Snell, Bradford. 1995. *The StreetCar Conspiracy.* Available at http://www.Lovearth.net.htm. Last accessed on July 20, 2002.

Thomas D. Fox, Ph.D., AICP. 2000. *The Memphis Trolley System: A Transportation Link and Development Tool.* Memphis: Memphis Area Transit Authority (MATA).

Transportation Research Board. 1996a. *TCRP Report 20: Measuring and Valuing Transit Benefits and Disbenefits.* Washington, D.C.: National Academy Press

Transportation Research Board. 1996b. *TCRP Report 22: The Role of Transit in Creating Livable Metropolitan Communities.* Washington, D.C.: National Academy Press

U.S. Census Bureau. *United States Census 2000.* Available at http://www.census.gov/main/www/cen2000.html. Last Accessed on June 28, 2003

Valentine, Emilie W. Available at http://www.Snapcity.com.htm. Last accessed on June 28, 2003.

Wagner, Richard M. 1968. *Cincinnati Streetcars*: Volume 1-8. Cincinnati: Wagner Car Company

Wagner, Richard M. 1997. *Cincinnati Streetcars*: Volume 10. Cincinnati: Valley Car and Coach

Weyrich, Paul M. 2002. *Bring Back the Streetcars! A Conservative Vision of Tomorrow's Urban Transportation.* Washington, DC: The Free Congress Foundation