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ABSTRACT

This report, an interim deliverable for Task Orders 5408 and 6408: "Improving Mobility through Enhanced Transit Services". Thus far in the study we have performed a review of the literature and conducted a small number of site-specific case studies for transit agencies in North America identified from the literature review as either currently having or in the past having had transit-taxi service implemented in their agency's jurisdiction. We initially classified alternative concepts of transit-taxis into a typology of three service design options based on a review of the literature: 1) fixed route, 2) fixed-route with deviation, or 3) hybrid/feeder service and three operational strategies: 1) using in-house vehicles and labor, 2) contracting out services, or 3) relying on the private market to meet demand. After the literature review, we performed the transit-agency-based case studies using a question-and-answer interview style over the telephone.

Key Words: transit-taxi, late night transit service, public transportation

EXECUTIVE SUMMARY

This report is an interim deliverable for Task Orders 5408 and 6408: "Improving Mobility through Enhanced Transit Services".

Due to low ridership and high operational costs, transit agencies especially in many medium-size cities have curtailed their after-dark and weekend services. Consequently, riders needing to travel during these times can go to fewer places, have to endure longer walking distances and waiting times, additional transfers, and are exposed to greater personal inconvenience and potential safety risks. There is a clear need for improvement in off-peak public transport service and this need calls for technologically innovative and cost-effective solutions.

One proposed solution is the concept of *transit-taxi service* ─ also referred to as *late night* or *night owl* service in North America and *Nachtbus* in Germany ─ as a means to satisfy the need for improvement in off-peak public transport service. Generally, transit-taxi service is publicly available, uses existing transit stop/station infrastructure as "origins" and/or "destinations, is offered when regular buses tend not to be operational, and allows for a shared-ride experience. Vehicle types range from standard 40 foot buses to smaller vans and taxis. Routing options include customary fixed route service and more flexible options with route deviation.

For many years, transit agencies as well as departments of transportation at state and local levels have been experimenting with different transit-taxi options in order to provide enhanced mobility services to their riders that went beyond traditional fixed-route and fixed-schedule transit during off-peak times. For example, fixed-route skeletal service is the most straight-forward transit-taxi concept and is used in many places around the world. It simply provides public transit services in a stop-to-stop style, but to a more limited extent than regular daytime bus service in terms of the number of stops the driver makes or diminished frequency or both. This typically happens during lower-demand hours, such as late-night hours (owl service) or weekends – times when the ridership levels do not necessitate full fixed-route service. Another type of transit-taxi service is fixed-route service with limited deviation, sometimes referred to as flexible routing, is slightly more complex than skeletal transit service. The vehicle typically has the flexibility of a shared-taxi type service and can deviate a certain distance from designated fixed route stops based on

rider requests. Feeder/Hybrid service is the most complex and has the most structural variety of these three examples. Broadly defined, this is a combination service whereby fixed-route transit vehicles interface with typically smaller shared-ride or dial-a-ride services that can provide door-to-door service (or at least closer point-to-point than a fixed-route service can provide) resulting in a hybrid bus-taxi service. This hybrid option can take on both a many-to-one (origins-to-bus) and a one-to-many form (bus-to-destinations).

Such enterprises a generation ago were constrained by technological limitations making these attempts a little ahead of their time. Now, however, technology ─ such as real-time information systems for vehicle dispatching ─has advanced sufficiently far and is fairly inexpensive to implement to make transit-taxi a much more realistic alternative.

The findings from the review of the literature left certain questions unanswered and issues unaddressed relative to specific transit agencies and the operation of their transit-taxi enterprises. To answer these questions and generally delve more deeply into these enterprises, we conducted site-specific case studies in which each case study focused on the transit-taxi experience of a single transit agency either currently having or in the past having had transit-taxi service implemented in their agency's jurisdiction. We conducted these case studies by discussing our questions and issues over the telephone with appropriately identified agency staff in an interview-like format based on a set of both general and agency-specific questions.

We conducted ten case studies as described in Table ES-1.

TABLE ES-1 Participants in Case Studies

AGENCY	SERVICE DESIGN	OPERATIONAL STRATEGY
Houston METRO	Fixed Route with Deviation	Contracted
AATA Night Ride	Feeder / Hybrid	Contracted
King County	Feeder / Hybrid	Contracted
Rimouski (Quebec)	Feeder / Hybrid	Contracted
AC Transit (SF Bay Area)	Fixed Route Skeletal	In-house
King County Night Bus (Washington State)	Fixed Route Skeletal	In-house
Boston MBTA	Fixed Route Skeletal	In-house
Los Angeles MTA	Fixed Route Skeletal	In-house
OCTA (Orange County, CA)	Fixed Route Skeletal	In-house
Vancouver Translink	Fixed Route Skeletal	Contracted

Each case study covered the following topics: 1) background and planning, 2) transit-taxi service, 3) operational strategies, 4) regulatory environment, 5) financing, 6) fare payment, 7) technology applications, 8) demographic characteristics, and 9) evaluation. Factors contributing to the creation and continuation of transit-taxi programs for case study operators include

- Larger service area (LAMTA, OCTA, SFBA, Vancouver, Seattle Metro)
- High community demand (LAMTA, AATA, AC Transit)
- University support (Rimouski, AATA, Boston, Vancouver)
- Strong agency support (OCTA, King County)
- Relative cost savings over traditional fixed route service option

Community pressure, in the form of advocacy groups, has contributed to transit agencies focusing beyond day-to-day operations and maintenance of existing system. Examples include Mothers Against Drunk Driving in Boston, Bus Riders Union in Los Angeles, and the Transportation & Land Use Coalition in the San Francisco Bay Area.

Innovative financing mechanisms should be considered to help deal with agency-wide financial constraints. For example, AC Transit in SF Bay Area. The fixed-route skeletal and in-house operation combination is frequent and more closely associated with larger service area agencies as expected. Cities with smaller populations with universities (Ann Arbor, 114,000 and Rimouski, 40,000) tend to have feeder/hybrid transit-taxi services, utilizing taxi cabs. Little, if any, service assessment performed.

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1.0 INTRODUCTION

This report is the second deliverable for Task Orders 5408 and 6408: "Improving Mobility through Enhanced Transit Services" in which we are investigating improvements in off-peak public transport service focusing on late night transit service also known as transit-taxi service. Overall, this project has three primary tasks: 1) Develop a transit-taxi concept as a means to improve nighttime and weekend public transit service, 2) Identify a site in California to conduct a pilot test of transit-taxi service, and 3) Design a program to implement the pilot test. The research team is using an integrated systems approach to investigate the transit-taxi concept from both operational and policy/institutional points-of-view. Each of these perspectives is critical in understanding the issues that are likely to arise as the concept advances from initial development to implementation.

The first deliverable (1) documented a review of the literature on the background and current potential for transit-taxi services in the U.S and abroad. The review of the literature provided the research team with a partial understanding of the characteristics that contribute to successful transit-taxi enterprises together with vital lessons learned from less than successful attempts at such enterprises. Because of this incomplete picture, we followed-up the literature review by conducting a small number of site-specific case studies for transit agencies that were identified from the review as either currently having or in the past having had transit-taxi service implemented in their agency's jurisdiction. We have documented this follow-up research in this second project report.

1.1 Research Objectives

Our prime objectives in reviewing the literature was to understand the context in which transit-taxi services have been implemented and to examine at a more detailed level different operational and financing strategies for, and existing examples of these services to determine the conditions that have contributed to successful as well as not so successful implementations of such nighttime services. More specifically, we wanted to identify, to the extent possible, those combinations of characteristics that have contributed to successful nighttime and weekend transit-taxi services, including: the physical and socio-demographic characteristics of communities and riders, the organizational and institutional characteristics facilitating or

hindering implementation, and any intelligent transportation systems (ITS) technologies that have been used.

This research sets out to identify how such transit-taxi services are evaluated by agencies, and what lessons transit agencies have learned from various types of transit-taxi provision. Through this we hope to determine just why agencies pick particular types of transit-taxi service for their particular service areas or why they pick no transit-taxi service at all. In addition to service type we are strongly interested in service operational strategy, particularly in determining the benefits and costs of privatization versus in-house operation, as well as the likelihood such variations in operational strategy may occur given the diversity in political environment across the country.

1.2 Contents of the Report

The report is divided into four sections. In Section 2, we present background information on the conceptual framework the team developed underlying transit-taxi service through a discussion of the historical and current developments of fixed-route public transit service alternatives. We discuss three different transit-taxi service types and their associated operational strategies and logistics. In Section 3 we discuss the methodological approach we used in conducting the case studies. Section 4 elaborates on findings from the case studies of existing or considered transit-taxi services (based on the three transit-taxi models) in different cities and highlights some of the necessary criteria and possible obstacles, e.g., institutional, political, technical, demographic, and financial in the implementation or continuation of these services. Finally, next steps for our study are discussed Section 5.

2.0 BACKGROUND MATERIAL AND CONCEPTUAL FRAMEWORK FOR TRANSIT-TAXIS

This section provides an abridged version of the development of the conceptual framework for transit-taxis that we performed earlier in the project. A complete write-up and discussion of this topic may be found in (1).

Due to low ridership and high operational costs, transit agencies especially in many medium-size cities have curtailed their after-dark and weekend services. Consequently, riders needing to travel

during these times can go to fewer places, have to endure longer walking distances and waiting times, additional transfers, and are exposed to greater personal inconvenience and potential safety risks. There is a clear need for improvement in off-peak public transport service and this need calls for technologically innovative and cost-effective solutions.

One proposed solution is the concept of *transit-taxi service* ─ also referred to as *late night* or *night owl* service in North America and *Nachtbus* in Germany ─ as a means to satisfy the need for improvement in off-peak public transport service. Generally, transit-taxi service is publicly available, uses existing transit stop/station infrastructure as "origins" and/or "destinations", is offered when regular buses tend not to be operational, and allows for a shared-ride experience. Vehicle types range from standard 40 foot buses to smaller vans and taxis. Routing options include customary fixed route service and more flexible options with route deviation.

For many years, transit agencies as well as departments of transportation at state and local levels have been experimenting with different transit-taxi options in order to provide enhanced mobility services to their riders that went beyond traditional fixed-route and fixed-schedule transit during off-peak times. Such enterprises a generation ago were constrained by technological limitations making these attempts a little ahead of their time. Now, however, technology ─ such as real-time information systems for vehicle dispatching ─ has advanced sufficiently far and is fairly inexpensive to implement to make transit-taxi a much more realistic alternative.

2.1 Transit-Taxi Service Descriptions

Transit-taxi service designs may be classified into three groupings: 1) Fixed-route skeletal, 2) Fixed-route with limited deviation, and 3) Feeder/Hybrid.

Fixed-route skeletal service

Fixed-route skeletal service simply provides public transit services in a stop-to-stop style, but to a more limited extent than regular daytime bus service in terms of the number of stops the driver makes or diminished frequency or both. This typically happens during lower-demand hours when ridership levels do not necessitate full fixed-route service. Many transit systems operate networks whereby several daytime routes are combined into a single night route. Frequently, the

routes are consolidated at major boarding points, thereby facilitating transfers between buses or from trains to buses at times. In several cases, we have also found a skeletal bus service taking over for metro or train service after the system's closing hours as seen in the San Francisco Bay Area where Alameda-Contra Costa Transit District (AC Transit), among other transit agencies, makes stops at the Bay Area Rapid Transit (BART) system stations after BART services end for the day.

Fixed-route service with limited deviation

Fixed-route service with limited deviation, sometimes referred to as "flexible routing," is slightly more complex than skeletal transit service. The vehicle typically has the flexibility of a shared-taxi type service and can deviate a certain distance from designated fixed route stops based on rider request. For example, in Prince William County, Virginia, the flex-route feeder service, Omnilink, allows buses to deviate as much as 1.5 miles en route to the Virginia Railway Express (VRE) commuter services (5). We find a good deal of variation of this service type – both legal and illegal ad-hoc – in developing countries where informal transit markets flourish. Flexible routing is also prevalent in many U.S. and Canadian cities.

Flexible routing is an especially useful service type for late-night – a time when safety concerns may prevent riders from using a normal bus service that does not deviate to bring passengers closer to their final destinations. In fact, because of safety concerns, we find flexible routing on many college campuses across the country, including the University of Michigan in Ann Arbor among others.

Feeder/Hybrid service

Feeder/Hybrid service is the most complex and has the most structural variety of the three service types. Broadly defined, this is a combination service whereby fixed-route transit vehicles interface with typically smaller shared-ride or dial-a-ride services that can provide door-to-door service (or at least closer point-to-point than a fixed-route service can provide) resulting in a hybrid bus-taxi service. This hybrid option can take on both a many-to-one (origins-to-bus) and a one-to-many form (bus-to-destinations). In both cases, it adds capacity and mainline mass transit usage by transporting people to/from the main corridors. Normally, this service type relies on

more advanced technologies such as real-time information systems than the other two service types since it requires communication between two different vehicles, and at times, between different agencies. In the majority of the cases where we find this service, agencies rely on taxi companies to provide feeder services (typically in the form of shared-ride taxis).

2.2 Operational Strategies

The literature focuses primarily on three operational strategies for the three transit-taxi concepts:

1. Use of in-house vehicles (regular full-size buses or smaller vehicles) coupled with extended service hours and/or days and operators to provide owl and/or weekend service.
2. Contracting out services to other transit agencies or taxi operators to provide owl and/or weekend service.
3. Completely relying on outside private services as determined by market demand for owl/weekend services (if the municipality authorizes outside services).

In the first two options, transit agency decision makers creating the additional nighttime and/or weekend service typically integrate the new service into the entire transit schedule regardless of whether the service is in-house or contracted out to another operator. Institutional issues, regulatory conditions and financial structuring help determine how the service is provided.

In-House Operations

Many transit agency decision makers throughout North America and Western Europe extend service hours or supplement train service during hours of non-operation by operating agencies' in-house vehicles additional hours beyond existing bus service. However, operating in-house buses can be very cost ineffective because of high union wages and benefits and low passenger loads, leading several agencies to attempt to discontinue such services.

Contracted Services

The high costs of operating an in-house service during low-demand hours, constrained agency resources, as well as other political and institutional factors have led many agencies that provide night-owl or other special services to contract out these portions of their service. The ability of agencies to contract out services and to determine specific route and vehicle options will depend

on the stipulations of the labor contract. For example, a contract may limit an agency to only contract out lower-demand, lower-revenue earning routes, or to only contract with operators using smaller vehicles to prevent competition since labor may be paid less to operate smaller vehicles. Therefore, adding clauses to the contract enabling agencies to operate all services using full-size buses in house makes it more likely that labor is paid higher wages.

Many agency officials view contracting as a cost-effective and cost-efficient alternative since the system infrastructure and operations in many cases would be established and therefore not necessitate heavy capital investments. Riders can benefit because contracted service operators would ideally react to the more competitive environment and therefore be motivated to provide better quality service. This could result in greater mobility options. The contractor, especially in the shared-taxi situation, can also benefit from a more secure and steady stream of business, and can allow the owner to expand operations.

Research shows that in Western Europe, transit agencies and cities often rely on contractual relationships with taxis to help provide public transportation services. In Western Europe, taxis are more typically viewed as complementary to regularly-scheduled transit service than in the U.S. even though the concept of shared-ride taxis is increasingly becoming more popular and prevalent in both Western Europe and the U.S.

More specifically, we find that transit agencies heavily rely on contracting with or subsidizing taxi companies for shared-ride taxis to provide hybrid service. In this situation, taxi companies contract with transit agencies to complement the fixed-route service with one-to-many door-to-door feeder services. In many cases, under this scenario, customers have different options for using the service. In one such option, as seen with the Sammel-taxi (group taxi) in numerous German cities, customers can call the transit system dispatcher who will then contact the contracted taxi service dispatcher. These taxis are dynamically-scheduled nighttime taxis that meet transit riders at suburban transit stops and take them directly to their homes. Passengers pay a small fare for the extra service, which is cross-subsidized by the public transit company.

Private / Market-Based Structure

A completely private, market-driven transit-taxi service can also meet the needs for all three taxi-transit models discussed. Laissez-faire transit-taxi service can either take on a jitney-like approach or a more standard privatized, for-profit bus operator approach.

The jitney service approach to transportation is typically privatized, *low cost*, flexible-route and demand-responsive. Riders often rely on jitney services to fill gaps in the mainstream public transportation system. While jitneys are not considered mainstream and are often highly regulated, if not illegal, in the U.S., typically clandestine jitney services operate successfully in ethnic communities centered in large urban areas including: Los Angeles, New York City and Miami. In the developing world, jitneys are much more in the mainstream and we find an enormous reliance on jitney services by significant portions of the population. Numerous informal transportation possibilities of varying sizes and vehicle types can arise when public transit agencies do not meet demand. These services can be more "taxi-like," providing door-to-door connections, or "bus-like," following more or less fixed routes. In general, independent operators can be very responsive to alternative markets and demands. Moreover, small, private services can aid mainline bus routes by improving connectivity, adding capacity and absorbing high-cost services.

U.S. transit agency decision makers hesitate to allow any jitney-type service that could potentially compete with public transit in the market because they mistakenly believe private informal services undercut the market, a concept known as "cream skimming". To ensure jitney services do not compete with public transit, many regulations and market barriers have been established in most U.S. cities. However, many illegal jitney services still operate their services.

There are also bus and collective taxi services that are completely privatized and operating on a for-profit basis, especially in Western Europe. In such cases as the Dutch Maastricht City Bus service that provides trans-border service between Maastricht in the Netherlands and Hasselt in Belgium using both conventional full-size buses and shared taxis, company officials explained that the 1994 privatization led to a cost savings of more than 40 percent. In Germany, there is another option whereby cooperation between transit authorities and local taxi companies occurs

through voluntary arrangements during hours when transit service is not available. In the U.S., official for-profit bus operators offering transit-taxi service are found in very few places. One such case is the 400 Dollar Van commuter minivans servicing the outer Boroughs of New York City, which provides feeder service for about 50,000 passengers daily to subway stations in the city since the Metropolitan Transit Authority (MTA) does not adequately meet the local demand. Dollar Vans are prohibited from accepting street hails or operating on bus routes, yet they frequently do both. They have semi-fixed routes with flexibility and are willing, for a small additional fee, to provide door-to-door service, which, for safety reasons, has been highly valued by women working late shifts.

In general, privatized bus service in both jitney-style and regular fixed-route could lead to greater mobility during nighttime hours and weekends.

2.3 Logistics

Once a transit agency decides to implement a weekend type service (assuming a private option is either unavailable or not sufficient), it must determine which transit-taxi service concept is most viable and logistically feasible and whether or not that service will be in-house or contracted out. These decisions will be based on a number of interrelated factors which can be very specific to a country, region or municipality, including: demographic characteristics of the region, agencies' financing sources (operational and capital budgets and resources), political and institutional environments, technological capabilities, as well as availability of external operators (in the case of contracting) and vehicles. These factors, which are briefly described below, also help to determine fare structures and service levels.

Demographic and Area Characteristics

There is a range of demographic features important to any of the transit-taxi concepts. The most commonly discussed and relevant features include: population density, age ranges and income levels. Trip generators/attractors are also crucial in determining the transit-taxi ridership demand. For example, the majority of night owl services take place in areas with big universities requiring service at night. In the U.S., the majority of nighttime users are either low-income workers or students.

Financing Sources

Beyond fare revenues, the level of operational and capital subsidies provided by the local, state and federal governments strongly influence the types of services that transit agencies can provide. There are cases where nighttime and weekend transit-taxi services are completely self-financing (e.g. Trein-taxi in Netherlands) and therefore tend to have higher levels of service and technological application. There are also examples of the necessary subsidy levels being too high to provide or maintain service. The funding sources and the general wealth of the transit system will also influence the fare structure for the additional transit-taxi service. Some additional transit-taxi services can charge the same fares as charged for regular service; other services require passengers to pay a small fare premium for the extra service. In all cases reviewed, the public transit-taxis charge lower fares than regular taxi services, thus providing a financial incentive to use the service.

Political and Institutional Environments

The political and institutional environment can greatly influence whether or not a transit agency contracts out service. If, for example, stringent labor laws prohibit an agency from contracting out service, it could lead to the inability to provide additional nighttime and/or weekend service because in-house operations would be too costly. Similarly, research has shown that the size of the agency can affect contracting decisions in the U.S., that is, agency size can be a proxy for heavier regulations placed on an agency; typically the bigger and older the agency, the more likely it will contract out less of its service than a smaller agency. This could directly impact the agency's ability to contract out service during lower-demand hours. Labor laws can also influence the type of vehicles and service design used for nighttime since some labor contracts only permit outsourcing of smaller vehicles on lower demand routes or times.

Regulatory constraints, when imposed on the transit agency by the federal, state or municipal governments can prevent implementation of transit-taxi services. On a federal level, Section 13(c) of the amended Urban Transportation Act of 1964, an underlying federal regulation to private-sector participation, can possibly prevent contracting (even though evidence of its use is not strong). This labor protection clause guarantees that transit employees will not be adversely

affected by any program involving federal transit grants. Many smaller California communities that have relied on taxis as substitutes for transit have avoided the potential constraints caused by 13(c) by refusing federal funds (8). At the state level, certain laws can make contracting very difficult, if not impossible. Massachusetts' anti-privatization law, for example, referred to as the "Pacheco law," severely limits the amount of contracting in which the MBTA can engage. City and state laws can prevent or support a more laissez-faire market whereby night and weekend demand could be met by private operators.

Technological Capabilities

The literature has shown that a variety of technologies applied to different service concepts exists – ranging from basic dial-in reservation systems technology used to provide nighttime fixed-route skeletal service to more complex technologies that enable dynamically-scheduled automated hybrid shared taxis (8, 22). Real-time information for operators and passengers, vehicle tracking, real-time reservation systems, rideshare matching systems, Advanced Vehicle Control Systems (AVCS) and wireless communication technology can be and, in many cases, are being applied to alternative services (8, 22). Satellite vehicle tracking and locating technologies can be used to achieve optimal dispatching and routing. Generally, the more sophisticated and automated the technology is, the greater hope agencies have of achieving efficiencies and cost effectiveness, thereby enabling them to provide or maintain the service.

External Operator and Vehicle Availability

Clearly, the implementation of night bus and/or weekend service, if operated in-house, will depend on vehicle and operator resources available. If the service is contracted out, the type of transit-taxi concept used, its level of sophistication and the choice of vehicle will be determined primarily by which external operators can meet the requirements of the agency and what resources they have available to do so.

3.0 METHODOLOGY

The findings from the review of the literature left certain questions unanswered and issues unaddressed relative to specific transit agencies and the operation of their transit-taxi enterprises. For example, for many transit agencies, it was not clear to what extent transit-taxi nighttime

services have been successful; in some cases it was not known if the utilized service design and operational strategy contributed to more cost savings over other options; moreover, based on the preliminary review of the literature there was insufficient information to determine how financing sources and fare levels contribute to the feasibility and cost effectiveness of the services. Our next step was to delve more deeply into these enterprises by conducting site-specific case studies in which each case study focused on the transit-taxi experience of a single transit agency.

A priori we knew there were a relatively small number of transit agencies to consider and thus we decided that it would be practicable to conduct the case studies by discussing our questions and issues over the telephone with appropriately identified staff in management and operations in an interview-like format based on a set of both general and agency-specific questions. The remainder of this section discusses how we identified participants for the case studies, how the interview guide was designed, and how it was administered.

3.1 Participant Identification

From a list of approximately two dozen potential transit agency candidates for the interview guide we narrowed the list down to the eventual ten sources. The largest number of potential agencies was obtained from the literature review which included the following sites:

- Madison, WI
- St. Bernard Parish, LA
- El Cajon, CA
- Peterborough, Ontario
- Bremerton, WA
- Arlington County, VA
- Westport, CT
- Chapel Hill, NC.

Many of these operators no longer implemented a transit-taxi service, had never implemented the transit-taxi study, or did not have a reachable representative. Word of mouth was used as well.

Based on the advice of Madison, WI transportation planner contacts, Boulder and Denver, CO were identified. Neither agency unfortunately provided transit-taxi service. Another simultaneous step was to identify the largest transit operators in the country in order to determine if a transit-taxi service was in operation. The premise behind this idea was that the largest operators were likely to at least have a fixed route skeletal late night service due to service demand and possibly more flexible transit-taxi service operations. While a number of agencies including New Jersey Transit, New York City MTA, SEPTA in Philadelphia, and Chicago Transit Authority were identified, no transit-taxi services or agency representatives were identified, due to time constraints and cold-call difficulties. These four agencies are likely to have fixed route late night skeletal service, and the next stage of this project will explore these areas (Section 5).

The ultimate list used in the study was obtained from the literature review. Due to language difficulties, we were unsuccessful in contacting representatives to discuss innovations in various German cities (*Nachtbus*) and in Lausanne, Switzerland. A representative from Singapore Bus Service was contacted, but declined the opportunity to participate in the survey. Although French is the primary language spoken in Rimouski, a city in the Canadian province of Quebec, we were able to conduct the survey with minimal language problems. The remaining nine operators were obtained from those identified in (1).

We sought to interview individuals involved in service planning with the presupposition that such individuals could yield insight into reasoning behind the selection of specific types of operational strategies, service designs, and routing. Survey participants varied in positions as Manager of Service Development, Manager of Schedules, Lead Transportation Planner, Contract Administrative Manager, Acting Supervisor of Service Planning, Division Chief of Planning and Service Delivery, Senior Transportation Analyst, Director of Taxibus Service, Deputy Executive for Service Development, and Transportation Planner. Those in higher management positions and at those at the agency the longest were able to provide the most in-depth answers due to their experience levels.

3.2 Interview Guide Design

The interview guide, which is provided in Appendix A, is organized around ten categories, which include: agency representative identification, background on transit-taxi planning, realities of transit-taxi service, operational strategies, regulatory conditions, financial structure, fare policy, technology, demographics, and customer response. Additionally, various operators were asked further questions regarding costs, ridership, competition, number of vehicles, service planning modeling, program evaluation, lessons learned, and conclusions about reasons for success or failure, and other miscellaneous questions tailored to particularities of the agency. The topics were presented in an order that first provided insight into what kind of service existed and how it came about, to the details of day-to-day operations of service, those policies regulating service, costs and payment methods, technologies, and then returning to planning issues regarding demographics, and finally concluding with marketing and ridership questions. More simply, the first two thirds of the questions provide service planning and operations background, while the last third provides quantifiable results in order to evaluate service from fares, subsidies, ridership, and demographics. Of all topics, those that were most difficult to obtain information included questions of contracting, system financing, agency support levels, decision-making power location, state and municipal regulation conditions, and reasons for success or failure of service.

3.3 Interview Guide Administration

In all cases the interview guide was administered through telephone discussions. Interviews lasted from 30 minutes to approximately one hour, depending on the complexity of service and whether or not additional and/or follow-up questions arose. Additional follow-up emails for all 10 interviews also supplemented the interview guides. At times, the guide was administered out of order if the conversation was naturally leading into another question not immediately next on the guide. For those agencies providing service that involved significant route deviation or hybridization of routes and service areas, specific questions were tailored to these appropriate agencies to be tacked on to the end of the survey. This was the case for Ann Arbor, Rimouski, and Houston.

4.0 FINDINGS

The set of interview questions was organized around the following nine major themes in which we have also organized this section of the report on findings from the case studies:

- Background/Planning
- Transit-taxi Service
- Operational Strategies
- Regulatory Environment
- Financing
- Fare Payment/Structure
- Technology Applications
- Demographic Characteristics
- Evaluation

Table 1 lists the case study agencies, along with each of their transit-taxi service designs and operational strategies.

TABLE 1 Participants in Case Studies

AGENCY	SERVICE DESIGN	OPERATIONAL STRATEGY
Houston METRO	Fixed Route with Deviation	Contracted
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Los Angeles MTA	Fixed Route Skeletal	In-house
OCTA (Orange County, CA)	Fixed Route Skeletal	In-house
Vancouver Translink	Fixed Route Skeletal	Contracted

The Background/Planning section discusses origins of transit-taxi service and which external groups were involved with transit-taxi planning. The Transit-taxi Service section highlights which category of transit-taxi the agency is operating, along with how the routes/service areas were selected. The Transit-taxi Service Selection also discusses details concerning vehicle size, years of program operation, and times of transit-taxi operation. The Operational Strategies section examines just whether the service is provided through contracting or through direct operations. The limits and details of the contracting agreement, if applicable, are also sketched out in this section, along with whether or not-for-profit jitney-like competing operators exist. The Regulatory Environment section discusses issues concerning regulations from the state, localities, inter-jurisdictional cooperation, and labor regulations. In the Financing section we will discuss just how transit-taxis are financed for each of the operators and cost recovery ratios. The next section discusses the fares paid by customers, differences in fares during different times of day, and whether or not fare increases affect ridership and customer satisfaction. Technological Applications are then discussed where any existing or future technological aspects of transit-taxi service are highlighted. Our report then considers demographic characteristics of each service area including trip attractors, income, race, age, and population. The travel patterns of the service areas are also discussed under the "Demographic Characteristics" section. The final section of section 4 discusses the degree to which transit agencies have performed evaluations of their transit-taxi services.

While the 10 case studies represent a variety of localities, urban area sizes, service area demographics, and operational strategies across North America, they are not meant to fully represent the spectrum of services for all transit-taxis. The case studies instead represent a sample of unique and potentially useful characteristics that should be noted when considering an ideal California city for transit-taxi operation and service design strategy. Though limited in scope, these case studies have helped the team in understanding the variety of operating details that can be of significant value for future policy studies and pilot programs.

We also note that some case studies go beyond the strict definition of transit-taxis, either operating during high demand daytime hours (Houston), as a demand responsive service

(AATA), or as both a daytime and demand responsive service (Rimouski). Such cases are still of much value, since many lessons learned may be gained when studying and applying the specific reasons for success or failure of such transit-taxi operations and may serve as models for potentially successful business cases.

4.1 Background / Planning

The first section discusses the impetus for transit-taxi service, whether it was from within the agency, from ridership demand, external sources such as advice from universities, or safety concerns. These background questions also asked specifically which entities determined transit-taxi service. As illustrated in Table 2, 40 percent of transit-taxi operators began by internally deciding to go forth with a transit-taxi program. Of all operators, half of the impetus for the service originated from the community. Lastly, one transit-taxi operator was initiated by both the community and the transit agency.

TABLE 2 Transit-Taxi Origins

Agency Origins	Community Origins	Agency and Community Origins
OCTA	AC Transit (SF Bay)	King County DART (Seattle)
King County (Seattle)	Los Angeles MTA	
Rimouski, Quebec	Vancouver, Canada	
Houston METRO	AATA (Ann Arbor)	
	Boston MBTA	

Various entities helped to determine transit-taxi service as well. As shown in Table 3, half of all agencies were the sole planning entity responsible for transit-taxi service, while for the other five agencies, a variety of different institutions planned the service. For example, in the college town of Ann Arbor, Michigan, the university played a key role in calling for and then planning the city's transit-taxi service in order to foster a safer campus environment during late night hours. In the San Francisco Bay Area, both the Transportation and Land Use Coalition (TALC) community group and the AC Transit Citizens Advisory Committee helped with the planning of the transit-taxi service. In Los Angeles, the influential Bus Riders Union helped lobby and plan the transit-taxi night owl service. Mothers Against Drunk Driving (MADD) in the Boston area

were the key group helping to plan the late night transit-taxi service in order to primarily prevent college age drunk driving. In Orange County, California, the citizens' advisory committee portion of the agency assisted in planning the routes for the late night skeletal transit-taxi service.

TABLE 3 Entities Assisting with Transit-Taxi Service Planning

Agency	Entity
AATA (Ann Arbor)	University of Michigan
AC Transit	TALC, Citizens Advisory Committee (CAC)
Boston MBTA	Mothers Against Drunk Driving (MADD)
Houston METRO	Agency
King County (Seattle)	Agency
King County DART	Agency
Los Angeles MTA	Bus Riders Union (BRU)
OCTA (Orange County)	Citizens Advisory Committee (CAC)
Rimouski, Quebec	Agency
Vancouver	Agency

4.2 Transit-Taxi Service

The Transit-Taxi Service section highlights which the three categories of transit-taxi each agency operates, along with how the routes were selected. This section discusses details concerning vehicle size, years of service operation, frequency of operation, and times of transit-taxi operation.

4.2.1 Transit-Taxi Service Type

Based on the ten case studies, the most popular transit service type is Fixed-Route Skeletal service, occurring in six case studies. Fixed-Route Skeletal service utilizes existing transit stops but generally only operates on the most heavily utilized corridors during off-peak hours. The routing can take the form of exact route duplication of daytime routes, or some modified form as in the case of AC Transit, where buses that run across the San Francisco-Oakland Bay Bridge into the city of San Francisco and operate along an extended route in order to meet up with other agencies for timed transfers. In the case of Boston, MBTA buses operate on a system that is a modification of heavily used bus corridors and rail corridor paths.

Only Houston METRO operates a Fixed-Route Service with Deviation. This service operates as two independent six-mile bus routes with a half-mile route deviation zone throughout. Passengers could be picked up by waiting at standard bus stops or by flagging down a moving vehicle.

Two agencies operate a Hybrid/Feeder service - the Ann Arbor Transportation Authority and the city of Rimouski in Quebec, Canada. In each case the service is operated by taxis with an operating area bounded by the respective city limits.

4.2.2 Determining Transit Routes

Operators determine their transit routes primarily based on the most heavily traveled and longest transit routes. As shown in Table 4, six of the ten operators planned their transit-taxi routes based on these criteria, which in five cases represented the Fixed-Route Skeletal service type, and in the Houston METRO case represented a Fixed-Route Service with Deviation service type. Since Ann Arbor and Rimouski planned their service based on a Hybrid/Feeder point-to-point system, the entire city was used as the transit network. Lastly, King County's DART was planned in areas where demand was light but service still necessary and thus service was planned around low density areas. AC Transit planned their service along heavily traveled routes, but also based their service upon a modification of existing late night service, lengthening the service area in order to meet unmet rider demand.

4.2.3 Years of Operation

While some transit-taxi operators have been in operation for as many as 25 years, most in our sampling of case studies are relatively new, with one agency, AC Transit, is not yet in operation. As shown in Table 4, Los Angeles MTA, AATA, and King County have been operating transit-taxi services for the longest period of time, at 35, 22, and 25 years of operation respectively. Houston METRO, Vancouver Translink, MBTA, and OCTA have been in operation the shortest period of time, at 2, 2, 3.75, and 3.25 years respectively. Falling somewhere in the middle are King County DART and Rimouski, who have been in existence for 20 and 12 years, respectively.

4.2.4 Times of Operation and Service Frequency

As indicated in Table 4, most operators provide service throughout the late night, while two agencies – MBTA and Vancouver – provide limited night service. Three operators, Rimouski, King County DART, and Houston METRO provide service during daytime hours. Of the seven services operating during late night hours and limited night hours, six provide fixed-route skeletal service. For the two operators providing limited night service, both are fixed-route skeletal operators. Of the three daytime operators, two are feeder/hybrid, and one is fixed route skeletal with deviation.

Service frequency varies just as much as time of operation and service type. Some services operate hourly such as OCTA and MTA. Others operate more frequently with half–hour headways, such as AC Transit, MBTA, Vancouver, and King County. Two others – King County DART and Houston METRO – operate at various intervals more frequently than half hourly. Lastly, AATA and Rimouski operate on a demand responsive schedule, with waits as low as 20 minutes and 15 minutes, respectively.

4.2.5 Vehicle Size and Type

Six operators use standard 40 foot buses – AC Transit, King County, Los Angeles MTA, Boston MBTA, OCTA, and Vancouver. All of these services are also during night time and late night hours and operate as a fixed-route skeletal service. Two operators – AATA and Rimouski, Quebec utilize taxis. Both services are demand responsive and contracted. Standard 16-18 passenger vans are also utilized by Houston METRO and King County DART, which are both contracted services.

TABLE 4 Transit-Taxi Service Comparisons

	Service Design	Basis for Routes	Years in Service	Frequency and Times	Vehicle
AATA (Ann Arbor)	Hybrid/Feeder	Entire City	22	20 – 25 minute wait 11 p.m. – 6 a.m.	Taxi cab
AC Transit	Fixed-Route Skeletal	Planning/Existing Routes	NA	Su – Th hourly Sa – Su half hourly 12 a.m. – 5 a.m.	40' Bus
Houston METRO	Fixed-Route Service with Deviation	Planning/Heavily Traveled Routes	2	Frequent service M- F 6 a.m. – 6 p.m.; Sa-Su 12p.m. – 6 p.m.	Sedan; Van
King County (Seattle)	Fixed-Route Skeletal	Planning/Heavily Traveled Routes	25	Varies 8 p.m. – 5 a.m.	40' Bus
King County DART	Hybrid/Feeder	Low Density	20	30 minute average wait 5 a.m. – 10 p.m.	Van
Los Angeles MTA	Fixed-Route Skeletal	Planning/Heavily Traveled Routes	35	Half Hourly /Hourly 9 p.m. – 5 a.m.	40' Bus
MBTA (Boston)	Fixed-Route Skeletal	Planning/Heavily Traveled Routes	3 ¾	Half hourly Sa-Su 1 a.m. – 2:30 a.m.	40' Bus
OCTA (Orange County)	Fixed-Route Skeletal	Planning/Heavily Traveled Routes	3	Half hourly 12 a.m. – 5 a.m.	40' Bus
Rimouski, Quebec	Hybrid/Feeder	Entire City	12	On-demand, 15 minute average wait 7 a.m. – 7 p.m./9 p.m. (F & Sa)	Taxi cab
Vancouver	Fixed-Route Skeletal	Planning/Heavily Traveled Routes	2	Half Hourly 1:40 a.m. – 3:10 a.m.	40' & 50' Electric Trolleybus

4.3 Operational Strategies

This section discusses operational strategies ranging from whether or not service is contracted or operated directly, the terms of such contracts, and whether or not other for profit operators exist in the service area.

4.3.1 Contracting Details

Of all ten services, five are operated directly by the agency. Direct operating agencies include AC Transit, King County, Los Angeles MTA, Boston MBTA, and California's Orange County OCTA. The other five agencies – AATA, Houston METRO, King County DART, Rimouski, and Vancouver – contract out services. Agencies operating services directly provide the most basic service – fixed-route skeletal, while those contracting service out provide more flexible fixed-route deviation and feeder/hybrid service types.

4.3.2 Terms, Limitations, and Details of Contracting Agreement

For the five agencies contracting out services, details vary among the contracted parties.

Ann Arbor Transportation Authority

AATA updates their contracting agreement annually giving operators the option to request a subsidy increase and negotiate other details. Although the option to negotiate is yearly, the contract is usually renewed every 3-5 years depending on contract length. Only one company is utilized in Ann Arbor but the city allows multiple companies. In order to ensure an accuracy of reporting, operators are required by AATA to keep a dispatch log and trip log, which are submitted to the agency every month.

King County DART

In King County all 14 DART routes are contracted, due to an agreement with the transit union that allows for contracting of up to 3% of service hours. The sole company, Hopelink, is also responsible for providing Medicaid trips throughout King County.

Houston METRO

In Houston, three companies were used during the peak of FasTrak to provide service along the two corridors. Initially, a Request for Proposal was sent out to various operators to initiate the bidding process. Ultimately it was decided that only one operator at most should be used in each corridor. Tips were allowed but were rarely given.

Rimouski, Quebec

Transit-taxi service in Rimouski is contracted out to a private company named "Les Taxis 800 de Rimouski, Inc." The city uses a computer dispatching program to assign order to the received requests for service and transfers this ride sheet over to the company. Although multiple companies may provide transit-taxi service, the two companies that did exist in the city merged after Rimouski signed the initial contract with Taxis 800.

Vancouver TransLink

The City of Vancouver established the wholly owned subsidiary, Coastal Mountain Bus Company (CMBC) in 1999 as a way to provide more cost effective service that covers daytime routes and Night Bus routes. Despite a four-month long strike in 2001, TransLink continues to contract with CMBC, which is responsible for short range planning activities along with service operations.

4.3.3 Competition from Jitney Operators

The next section examines whether already existing private shared ride service conflicts with transit-taxi service. In almost all cases there were no private jitney operators with the exception of illegal jitneys in Los Angeles, which mostly operated during the day and did not conflict with night owl service.

4.4 Regulatory Environment

Depending on regulations, transit-taxi service may be limited severely or permitted through legislation and regulatory conditions. This section explores similarities, differences, and reasons for such variation in terms of federal, state, and municipal regulation, taxi cab regulation, labor complexities, jurisdictional cooperation, and institutional and political conditions.

4.4.1 Federal Transit Act Section 13 (c)

Federal Transit Act (FTA) Section 13(c), originally enacted in 1964, maintains that union jobs cannot be replaced by contracting already existing service out to private operators. For operators adding night service or suburban service, Section 13 (c) does not present a problem; however for those interested in cutting service hours, 13 (c) can become a stumbling block. For those

agencies that contracted service – AATA, Houston METRO, Vancouver TransLink, and Rimouski – Section 13 (c) may have been a barrier, but neither AATA nor Houston METRO replaced existing service. AATA added night service, and Houston METRO added additional daytime service. Rimouski and Vancouver did not qualify since Canadian labor law varies from U.S. Federal Transit Act laws.

4.4.2 Federal, State and Municipal Regulation Service Limitations

The various federal, state, and municipal regulations can also serve to either limit or encourage transit-taxi operations. As indicated in Table 5, most agencies must operate in some form of a regulated environment. Ann Arbor taxis must operate 24 hours a day due to city regulations, but transit-taxis were allowed an exception. The city of Houston did not legally permit jitney service for 70 years until legalization in 1995. Los Angeles faces regulation from the Consent Decree as a result of the lawsuit claiming that the MTA violated the Federal Title VI 1964 Civil Rights Act. In Boston, the state Pacheco law limits the contracting out of service provided by unionized operators. The regulations in Quebec Province over Rimouski limit the number of taxibuses to 42, just as normal taxi operators are limited in number in cities across North America.

TABLE 5 Federal, State and Municipal Regulations Affecting Transit-taxi Service

Agency	Regulation
AATA (Ann Arbor)	Municipal: 24 hour service requirement for taxis
AC Transit	None
Houston METRO	Municipal: Anti-jitney law
King County (Seattle)	None
King County DART	None
Los Angeles MTA	Municipal: Consent Decree
Boston MBTA	State: Pacheco Law limits contracting union jobs
OCTA (Orange County)	None
Rimouski, Quebec	State/Province: max of 42 taxibus vehicles operating in city
Vancouver	None

4.4.3 Taxi Cab Regulations

As mentioned in Section 4.4.2, various municipal and state regulations over taxis can serve to limit operations. In the case of the East Bay portion of the San Francisco Bay Area, King County, Los Angeles, Boston, OCTA, and Vancouver, shared ride taxis are not legal. In the case of the remaining operators, shared ride taxis are or were legal, yet still had a variety of regulations to operate in. In the case of Houston for example, shared ride jitney taxi drivers had to go through an extensive and costly insurance process, which served to severely limit transit-taxi operation. In Ann Arbor, the city was able to successfully circumvent the city ordinance requiring taxis to operate 24 hours a day.

4.4.4 Labor Group Involvement

Case study contacts indicated that most labor groups do not mind the addition of late night hours; however the threat of providing extra service contracted out to private operators is a matter of concern. As indicated in Table 6, some agencies such as King County DART, reach specific agreements with unions regulating the percent of service that can be contracted. In this case, 3 percent can be contracted to the private sector. In Houston, which is in a Right-to-Work state preventing mandatory union membership, unions have little power to prevent the addition of non-union contracted service hours. In Los Angeles, late night service cannot be contracted, since this would violate FTA Section 13(c). In Boston as well, service cannot be contracted due to strict Pacheco law regulations preventing labor from being contracted to non-union workers. In Vancouver, labor issues such as the 2001 strike do not result only from the fact that service is contracted, but perhaps contracting has much to do with the fact that cost cutting upsets labor unions.

Agencies such as OCTA indicated that labor groups actually enjoy additional hours, and support the extension of service into night owl service. When contracting is not an issue, labor groups tend to generally hold this perspective, since there are more hours available for drivers to work.

TABLE 6 Labor Group Involvement

Agency	Labor Issues
AATA (Ann Arbor)	NA
AC Transit	NA
Houston METRO	Right to Work State – Unions opposed but had little power
King County (Seattle)	3% can be contracted
King County DART	3% can be contracted
Los Angeles MTA	Can't contract existing service
Boston MBTA	Pacheco – state law; unions didn't care either way when service was cut
OCTA (Orange County)	NA
Rimouski, Quebec	NA
Vancouver	Contracting limitations

4.4.5 Inter-Jurisdictional Coordination

Transit-taxi service can be constrained due to inter-jurisdictional coordination issues that arise during the planning and operations process. Perhaps the strongest illustration is in the San Francisco Bay Area where the lack of participation in the regional coordinating ad hoc policy group on the part of San Mateo County Transit District (SamTrans), possibly resulted in efficiency difficulties. This is because SamTrans did not reroute service to align stations and transfers with AC Transit buses, and instead chose to operate on a separate route. Also in the case of the Bay Area, San Francisco MUNI chose to cooperate with AC Transit by allowing it to route deeper into MUNI's service area, 2 miles beyond the Transbay Terminal. The OCTA could have faced inter-jurisdictional coordination problems because their service area overlaps with Long Beach Transit and LA MTA; however coordination prevented any routing limitations. Many agencies however due to the geographic scale of operations do not have to worry about cooperation with other jurisdictions as is the case with AATA, whose service area is the entirety of the city of Ann Arbor, and Los Angeles MTA, whose service area is Los Angeles County.

4.4.6 Institutional and Political Conditions

Institutional conditions that could preclude transit-taxi service include (1) managerial reluctance, (2) unfamiliarity with transit-taxi programs, and (3) lack of council/commissioner support. A strong institutional history certainly can facilitate the continuation of service, as is the case of AATA and Vancouver, who each have 23 and 30 years of service respectively. Strong internal support such as was indicated with OCTA have also lead to the support and continuation of transit-taxis, even when little community pressure was present on the agency. In the case of Houston METRO and MBTA, lack of agency support, along with many other variables, certainly helped to contribute to the decision to discontinue service.

4.5 Financing

This section discusses three aspects of transit-taxi finance. First, the source of financing, subsidy levels and fare returns are examined. Second, the strategies agencies use to deal with increased costs of service are discussed. Lastly, any innovative financing mechanisms used by the ten services are explored.

TABLE 7 Transit-Taxi Finance

	Finance Source, Subsidy Levels, Fare Returns	Costs Compared to Normal Operations	Innovative Financing Mechanisms
AATA (Ann Arbor)	Source: General Budget Subsidy: $10.05 Farebox Recovery: 25%	Systemwide Subsidy: $3.25	Property Tax
AC Transit	Source: Regional Measure 2 (Bridge Toll) Subsidy: NA $1.2 million budgeted Farebox Recovery: NA	Systemwide Subsidy: $2.65[3]	Bridge Toll
Houston METRO	Source: General Budget Subsidy: $25/taxi/day ($0.56/passenger trip) Farebox Recovery: NA	Systemwide Subsidy: $2.78	Contracting
King County (Seattle)	Source: General Budget Subsidy: $9.78 Farebox Recovery: 25% (systemwide)	Systemwide Subsidy: $3.40 Systemwide Farebox Recovery: 25%	NA
King County DART	Source: General Budget Subsidy: $5.34 Farebox Recovery: 8%	Systemwide Subsidy: $3.40 Systemwide Farebox Recovery: 25%	Contracting
Los Angeles MTA	Source: General Budget Subsidy: NA Farebox Recovery: NA	Systemwide Subsidy: $2.14[7]	No
Boston MBTA	Source: General Budget Subsidy: $7.53 Farebox Recovery: NA	Systemwide Subsidy: $1.08[4]	No
OCTA (Orange County)	Source: General Budget Subsidy: $7.00 Farebox Recovery: 8.5%	Systemwide Subsidy: $2.48[6]	No
Rimouski, Quebec	Source: General Budget Subsidy: $1.70 (US$1.48) Farebox Recovery: 44%[1]	Subsidy: $1.70 (US$1.48) Farebox Recovery: 44%[1]	No
Vancouver	Source: General Budget Subsidy: $3.00[2] (US$2.62) Farebox Recovery: (data forthcoming)	Systemwide Subsidy: $0.64 (US$0.56)	$0.12/Liter Fuel Tax, Parking Tax
SYSTEM AVERAGE	Subsidy: $4.78 Farebox Recovery: 21.4%	Systemwide Subsidy: $2.32	

1. "De-Regulation of the Taxi Industry", Denis Cartier, Quebec Ministry of Transport, 2005
2. "Night Bus: General Public, Rider and Stakeholder Interviews, Greater Vancouver Transportation Authority, 2005.
3. Alameda-Contra Costa Transit District System Wide Information, 2001.
4. "Night Owl Service Plan", MBTA, Central Planning Staff, pg. 12.
5. http://www.ntdprogram.com/NTD/Profiles.nsf/2004+30+Largest+Agencies/6008/$File/6008.pdf
6. http://www.ntdprogram.com/NTD/Profiles.nsf/2004+All/9036/$File/9036.pdf
7. http://www.ntdprogram.com/NTD/Profiles.nsf/2004+All/9154/$File/9154.pdf

4.5.1 System Financing, Subsidy Levels, Fare Returns

As indicated in Table 7, most financing is through the same operations budget as normal transit service, with the exception of AC Transit, funded through the passage in 2004 of Regional Measure 2, which funnels a percentage of the bridge tolls. The highest subsidy is found with AATA at $10.05, followed by King County at $0.78, MBTA at $7.53 and OCTA at $7.00. The lowest subsidy is found with Houston METRO - $0.56, and Rimouski - US$1.48. Due to differences in operational strategy and service type, comparing subsidies only provides a sketchy picture of different service costs. It would be expected that contracted services are at a lower subsidy, which is seen in the cases of Houston METRO and Rimouski. AATA, although contracted, operates during very low demand hours, and thus, costs are relatively high. Most comparable perhaps is King County Night Owl, MBTA, and OCTA, since all three are late night fixed route skeletal in-house service. For all three, operations subsidies are relatively close, for the limited sample size of case studies. Farebox recovery rates vary, ranging from a low of 8% for King County DART to a high of 44% in Rimouski. For all operators, the average (mean) subsidy was $4.78, and the mean farebox recovery ratio was 0.214 (21.4%).

TABLE 8 Ranking by Subsidy per Unlinked Passenger Trip

	Agency	Operations Subsidy
1.	**AATA**	$10.05
2.	**King County Night Owl**	$9.78
3.	**MBTA**	$7.53
4.	**OCTA**	$7.00
5.	**King County DART**	$5.34
6.	**Vancouver**	$2.62
7.	**Rimouski**	$1.48
8.	**Houston METRO**	$0.56
9.	**AC Transit**	*NA*
10.	**LA MTA**	*NA*

4.5.2 Agency Strategy to Deal with Increased Costs of Service

Most agencies indicated that since they use their general budget to fund transit-taxi programs, they merely allocate monies appropriately. When required to provide more night service agencies squeeze the maximum they can out of existing revenue, and make staff cuts if necessary. AC Transit represents an interesting case to follow once "All Nighter" service begins to see how Regional Measure 2 funds are allocated if costs increase beyond forecasts. Many agencies deal with increased costs in two main ways – either through fare increases or service cuts. AATA has dealt with increasing costs through increasing fares, to their current $5.00 level. The MBTA also attempted to deal with increasing costs of service by increasing fares, but ultimately was unable to keep costs steady. Agencies such as LA MTA who are mandated to keep fares at $0.75 must either cut costs elsewhere or cut agency staff.

4.5.3 Innovative Financing

Due to the higher costs of providing transit service during late night and in low demand areas, innovative financing represents an under-pursued avenue for exploration. Of all ten case studies, only AC Transit has a dedicated stream of financing. In addition to typical sales tax financing, some agencies such as Ann Arbor have a property tax stream of financing, while some agencies such as Vancouver have a dedicated fuel tax. Perhaps the best innovation in financing is contracting and shifting the burden to the private sector, which in the case of Houston METRO for example, yielded extremely low subsidies ($0.53 / passenger). Shuffling of the burden to the private sector also may not prove to be the most sustainable over time, since without proper subsidy, operations are too expensive to continue profitably and the result is bankruptcy.

4.6 Fare Payment Structure

This section illustrates three aspects of fares – (1) how fare structures are determined, (2) whether or not transit-taxi fares are different from standard service fares and why this is the case, and (3) how customers react to fare changes in terms of ridership and customer feedback. Table 9 illustrates these fare differences and explanations of the logic behind such fare differences if available.

TABLE 9 Standard and Transit-Taxi Fares and Fare Structures

	Transit-taxi Fare	Normal Service Fare	Determining Fare Structure
AATA (Ann Arbor)	$5.00	$1.00	At first – double daytime fare; now, slightly higher
AC Transit	$3.00	$3.00 Transbay	Same as daytime
Houston METRO	$1.25 & $1.00	$1.00	Same as Bus
King County Night Bus (Seattle)	$1.25	$1.25	Same as regular service
King County DART	$1.25 ($1.50 peak one zone)	$1.25 ($1.50 peak one zone)	Same as regular service
Los Angeles MTA	$0.75	$1.25	40% discount from daytime ($.75)
Boston MBTA	$1.50 owl bus; $2 RailBus	$1.25 rail (base fare), $0.90 bus	60% more than rail
OCTA (Orange County)	$1.25	$1.25	Same
Rimouski, Quebec	$2.90 (US $2.52)	$2.90 (US $2.52)	Same service
Vancouver	$2.25 (US $1.96)	$2.25 (US $1.96)	Same – no additional zone surcharge

4.6.1 Determining Fare Structure

As a result of the differences in size, economies, transit dependency rates, levels of service, and unionization, we would expect fares across our sampling to show much variation. Instead however, we find that $1.25 appears quite frequently - 4 of 10 cases, and in fact, 6 of 10 cases are $1.50 or below. Due to limited sample size, it is unclear to what degree coincidence played in the similarity of fares. In these cases, fares are the same, or nearly the same as daytime standard service fares. In the case of LA MTA, nighttime fares represent a 40% discount from daytime fares. AATA fares have typically always been double that of normal daytime fares, until recently, when fares were increased due to low ridership and increased costs. Many agencies also utilize zone fares, such as Vancouver, MBTA, and King County. Vancouver however, discontinues zone pricing during nighttime service. Of all agencies, fares for AATA, Boston MBTA, and Rimouski are most closely tied to costs of service provision. Fares in all three cases underwent price adjustments to reflect increased costs.

4.6.2 Regular Versus Transit-Taxi Fare Prices

Whether we should expect higher night fares is something of a matter for debate. Initially it was expected that transit-taxi fares would all be higher than daytime fares, since operating costs, particularly labor costs are higher at night. However, most fares are either entirely or nearly the same. This is due to the fact that in many cases transit-taxi service is mandated by community pressure in order to meet the needs of the late night transit dependent working populations. In only one agency are transit-taxi fares significantly higher than normal service fares. In fact, transit-taxi fares are 500% higher in this single case for AATA - $1.00 compared to $5.00. In one case, LA MTA, the transit-taxi fare was actually reduced - $0.75 compared to $1.25 – due to the Consent Decree which mandates more frequent bus service and lower fares.

4.6.3 Customer Reactions to Fare Increases

Of all ten transit-taxi cases, fare increases were only experienced for three operators – OCTA, AATA, and MBTA. When fares increased from $0.75 to $1.50 in 2003 for MBTA ridership remained the same. When OCTA increased fares in 2005, ridership actually continued its increasing trend, partly due to the rising numbers of employment in the county. In the case of AATA, the recent fare hikes from $2.00 to $3.00 and now $5.00 since 2002 have corresponded to a dramatic ridership decreases, halving ridership from 57,100 to 24,300 annual trips. Lastly, in a Vancouver TransLink study, which examined hypothetical fare increase scenarios, it was predicted that increasing fares to $2.50 would leave the ridership behavior of 79% unaffected, and that an increase to $3.00 would leave 73% unaffected.

4.7 Technology Applications

We found that technological innovations are heavily underutilized among the transit operators interviewed, when in many instances, such innovation could lead to tremendous cost savings. It is common that operators are reluctant to try out new technological approaches mainly because new technologies incur an initial startup cost of capital, and costs of familiarization with the equipment. Not surprisingly, technology is most utilized by taxi companies who dispatch operators to pick up requests for service in the most efficient manner.

Ann Arbor and Rimouski taxis in particular utilize these technologies, along with the feeder/hybrid service that King County DART provides. Houston METRO service, although

operated in automobiles and vans in a route deviation zone, did not utilize any advanced technologies. Operators are slowly adapting global positioning satellite (GPS) technologies as a way to determine where vehicles are and that transfers are timed adequately. This is the case for: OCTA, LA MTA, and AC Transit. Lastly, some non-routing technology is used such as OCTA's use of solar-powered flashing lights at bus stops to alert drivers that passengers are waiting for pickup during late hours.

4.8 Demographic Characteristics

The demographic characteristics section examines three main topics discussed during the interviews: 1) Demographics of the service area including income, population, race, gender, age, worker population, and student population, 2) Travel patterns of transit-taxi patrons, and 3) Trip attractor locations among the 10 case study sites (See Table 10).

TABLE 10 Demographics, Travel Patterns, and Trip Attractors

	Demographics	Travel Patterns	Trip Attractors
AATA (Ann Arbor)	Students, Workers (75%)	Dispersed	Low income housing, university area
AC Transit	Students, Workers, Late night partiers	Downtown San Francisco to UC Berkeley	Downtown San Francisco, Oakland, UC Berkeley
Houston METRO	Heavily traveled corridor	Linear corridor	Downtown, Uptown Galleria, Westchase, Medical Center
King County (Seattle)	Low income, Late night workers, Students	NA	NA
King County DART	Workers, Seniors, Students	Neighborhood circulator pickup and drop off at park and ride lots during AM hours	Commuter park-and-ride lots, senior homes, schools, shopping areas
Los Angeles MTA	Workers	NA	Downtown (for transferring)
Boston MBTA	Young 20s crowd, Students, Few workers due to weekend service only	Colleges to downtown; Rail system patterns	Downtown, College Campuses, Rail Stations
OCTA (Orange County)	Hispanic, Low Income, Workers	Work to Home	Transfer points, Anaheim Resorts, Brea Mall, Verizon
Rimouski, Quebec	Students, those without cars	Dispersed	NA
Vancouver	Students, Workers	Downtown to Universities	Downtown, College Campuses, Hospitals

4.8.1 Service Area Demographics

Most night transit-taxi services transport students and late night workers. These include AATA Night Ride, AC Transit, King County, Rimouski, and Vancouver. Those who indicated that they served primarily late night workers only were LA MTA and OCTA, both in Southern California where transit use is patronized primarily by the transit dependent. Lastly, only MBTA focused primarily on serving the college student and 20-something crowd and, thus, only operated during weekends.

As AATA has increased its fares, they have reported a sort of shift towards more of a worker-dominated rider base of approximately 75% workers. AATA indicated that such a change is a result of the fact that service now is only used by primarily the transit dependent.

4.8.2 Travel Patterns of Transit-Taxi Riders

Quite a few agencies indicated that travel patterns generally followed a downtown to college route and vice versa. These agencies include AC Transit, MBTA, and Vancouver. AATA and Rimouski who operate more of a point-to-point transit-taxi service, indicated that the primary travel patterns were dispersed. OCTA service primarily served trips originating from work and traveling towards home. King County indicated that their DART service primarily acted as a feeder service in lower density outlying areas towards the park and ride lots for commuters. Lastly, in the case of Houston METRO, due to the linear nature of the corridor, most trips were obviously linear in nature.

4.8.3 Trip Attractors

As indicated in Table 10, downtown areas are one of the strongest trip attractor locations, despite the fact that, many American downtown areas continue to lose population and employment. Downtown was indicated as a trip attractor for AC Transit, Houston METRO, LA MTA, MBTA, and Vancouver. College campuses also represented another primary trip attractor as in the case of AATA, AC Transit, MBTA, and Vancouver. Not surprisingly, downtown and college trip attractors are found together much of the time due to downtown night life destinations among the college age crowd. Shopping destinations were also a common answer, found in three of 10 agencies – OCTA, Houston METRO, and King County DART. Insight may also be gained from the appearance of hospitals for Houston METRO and Vancouver as a destination, as well as low income areas for AATA.

4.9 Evaluation

Given the high costs of transit-taxi operations compared to typical transit costs along with the heightened level of program scrutiny by the public and internally, it was unexpected that operators rarely conducted program evaluation reports to determine the effectiveness of their transit-taxi programs. In many cases, operators only conduct evaluations if necessary, especially

in the case that they are mandated by court agreement or community pressure to provide additional service. Operators also indicated that evaluations are rare because of the perception that transit-taxi programs are not cost effective compared to traditional fixed route service and the fact that many of the times transit-taxi operations represent such a miniscule aspect of overall service that their costs are not on the whole significant. This section will examine three aspects of program evaluation – (1) whether or not a program evaluation has been conducted, (2) just what type of ridership exists for transit-taxis, ridership for system wide service, and the ridership base in the service area population, and (3) transit-taxi ridership trends. Table 11 illustrates these characteristics.

TABLE 11 Program Evaluation, Ridership, and Ridership Trends

Agency	Evaluation	Ridership Trends	Transit-taxi Weekday Ridership	System wide Weekday Ridership (Inc. transit-taxi)	Service Area Population
AATA (Ann Arbor)	No	Decreasing	81 (0.4%)	19,100[9] (16.8%)	114,000
AC Transit	NA	NA	NA	230,000[5] (13.6%)	1,409,000
Houston METRO	No	NA	160 (0.1%)	293,900[6] (11.9%)	2,457,673[11]
King County Night Owl(Seattle)	No	Increasing	245 (0.1%)	231,200[7](12.9%)	1,788,300
King County DART	No	Varies	2058[10](0.89 %)	231,200 (12.9%)	1,788,300
Los Angeles MTA	No	NA	NA	1,186,957[4] (12.1%)	9,800,000
Boston MBTA	1st year evaluation	Slight Decrease	1,230 per day[3]	1,100,000[2] (24.4%)	4,510,500[12]
OCTA (Orange County)	No major report (just monthly)	Increasing	617 (0.3%)	228,333[1] (8.3%)	2,751,791
Rimouski, Quebec	Yes; 2005.	Increasing	270 (100%)	270 (.66%)	41,000
Vancouver	Yes; 2005.	NA	NA/	894,323[8]	2,200,000

NOTES:
All annual ridership figures are converted to daily figures by a correction factor of 1/300.
1.OCTA 2004 Annual Report
http://72.14.203.104/search?q=cache:pBU6p4vPFtwJ:www.octa.net/pdf/2004_octaannual.pdf+octa+ridership&hl=en&gl=us&ct=clnk&cd=1&client=firefox-a
2. Personal communication with MBTA, 11/9/2005
3. "Night Owl Historical Information" Document, provided by MBTA Planning Department
4. "Bus Ridership Estimates", http://www.metro.net/news_info/ridership_avg.htm
5. "Ridership, Bus Fleet, and Service", http://www.actransit.org/aboutac/ridershipbusfleet.wu
6. "Largest Bus Agencies Transit Ridership Report", http://www.apta.com/research/stats/ridershp/riderep/documents/05q3bus.pdf
7. *ibid*
8. "APTA Transit Ridership Report" , http://www.apta.com/research/stats/ridershp/riderep/documents/05q3can.pdf; Average of 3 months and then annualized.
9. ""APTA Transit Ridership Report", http://www.apta.com/research/stats/ridershp/riderep/documents/05q3rep.pdf
10. "Hopelink Facts", http://www.hope-link.org/newspress/facts, 2005. FY 2004.
11. www.ntdprogram.com/NTD/Profiles.nsf/1996+30+Largest+Agencies/6008/$File/P6008.PDF -
12. http://www.ntdprogram.com/NTD/Profiles.nsf/2004+30+Largest+Agencies/1003/$File/1003.pdf

4.9.1 Existence of Program Evaluations

Surprisingly, little evaluation has been conducted for transit-taxi programs beyond either monthly reports, or basic ridership and cost monitoring. The only agencies with more

comprehensive program evaluations include Rimouski, Vancouver, and MBTA. OCTA maintains that is produces smaller monthly program evaluations of its night owl service. For the rest of the six agencies, no contact person we spoke with indicated that any large scale formal program evaluation had been conducted. Such a dearth of evaluation is likely due to the fact that either

- The program has been around for many years and evaluation is not necessary (AATA, King County night owl),
- Little agency desire for the program exists in the first place and political conditions mandate the transit-taxi program regardless of cost efficiency (LA MTA),
- The transit-taxi program is relatively new, is a pilot program, or little data exists (OCTA, AC Transit, Houston METRO),
- Transit-taxi services comprise a very small aspect of overall agency operations and are normally considered low priority services.

4.9.2 Ridership

Ridership among operators varies according to service area size, demographics, and length of program existence, and of course many other variables, as outlined in Table 11. System wide for existing data, transit use is particularly high in the service areas of MBTA (24.4%), AATA (16.8%), AC Transit (16.3%), King County (13.6%), MTA (12.1%), Houston METRO (11.9%), and OCTA (8.3%). Transit-taxi usage normalized to system wide ridership produces very low ridership with a few exceptions. King County DART and AATA are actually the largest agencies providing transit-taxi service as a percentage of all transit service – 0.89% and 0.4%, respectively, followed by ridership on OCTA, Houston METRO, and King County night owl transit-taxi service: 0.3%, 0.1%, and 0.1%, respectively. This calculation of course excludes Rimouski, where all service is provided by transit-taxi operations.

4.9.3 Transit-taxi Ridership Trends

Some transit-taxi agency operators have experienced increases in ridership, while others have experienced decreases, and even others with extremely uncertain or missing overall results. Those experiencing an increase include King County Night Owl, OCTA, and Rimouski. King County Night Owl service operates on six bus routes five of which emanate from downtown

Seattle in hub-and-spoke fashion while the sixth route circumnavigates downtown and crosses the other five Night Owl routes. Cumulatively, ridership on these six routes has increased approximately 15% over a 15-year period between 1989[1] and 2004. According to King County officials, this increase is likely due to a 20% increase in overall regional population over the same time period. Interestingly, while there was an increase in service hours for non-Night Owl routes, there were no changes to Night Owl service over this same period. According to OCTA contacts, ridership continues to increase due to population and job growth in Orange County. According to Rimouski, ridership increases there are likely due to recent increases in service area into southern and eastern parts of the urban area. Those experiencing a decrease in ridership include AATA and MBTA. AATA most likely experienced a decrease due to the 66.7% fare hike just recently in Fall of 2005, along with a fare hike not to long before that. MBTA ridership decline is most likely due also to the fare hike which doubled fares from $0.75 to $1.50 before service was eventually discontinued. Those experiencing neither an obvious increase nor decrease include King County DART. Data was unavailable for AC Transit (due to program delay until March 2006), Houston METRO, LA MTA, and Vancouver.

4.10 Lessons Learned

The following observations are based only on a small sample of transit agencies with transit-taxi experience for which we conducted numerous site-specific case studies. Thus caution should be used in interpreting these observations more broadly than intended.

Factors contributing to creation and continuation of programs for targeted operators include,

A. Strong agency support
B. Supportive demographics
C. Large service area
D. Community pressure.
E. Labor flexibility
F. Fares Supportive of Stable/Increasing Ridership

A. Agency support in the case of OCTA, King County, Rimouski, and AATA have helped both to initiate transit-taxi programs and to support their continuation. Transit-taxi programs in case studies where agency support was minimal led in part to the decision to terminate the transit-taxi,

[1] 1989 and 2004 are, respectively, the earliest and latest years for which data was available.

as in the cases of Houston and MBTA. Since continuation or termination of transit-taxi programs is ultimately up to the agencies themselves, strong agency support is critical for program continuation.

B. Supportive demographics such as strong employment growth, a significant student population, and a sizable late night labor force also have resulted in the success in various transit-taxi programs. Those with employment growth include King County Night Owl, King County DART, and OCTA. Those with sizable student populations include Rimouski, AATA, and Vancouver. Lastly, many transit-taxi case studies indicated that the major or one of the major ridership demographics was the late night labor force. These agencies include AATA, AC Transit, King County Night Owl, Los Angeles MTA, OCTA, Vancouver, and Rimouski.

Employment

Agencies with rising employment also tend to correspond with higher regional population growth, which provides more of a ridership base. In the case of OCTA where population and employment growth have been significant, 5% in the last 5 years (2) and King County, where population growth has been 15% from 1990 – 2000 (3), ridership has also increased correspondingly.

Student Population

High student populations certainly contribute to the success of transit-taxi services. These populations are low in automobile ownership and high in relatively percentage of late night trips. Rimouski, a city of 41,000 contains a student population of 2,500. Ann Arbor, a city of 114,000 contains a separately counted student population of 42,000. Choosing an area for a transit-taxi pilot program with a high student population would certainly contribute to a sizable stable ridership element.

Late Night Work Force

Many case study agencies with transit-taxi programs are large cities which subsequently have a significant population working late night shifts. For medium sized cities such as Ann Arbor and

Rimouski, the late night work force is sizable enough as well to make up a significant component of the ridership demographic.

C. Large Service Area Population

While not all very large urban areas were surveyed, for those that were, the very fact of their size indicates that the size was a major contributing factor to transit-taxi creation and continuation. The very large urban areas of Los Angeles, Orange County, the San Francisco Bay Area, along with large urban areas of Vancouver and Seattle, all indicate the transit-taxi operations can not only thrive, but are a necessity in such large areas.

D. High Community Demand

Pressure from the community certainly is a significant factor for many agencies in the creation, expansion, and maintenance of transit-taxi services, as in the cases of LA MTA, AATA, and AC Transit. The Bus Riders Union in Los Angeles put pressure on the MTA to expand service and focus more on bus operations as opposed to the more highly subsidized rail projects begun in the late 1980s and early 1990s, resulting in a night fare drop to $0.75 and nighttime service expansion. Pressure from the University of Michigan, Ann Arbor and community safety groups around late night safety concerns led to the implementation of AATA late night transit-taxi service. Prior to such pressure, no service was in existence. In the case of AC Transit, community pressure from a coalition group representing over 90 community, environmental, social, and transit interests led to the creation of enhanced late night service which lengthens and consolidates routes, and shortens headways on existing service. Alongside community pressure, is University support, in the cases of Rimouski, AATA, and Vancouver. Such support is lasting, powerful, and a main contributing factor to transit-taxi success.

D. Labor Flexibility

The degree to which unionized labor if supported or contracted out to private operators can significantly contribute to or lessen the success of transit-taxi operations. In Houston, where Right to Work laws lower the power of unions to prevent contracting, the legalization of jitney operations at first had a successful effect on lowering METRO's per passenger subsidy levels significantly, but later on, because labor lacked the power to demand higher reimbursement from

METRO for operations, they eventually were forced out of business due to lack of profitability. In the case of MBTA, the lack of flexibility in contracting out union jobs due to the Massachusetts State Pacheco Law, prevented the agency from searching out more cost effective means of providing the increasingly costly night service, eventually resulting in the termination of Night Owl operations.

E. Fares and Ridership

Increased ridership, and thus the success or failure of transit-taxi programs is also to a significant degree based on relatively low fares. Ridership in Ann Arbor has been reduced by 50% since fares increased from $2.00 to $3.00, and with the recent jump to $5.00, ridership may very well halve again. Such responses to ridership drops can prove to be problematic, leading to self destructive cycle of ridership drop-fare hike-ridership drop-fare hike patterns. In the case where ridership is relatively inelastic and continues to increase despite fare hikes, such as OCTA, ridership hikes should still be carefully done to not initiate the vicious cycle. Lastly, in the case of Houston METRO's FastTrak program, fares became somewhat of an inhibitor to success. Private operators were told to keep fares at the same level METRO did, but METRO would not subsidize the private operators nearly the amount necessary to break even, which is amount METRO is normally subsidized by the public.

5.0 NEXT STEPS

Thus far in the study we have performed a review of the literature and conducted a small number of site-specific case studies for transit agencies identified from the literature review as either currently having or in the past having had transit-taxi service implemented in their agency's jurisdiction. Currently, we have a partial understanding of characteristics we are interested in.

For the next stage of the project, we will conduct a nationally-focused web-based online survey of U.S. transit agencies to continue to expand our understanding of the characteristics contributing to or detracting from successful deployment of transit-taxi services. Such characteristics include physical/geographical, socio-demographic, operational, organizational/institutional, financial, and technological considerations. For this component of

the study, we focus on the following issues for which the enclosed survey is being administered to fill the gaps in our understanding:

- Acquiring a more representative U.S. sample identifying characteristics contributing to or hindering successful deployment including physical/geographical, socio-demographic, operational, organizational/institutional, financial, technological, and labor considerations.
- Identifying the most significant factors contributing to ultimate decision-making whether or not to implement
- Understanding why transit agencies ultimately rejected implementing transit-taxi service after considering it.
- Identifying factors that must change for future consideration to be possible
- Gauging agencies' level of interest in implementing this service

The product of this component of the research will be a recommended profile of transit agency/community candidates for ultimate selection of a specific transit-taxi Pilot Field Test site in California.

REFERENCES

1. Factor, R.J. and Mark A. Miller, "Improving Mobility Through Enhanced Transit Services: Review of the Literature for Transit-taxis", California PATH Working Paper, UCB-ITS-PWP-2006-6, California PATH Program, University of California, Berkeley, May 2006.
2. State and County QuickFacts, Orange County, http://quickfacts.census.gov/qfd/states/06/06059.html.
3. State and County QuickFacts, King County. http://quickfacts.census.gov/qfd/states/53/53033.html.

APPENDIX A: TRANSIT-TAXI SURVEY

WHO IS IT

1. What is your position in the agency? How long have you been working there?

2. Do you mind if we use your name? If you don't feel comfortable with us using your name, would it be acceptable if we referred to your agency by name in our report?

TRANSIT-TAXI CONCEPT

3. Do you provide a transit-taxi service (based on our three concepts)?

4. How did your agency decide to operate this type of service? Consulting company, based on other agencies operations, etc.?

5. Who made these decisions and when?

6. How involved/ instrumental was the public and determining the implementation of night bus and/or weekend service?

7. When and at what times specifically do you provide these services (e.g., at night or weekends)?

8. Can you describe how the system was designed and implementation efforts.

9. What vehicle types do you use? What are their capacities? Do you use these vehicles for any other purposes?

OPERATIONAL STRATEGIES

10. Does your agency operate this service or contract out this service?

11. What are the terms, limitations and details of the contracting agreement (if this is the case)?

12. Are there other private, for profit (jitney-like) operators providing this service?

13. Are there institutional or political conditions preventing or facilitating the use of this service?

14. How is the system financed? Subsidy levels? Fare returns?

15. How do the subsidies of this service compare with other services you offer? Do you anticipate that the service will continue in the coming years?

FARE STRUCTURES

16. What fare do you charge for this service? How does it compare with your regular fixed-route service? How do the fares compare with local taxi service?

17. How did you go about determining your fare structure?

REGULATORY CONDITIONS/ POLICIES

18. Do you charge the same fare for this service as for your other services?

TECHNOLOGY APPLICATIONS

19. Are there any advanced technology systems that contribute to your system?

DEMOGRAPHIC CHARACTERISTICS

20. Can you describe the demographic characteristics of the area where your agency provides service and please explain what characteristics you believe are especially relevant to the success or failure of your taxi transit service?

EVALUATION METHODS

21. Were feasibility studies conducted prior to the initiation of this service? If so, who funded these?
22. How do you evaluate the services? Can you explain this process a little and explain what you have found.

CUSTOMER RESPONSE

23. How have you done the marketing for the service to 1) teach customers how to use the service, 2) convince them it's better and 3) ensure safety and reliability?
24. If you have changed the level or structure of fares for this service after it was initiated, what was the nature of these changes, and how did you users respond to them?

<u>Agency Specific</u>

Vancouver TransLink:

- Operates full size buses?
- All in-house? Why not contract out?
- Have had to cut routes or reduce service hours?
- Latest news about the strike?
- Coquitlam expansion happened?
- Can we see report prepared by Urban Systems?

- Discuss demographics (population, specific ridership numbers) – can look at the census. Who are your riders?
- Talk about Innovative arrangements if existent?
- Technology if applicable – any special technology?
- Evaluation data if available?

Seattle Specific
- Does link still exist? Who implemented the city or the transit agency?

MTBTA
- Do your night buses deviate from the fixed route?
- What time does your service start

SBS/Singapore
- Does the bus service have deviations or hybrid style?
- Has the SMS technology been reviewed yet? If so, will it be implemented into other bus services?

Rimouski
- In the initial test phase to determine most efficient service, the city determined operating buses would be most expensive, but were only full-size buses considered or did they look at smaller vehicles as well?
- Was a private operator always in place before the taxi system?

Houston Metro
- Need to understand better how jitneys turned into FasTrak services.

City of Madison
- What happened after the 1979 feasibility study?
- Is the State of Wisconsin Mass Transit Demonstration program the same as UMTA?
- What are Madison Metro's operating hours?

Bart
- In 2001, The Metropolitan Transportation Commission (MTC) concluded a study to determine whether enough people would use a late-night service to make it feasible. Need more details (from BART, MTC or AC Transit) to get the details of the study.
- http://www.bart.gov/guide/destinations/index.asp (Stats on nighttime riders?)

Germany
- (VRS http://www.vrsinfo.de/eng/index.php (good website) in Cologne /Bonn region,