

**A FRAMEWORK FOR COLLABORATION IN PUBLIC  
TRANSIT SYSTEMS**

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**INTRODUCTION**

As the financial position of transit worsens and transit operators seek means to improve their cost effectiveness, the question of transit organization becomes important. Can the cost effectiveness of single service transit operators within a region be improved if the service is provided through some form of collaborative arrangement? Can the cost effectiveness of single-service transit operators within a region be improved if these services are provided by a multi-service consolidated transit system? Three sources of potential economies may arise from collaboration. First, by collaborating participating systems might experience economies of scale. Second, duplicate services can be cut and third, economies of scope may be realized. Despite these economies, impediments may exist in the formation of a collaborative arrangement designed to provide consolidated services. These impediments include inability to agree on cost sharing, the existence of large sunk costs, and predatory behavior including threats of firms not cooperating in terms of interlining of passengers, and charging passengers who interline high fares. Other impediments include fears of unions regarding possible job losses, federal labor protection requirements, internal resistance, lack of support of political leaders and possible increases in deficits.

Collaboration takes various forms, one involves transit firms in an area coming together to merge their operations (a merger). Another involves adjacent municipalities operating their independent transit systems agreeing to jointly provide certain transit services while maintaining their independent identities (an alliance). Collaboration may also take place when a larger transit system decides to contract out certain services to an independent contractor for the purpose of cost saving (contracting). Still another form of collaboration is consolidation which occurs as a result of a mandate of state legislature.

Though consolidation and collaborative arrangements have existed for many decades, their effective management continues to be a challenge to participating transit firms and municipalities (Business Week, July 21, 1986; Killings, 1982; ). Often when proper management structures are not designed to effectively manage the consolidated arrangement, the potential for shared benefits evaporates and the intended purpose remains unaccomplished (Lei & Slocum, 1991). Viton (1992) studied the cost effectiveness of forming large multi-service transit systems. He found that it is cost effective to consolidate single-mode systems into multi-modal systems if wages are unaffected by the consolidation.

Even though collaborative arrangements have been in existence for some time, there is still very little empirical evidence to answer the questions that managers of such systems face, especially in public transit systems. For example, how are costs and benefits shared?; what agreement must be made to assure smaller participating firms or municipalities that their voices will be heard and their concerns and interests considered in major decisions? ; what mechanisms must be designed to resolve inter-firm or municipality conflicts, and initial resistance which may result from organizational cultural differences and fear of "the unknown"? Obviously, the requirements and management structures are different for each form of collaborative arrangement.

Recognizing the difficulties that collaboration implies, Kanter (1994) proposed eight criteria among which is that in successful collaboration all partners must be individually strong and have something to contribute to the relationship, and their motive for entering into the relationship should be to pursue opportunity and not to mask weaknesses or escape a difficult situation (individual excellence). Further, the relationship should fit major strategic or organizational objectives of participating members so that they want to make it work (importance), and participating members must need each other (interdependence). That is, they should have complementary assets and skills so that no member alone can accomplish individually what they can accomplish together. In other words the potential for synergistic advantages must exist.

Another set of criteria proposed by Kanter (1994) is that participating members should invest

in each other to show their respective stakes in the relationship (investment). Thus, the members should show tangible signs of long term commitment by devoting financial and other resources to the relationship, and they should have open communication (information) so that they can share information necessary to make the relationship work, including their goals and objectives, technical data and knowledge of conflicts, trouble spots, or changing situations. Additionally, the partners should develop linkages and shared ways of operating together smoothly; they should build broad connections between many people at many organizational levels and should become teachers and learners (integration). Kanter also suggests that the relationship should be given a formal status with clear responsibilities and decision-making authority (institutionalization), and members should behave toward each other in honorable ways that justify and enhance mutual trust (integrity) by not abusing the information gained, and not undermining each other.

As valid as these criteria seem, not very much has been done to validate their application in the creation of successful collaborative arrangements among public transit systems. Therefore, the problem is how can these criteria be operationalized when creating a collaborative arrangement, and what will be the contributions that their operationalization or presence will make. The answers to these questions will be extremely valuable especially to managers of public transit systems who operate in an environment where these types of arrangements are new phenomena.

### **Research Objectives**

In seeking answers to these questions, the first objective of this study is to identify transit firms already cooperating in providing consolidated transit services and study their characteristics, and the levels and types of cooperation that exist between them. A second objective is to identify from management the perceived advantages, and obstacles/impediments of the cooperative efforts while the third is to develop criteria to assess the effectiveness and efficiency of the cooperative efforts. Lastly, it is the objective of this study to design a blueprint for collaboration which minimizes the potential and known pitfalls for carrying out interagency cooperative agreements for coordinated transit services. The accomplishment of these objectives should lead to a specification

of procedures to achieve efficiency and effectiveness in setting up inter-agency collaboration arrangements for providing transit services.

## **Methodology**

To accomplish these objectives, the research team used and built upon professional relationships it established with transit systems during its previous work in the public and private sectors of our economy, particularly its recent works on Total Quality Management (TQM) in public transit systems, and its studies of cost and efficiency issues in urban public transit firms. Relevant literature in management, economics, and public administration that addressed interfirm and intergovernmental cooperation were reviewed and provided the foundation for the methodology developed for the study. This review involved a synthesis of the theories relevant to cooperation from the fields of management, economics, and public administration.

Based upon the review, a survey questionnaire targeted at top level transit managers was developed, and used to evaluate the performance and the dynamics of cooperative arrangements among public transit firms. A copy of the survey instrument is in the appendix. Top managers were asked to answer questions about their collaboration arrangements, and to indicate their levels of agreement to statements related to the processes and outcomes of collaboration. Specifically, the instrument elicited information on top managers' perception of and experiences with coordinated services in the areas of cost, impediments, benefits, and management processes. Additionally, it elicited background information about the organization. If a transit system has been involved in all three areas of collaboration, the manager was asked to answer the questions for each type of collaboration, otherwise the manager was asked to complete the questionnaire for the type of collaboration applicable to his transit system.

The questionnaire was pretested, modified, and then mailed with prepaid return postage to 400 top executives (General Managers) of United States public transit systems who are members of the American Public Transit Association (ATA). The 1996 directory of the ATA was the source

of the addresses of the top executives. Of the 135 completed questionnaires returned 115 were usable. The data from the questionnaire were coded and analyzed using the probit method and other statistical techniques including factor analysis. Specific models for contracting, mergers, and alliances were developed and estimated to identify the factors relevant in explaining these forms of collaboration. Additionally, a recursive system of equation was developed and estimated to explain the outcomes of collaboration.

After the analysis of the questionnaire data, the research team visited three transit systems selected to be representative of those in the sample that are currently involved in collaborative arrangements. Among the criteria used in selecting these systems were the levels of detail of the survey responses of the firms and the extensiveness of the collaboration arrangements of each firm adduced from its responses to open-ended questions in the survey. Also, in selecting the firms for site visits, due consideration was given to firms with experiences in the three areas of collaboration identified previously, i.e., alliances, contracting, and consolidation/mergers. The systems selected for the site visits were Metro Atlanta Rapid Transit Authority representing large systems, Capital Area Transit Authority in Lansing, Michigan representing a small system, and Hampton Roads Transit District (HRTD) providing services in the Tidewater and Peninsula areas of Virginia and representing medium size transit systems. The inclusion of HRTD is significant because presently it is undergoing a merger which will consolidate transit operations in the municipalities in the Tidewater and Peninsula area of Southern Virginia under one agency.

During the site visits, personal interviews were conducted with key managers having responsibilities for managing various aspects of each firm's respective collaboration arrangements. The information gathered from the visits was used to clarify, support, and elaborate that obtained through the survey questionnaire. Specifically, managers were asked about problems they confront in the process of putting together their respective collaboration arrangements, revenue sources, cost sharing agreements, strategies for securing union support and involvement and management of conflicts. Also, formal documents establishing these agreements and secondary agency-wide data were reviewed for detailed information on the nature of the agreements.

## **Organization of Chapters**

The discussion following begins with the literature review in Chapter 2, followed by the results of the questionnaire survey in Chapters 3. In Chapter 3 we present statistical models to explain the probability of contracting, forming alliances, and merging or consolidating services and to identify key variables that influence management decisions to collaborate. Models of the outcomes of the collaboration efforts are in Chapter 4. Here, the outcomes are discussed and factor analysis methodology is used to identify a limited number of factors that best represent the outcomes. The factor scores for these factors are used to construct new variables (outcomes) that are used further as dependent variables in a system of recursive equations estimated to explain the outcomes of collaboration. Chapter 5, gives detailed accounts of collaboration in the three systems selected for the visits, while Chapter 6 deals with recommendations.

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## LITERATURE REVIEW

### **Collaborative Arrangements in The Private Sector**

Multi-organizational collaborative arrangements or *HYBRIDS*, (e.g., strategic alliance, joint venture, consolidation or merger) are formed with considerable degree of regularity in the business sector especially in recent years. A primary motivation for these arrangements is to improve productivity and efficiency through cost reduction and to pool distinctive competencies or expertise.

Generally, they are defined as organizational arrangements that use resources and /or governance structures from more than one organization to meet shared needs (Borys and Jemison, 1989). However, each arrangement is different in terms of ownership, structure, cost and profit sharing agreements, decision-making and management roles. Overall, collaborative arrangements have the potential to result in economies of scope and foster cost containment through group activities. They also have the potential to increase an organization's ability to get human and financial resources, increase both political and organizational influence and gain access to management and technical services. Furthermore, collaborative agreements enhance the revenue bases of members and strengthen their market positions. And, they add value through economies of scale when members pool resources to buy equipment, raw materials and other inputs in bulk (Zuckerman and D'Aunno, 1990; Zuckerman and Kaluxny, 1994). The various forms of collaboration are discussed below.

**Joint Venture** - A joint venture involves an equity arrangement between two or more independent organizations which results in the creation of a new organizational entity. Joint ventures may be permanent or for a specific purpose or specific time after which they are dissolved. They are opportunistic arrangements which allow members to reduce the risk of a new venture, pooling

resources and knowledge to produce a more competitive organization. Joint ventures reduce the financial costs of new ventures and are a way to develop cheaply new products and technologies that may be too expensive or risky for one organization (Jauch and Glueck, 1988; Thompson and Strickland, 1990).

A major drawback of joint ventures is that they raise questions about the role of each parent organization and effective control. Therefore, many important decisions must be made when setting up a joint venture. These decisions include the share of control, ownership, rewards and voting strength, and the choice of partners (Jauch and Glueck, 1988). If a joint venture passes these hurdles, the partners must then be scrutinized for any clues about whether the joint venture goals, expectations, or managerial proclivities concerning the venture diverge from those of potential members. Such differences, according to Porter (1979), may make even a sound business proposition unworkable as a joint venture.

**Consolidation/Merger** - Consolidation or merger occurs when two or more independent organizations give up their individual identities and structure to become one organization under a new identity. Often it results when a stronger or larger organization acquires a small one. The acquisition may be friendly or hostile. Also, efforts by governments and private businesses to reduce cost and improve efficiency by eliminating duplication of functions often require consolidation of agencies or functions. In other cases, consolidation or merger may be undertaken to reduce uncertainties caused by dependency when organizations involved are at different stages of the production and distribution chains (Pfeffer, 1972; Pfeffer & Nowak, 1996)

**Strategic Alliance** - Cooperative alliance, by definition, is a network of independent organizations that come together through a contractual agreement rather than equity relationship to pool resources to facilitate joint research efforts and collaboration on large scale projects of mutual interest. Kanter (1989) identified three categories of multiorganization alliances: *service*, *opportunistic* and *stakeholder*. A multiorganization service alliance is a consortium model wherein groups of organizations with similar needs band together to meet that need. Typically, they engage in activities

designed to secure economies of scale through resource pooling. The second category, opportunistic alliance, is similar to a joint venture created to gain immediate competitive advantage. The third category, stakeholder alliance, consists of several types of arrangements among suppliers, customers, and employees. These types of partnerships may include suppliers, customers and competitors. They allow members to share costs and skills and collaborate on large scale projects with each member contributing what it does best - its core distinctive competence.

An alliance may not require a separate independent organizational structure and bureaucracy. But, it may exist as an activity and informational network or arrangement that helps members to link together and work on projects, develop products, technology and provide service. Often, teams of personnel from different companies are created to work together concurrently, rather than sequentially, on accomplishing the strategic objective of members. The major advantage of an alliance over traditional organizational forms is its ability to pull together the core distinctive competencies from the best people in different organizations, allowing organizations to accomplish large scale tasks without adding to their individual internal capacities. Its life blood, however, is absolute trust among members.

### **Competitive Alliance in the Private Sector - Formation and Structure**

Having decided to form a cooperative alliance, it is important for organizations to select their members based on factors that would ensure compatibility. Six factors have been identified as crucial to the selection of members of a cooperative alliance network. They are mission, strategy, governance, culture, organization and management.

**Mission :** An alliance's mission defines the needs for its existence to fulfill, whose needs to fulfill, and how (strategy and technology) it plans to fulfill the stated needs. Members must commit to a "win-win" mission which is based on each member believing that others have key competencies that it needs. Alliances should be built on a unified vision, based on a commitment to common values, and accountability exacted through commitment and information (Drucker, 1988). The vision is important because it becomes the motivating factor that keeps members loyal to the objectives of the alliance. The importance of common and acceptable missions and purposes for alliances have been

forcefully argued by Scott (1987) stating that A . . . the concept of purpose is especially important to hybrids (alliances) functioning insofar as it provides institutional direction that acts as a legitimating mechanism both among and within the partner organizations.@Bory and Jemison (1989) added that Athe legitimating function of hybrid (alliance) . . . makes breadth of purpose central to both institutional leadership and the adjudication of political conflict.@However, the purpose or mission should be defined broadly enough to provide sufficient glue in the face of conflicts and disagreements over issues of narrow interest. Yet, the purpose should be focused enough to provide details about what partners expect from each other.

**Strategy:** That each member remains independent and continues to exist as a sovereign organization, even when it enters an alliance, means that each will continue to formulate and pursue competitive strategies apart from those of the alliance. Therefore, each member's development and competitive strategy must be designed to avoid "niche collision" which occurs when independent members' development plans, and competitive strategies produce, an unintended overlap with the alliance's objectives and strategies. This effort requires a strategic integration that involves continuing contact among top leaders to discuss broad goal changes in each organization (Kanter, 1994). The objective is to produce a balance between cooperation and competition that is needed to achieve strategy and systems synergy. The joint capabilities and strengths of the prospective partners must be used to produce synergies that benefit all partners. The combination of forces should enable all partners to experience the all important win-win situation (Lorange, Roos and Broon, 1992).

**Governance:** Since alliances are created for the mutual benefits of members, parity and shared decision-making authority should be the basis of governance. Without some sort of collective governance, the alliance risks becoming no more than a haphazard collection of sovereign organizations (Gomes-Casseres, 1994). To provide for collective governance, Paap (1990) recommends establishment of peer and balanced relationships between top executives of all participating members throughout the life of the alliance. Besides collective governance, the structure of an alliance partnership must provide incentives for performance. An alliance should provide incentives for performance and balanced representation that ensures members an opportunity

to participate in critical decisions. Also, commitment rather than control should be the underlying principle because commitment, especially of top managers, is a powerful force in achieving alliance cohesiveness (Drucker, 1988). Commitment should be both personal and institutional so that personnel change or turnover does not threaten the life of the alliance. Because only Chief Executive Officers (CEOs) are generally empowered to make institutional commitment, Paap (1990) recommends the personal involvement and commitment of the most senior managers (CEOs) of member organization.

**Culture:** Critical to the endurance of any alliance is the chemistry of member organizations. Incompatible cultures (the way of life in an organization, decision-making style, conflict resolution leadership style etc.) often lead to operational problems. Therefore, cultural integration requires people involved in an alliance relationship have communication skills and cultural awareness to bridge their differences (Kanter, 1994). It may require a system that provides flexible policies that fit the cultural strengths and weaknesses of members.

### **Organization Design and Management of Collaborations in the Private Sector**

The key to organization design of collaboration is the effective combination of the various organizational elements of members to avoid fragmentation. One approach is the creation of a management team that acts as buffer between the alliance and each member. Active collaboration, according to Kanter (1994), takes place when companies develop mechanisms, structures, processes, and skills for bridging organizational and interpersonal differences and achieving real value from partnership relationships.

To avoid the typical management problems of poor communication, blurring lines of authority, and a slow decision-making process, members must identify operational issues such as the quality and quantity of resources that will be required of each member and the associated payoff. Kanter(1989) addressed the problem of blurring lines of authority by emphasizing the need for an alliance *boundary or scope definition, i.e.*, a definition of which resources and obligations belong

to the alliance and which do not. Further, the resources available to the alliance, and the legitimacy of members' claim to those resources should be decided. Williamson (1985) contends that decisions must be made about how much of each partner's resources can be legitimately claimed by the alliance, and to what extent a partner's governance structure has legitimate power over the alliance. Because of an assumed degree of boundary permeability by the alliance and its members, a potential for unintended encroachment exists, and often leads to conflict. Therefore, Williamson (1985) recommends identifying which resources are a part of and which are not a part of the alliance. Further, he recommends clarifying the resource authority and obligations of the members of the alliance.

For an alliance to be effective it needs an organizational structure capable of achieving strategic, tactical, operational, interpersonal and cultural integration. Strategic integration involves continuing contact among its leaders to discuss broad goals or changes in each organization. Tactical integration aims at bringing middle managers or professionals together to develop plans for specific joint projects or activities to identify organizational or system changes to enhance transfer of knowledge. The objective of operational integration efforts is to provide a way for people performing their daily duties to have timely access to the information, resources, or people they need to accomplish their tasks. Operational integration may be facilitated by participation in each organization's training program to develop a common vocabulary. Interpersonal and cultural integrations are aimed at building the necessary foundation for creating value, developing relationships and communication skills and creating cultural awareness (Kanter, 1994). Both cultural and interpersonal integrations help to ensure that the human side of collaborative arrangements is not ignored. Understanding the human elements and approaching them directly will give organizations an edge in facilitating the transition that is often required and necessary in the implementation phase of a collaborative agreement (Conroy, 1992).

Organizational or alliance relationships like good marriages, do not work based on ownership and control. They take effort and commitment and enthusiasm from both sides to realize the hope for benefit (Ohmae, 1989). Like true partnerships, they tend to meet certain criteria that Kanter

(1994) called eight *I*s that create successfully *W*e's: Individual excellence, importance, interdependence, investment, information, integration, institutionalization and integrity.

Individual excellence requires all members of an alliance to have something of value to contribute to the relationship. The motivation to belong to an alliance network is to pursue future opportunities. It is important that objectives of the alliance fit the strategic plans and objectives of member organizations in a way that will motivate them to want to do whatever needs to be done to ensure the lasting survival of the alliance. Another way of ensuring the commitment of members to the survival of the alliance is to require members, whenever possible, to invest in each other through equity swaps. Also, cross ownership is a way of showing tangible commitment to the relationship. The cooperative atmosphere required of any successful alliance network calls for a reasonably open communication and free flow of information about technical data, trouble spots, knowledge of conflicts and changing situations among members. To fit alliance responsibility into members' conventional responsibilities, a degree of task integration is needed at various levels of the organization. This integration will in due course ease institutionalization of the web of relationships that will develop from the alliance task relationships. As these relationships develop and multiply, it is very important that members behave toward each other in honorable ways that justify and enhance mutual trust ( Kanter, 1994).

Stiles (1994) in a summary of a Conference Report on how to make alliances work concluded that "A strategic alliance demands considerable attention and management and skills throughout the period of their existence to be successful." They need to be clearly focused in their aims and in the deliverables anticipated from the venture by the partners involved. Consideration also needs to be paid constantly to a wide range of internal and external compatibility and influences both specific to industry and business, and to the alliance relationship itself.

Peter L. Bonfield, chairman and managing director of International Computer Ltd., provides twelve guidelines for successful collaboration (Ohmae,1989):

1. Treat the collaboration as a personal commitment. It's people that make partnerships work.



2. Anticipate that it will take up management time. If you can not spare the time, do not start it.
3. Mutual respect and trust are essential. If you don't trust the people you are negotiating with, forget it.
4. Remember that both partners must get something out of it (money, eventually). Mutual benefit is vital. This will probably mean you've got to give something up. Recognize this from the outset.
5. Make sure you tie up a tight legal contract. Don't put off resolving unpleasant or contentious issues until later. Once signed, however, the contract should be put away. If you refer to it, something is wrong with the relationship.
6. Recognize that during collaboration, circumstances and markets change. Recognize your partner's problems and be flexible.
7. Make sure you and your partner have mutual expectations of the collaboration and its time scale. One happy and one unhappy partner are a formula for failure.
8. Get to know your opposite member at all levels socially. Friends take longer to fall out.
9. Appreciate that cultures, both geographic and corporate, are different. Don't expect a partner to act or respond identically to you. Find out the true reason for a particular response.
10. Recognize your partner's interests and independence.
11. Even if the arrangement is tactical in your eyes, make sure you have corporate approval. Your tactical activity may be a key piece in an overall strategic jigsaw puzzle. With corporate commitment to the partnership, you can act with the positive authority needed in these relationships.
12. Celebrate achievement together. It's a shared elation, and you'll have earned it! (Ohmae, 1989)

A study by Parker and Allio (1994) of what makes alliances work provide the following seven guidelines:

1. Anticipate business risks from the alliance;
2. Carefully examine alliance business plans for analytical soundness;

3. Undertake realistic and feasible alliance;
4. Link budgets to resource and strategic priorities;
5. Know your partners alliance experiences;
6. Undertake rigorous resource planning and
7. Couple pay and investment with performance measures.

Holding an alliance together requires paying attention to what Kanter (1989) called alliance vulnerabilities. They are:

1. Strategic shifts which occur when there are changes in the strategic thrust or priority of member organizations because of either a change in top level leadership or core business interest;
2. Uneven levels of resource commitment and a resulting power imbalance;
3. Imbalance of benefits; and
4. Conflicting loyalties.

### **Cost and Benefit Sharing Agreements in the Private Sector**

Almost every organization joins an alliance to help itself, i.e., for selfish reasons. Therefore input and output agreements are important determinants of the strength of members' commitment to the alliance. Again, the key here is to strive for a win-win situation for all partners. If an apparent win-win situation is not obvious, then the chances for success of the alliance are low despite how good the venture or the opportunity it seeks to exploit (Lorange, Ross and Bronn, 1992). Therefore, it is incumbent on alliances to develop programs and services that are responsive to the need of the members and built on their unique characteristic (Zackerman and Kaluzny, 1994).

Cost sharing is often based on transaction cost analysis (Williamson, 1995), answering the question of cost distribution by focusing the decision on which member of an alliance is better

equipped to handle a particular operation or project more effectively and efficiently. It is also based on which member of the alliance has the resources required for a particular activity or project. Benefits are distributed based on the resources that each member contributes.

### **Collaborative Arrangements in the Public Sector**

Schneider (1989) suggests from purely economic perspective that bureaucratic budget maximization and rent seeking are the reasons for bureaucratic support of public cooperation/consolidation. This view holds that bureaucrats favor consolidation because it increases their monopoly power and enables them to raise taxes and fees thereby increasing their budgets. Indeed if this is true, then one should expect higher levels of inefficiency and, therefore, a core argument against public cooperation/consolidation.

This seems to be the prevailing view against consolidation. Durning (1995), for example, contends that fragmentation holds down prices, and reduces the market for public goods thus causing inefficiencies. Further, Boynes (1992) and DiLorenzo (1983) argue that fragmentation, not consolidation, is associated with lower government costs in metropolitan areas.

Empirical results of public transportation and public administration studies suggest economies in consolidating transportation services (Viton, 1990), and mild optimism that consolidation improves services respectively (Durning, 1995). However, Durning (1995) in his study found that consolidation of county services lowered efficiency, effectiveness and responsiveness and that contrary to popular views, the type of management did not affect cooperation nor did location in a SMSA increase cooperation. But, Campbell and Glynn (1990) found that the propensity to cooperate among cities depended upon city size.

In the public sector, counties and cities cooperate in the exchange of information or in the purchase and supply of public services (Campbell and Glynn, 1990). Similar cooperative arrangements are also found in the public transit sector, though here, the subject has not been well researched and documented. The few accounts of cooperation in public transit can be traced to Shaw

(1981), Topp (1989, 1990) and Hartgen and McCoy (1990).

Topp's (1989, 1990) accounts of cooperation in public transit in Germany distinguished between cooperatives and federations. Cooperatives are found in small cities and emphasize service between towns and country. They do not involve establishing a new company, rather companies negotiate and work together. A federation, on the other hand, consists of firms that cooperate by establishing a new authority. Members of the federation divide revenues among themselves according to a predetermined formula.

In the United States, cooperation may be mandated by legislation as is the case in Los Angeles county where a commission was established and made responsible for short-range planning, policy and program development, project selection, new system development, resource generation and allocation. The legislation requires that "key decision makers sit together as a single policy board to discuss, decide and act in concert" (Shaw and Simon, 1981). Voluntary forms of cooperation also are found in the United States, but not on the scale described by Topp (1989, 1990) for Germany. Particularly, in the case of delivering elderly and handicapped transportation services, there is ample evidence of cooperative agreements at the local level and between agencies and transit firms (Lantz and Demetsky, 1981). At a higher level, that is in regional planning, cooperation also exists between Metropolitan Planning Organizations (MPOs). Hartgen and McCoy (1990) identified five vehicles for cooperation in transportation planning and the provision of transportation service. They are county compacts, state and local government compacts, councils of MPOs, transportation management associations where the private sector contracts with the public sector to supply transportation services, and the establishment of state authorities (i.e., one or more states establish an authority for planning, building and operating a transportation system). Outside the transportation field, cooperation can be found between counties in the exchange of information and services.

Motivations in the public sector for cooperation include service improvements and generating more revenue (Topp, 1994). In the public transportation sector, cooperation also is established for better integration of highway transportation and public transit, to improve decision

making, to make effective use of resources, and to involve municipalities and agencies in the transportation decision making process (Shaw et.al, 1981). Additional reasons include getting social service agencies out of the transportation business and ensuring greater vehicle utilization (Lantz and Demetsky, 1981). When cooperation has been used by counties, its purposes have been to increase efficiency, to provide better quality services at costs equal to or lower than each county would incur separately in providing the service (Durning, 1995; Town and Lambert, 1987; Dehoog, 1992). We may add that an additional reason for intercounty cooperation is to pool together the individual expertise of the counties to develop and deliver high quality services.

**Motivations For Public Transit Collaborative Arrangement** - A motivation for establishing a single-mode regional transit system (where transit systems providing the same single-mode service in a region are consolidated into a regional system) may be cost savings i.e., cost savings that arise from consolidation of scale or the provision of a greater level of service. The (merged) regional system may be able to exploit economies in purchasing or inventory, or perhaps a more efficient use of joint maintenance facilities and other types of capital. A motivation for establishing a multi-modal transit system (where the system is a merger of transit agencies having at least one mode not operated by the other agencies) may also be cost-based -- i.e., cost savings that arise from consolidation of scope. Although the modes may be distinct, there are central functions common to all transit modes and thus the potential for cost savings for these central functions (e.g., scheduling and payroll). The less distinct are the modes, the greater the potential for economies from consolidation of scope.

Cost savings from consolidation of scale and scope of transit systems have been investigated by Viton (1992), but restricted to operating costs, thereby ignoring the question of capital costs savings. Viton (1992) finds that the extent of the cost savings from consolidation of scale depends upon the levels of service provided by the merging agencies: Consolidations involving modes other than motorbus service can lead to significant cost savings over separate provision, but the addition of motorbus service can actually increase regional transit costs. Whether and to what extent cost savings arise from consolidation of scope depend upon the resulting systemic wage as compared to

the wages paid by the individual transit agencies as well as by the levels of service provided. If consolidation raises wages, the cost-saving effect of the multi-modal merger will depend upon the wage levels before and after consolidation. Mergers are more likely to be cost effective (with respect to consolidation of scopes) for smaller than larger agencies. A properly-chosen consolidation can reduce costs; ill-conceived proposals may have the opposite impact.

Another motivation for establishing regional and multi-modal transit systems is government pressure (and the accompanying government funding). In Tidewater, Virginia, the Tidewater Transportation District Commission (TTDC, the local provider of fixed-route- transit services) under pressure from the U.S. DOT has become the coordinator and provider of special transportation services as well. Few human service organizations understand the linkage between the potential service to their clients and transportation; one means of enhancing this potential service is to get the social service agencies out of the transportation business by consolidating their transportation resources under the auspices of a transportation provider such as TTDC (Lantz and Demetsky, 1981). Under its Special Transportation Services program, TTDC is the central coordinator and provider of special transportation services, having participating human service agencies being responsible for:

- 1) hiring and controlling drivers,
- 2) determining an individual's eligibility for service, and
- 3) securing \$1 million worth of liability insurance.

Evidence suggests that typical transit organizational structures are ineffective in addressing financial and service provision difficulties and that more effective organizational and monitoring structures should be found (Downs, 1988 and Keough, 1987). "The implication from the (transit) literature is that most public bus transit systems are not organizationally positioned to meet the competitive and financial challenges and unless they restructure along new organizational lines the financial and service provisions difficulties will continue" (Farkas, 1991, p. 225). If a regional or multi-modal transit system is an effective organizational structure to meet such challenges, then establishing an effective transit organizational structure is another motivation for establishing regional and multi-modal transit systems.

The motivation for establishing regional and multi-modal transit systems may also be to reduce risk, i.e., spreading the risk over the greater assets of a system versus the assets of a single agency (Contractor and Lorange, 1988). Also, a larger public system may be able to take advantage of greater government support (e.g., subsidies) provided to larger by not to smaller systems.

### **Impediments for Public Transit Collaborative Arrangement**

The costs of establishing regional and multi-modal transit systems (and interfirm cooperation agreements in general) include system capital outlays for provision of service by the system (as opposed to capital outlays required of independent agencies or firms) and transaction costs (Gegax and Tschirhart, 1984; Hill, 1990; Hennart, 1991). System transaction costs are the costs of extensive decision making for negotiating, operation and enforcement of the system. The negotiation costs in establishing regional transit systems in particular may be high. For example, negotiations for determining the rules (or methods) for allocating system costs and revenues that are acceptable to the merging agencies may be time intensive. Allocating shared (or system) costs is discussed in Talley (1988) and Telser (1985). The transaction costs for operating a system (due to its size) are expected to be greater than the sum of those costs formerly incurred by the merging agencies. If so, the difference between the system transaction operation costs and those formerly incurred by the merging agencies are the transaction operation costs attributable to the system. Transaction enforcement costs are the costs of ensuring compliance (e.g., monitoring costs and costs of safeguards to keep opportunism in check) by the merging or cooperating agencies with system agreements or arrangements.

In addition to the above cost impediments to establishing regional and multi-modal transit systems, other possible impediments include:

1. How to respond to other agencies in the region that have transportation planning responsibilities (Hartgen and McCoy, 1990);
2. The joint determination of system goals and objectives by participating agencies and governments;

3. The joint determination of system cost and revenue allocation rules (or methods) by participating agencies and governments;
4. The integration of different services into a multi-modal system (Cottrell and Demetsky, 1981);
5. Government funding restrictions (e.g., no funding) and regulations; and
6. The lack of technical, evaluative and planning skills of agencies.

### **Longevity of Public Transit Collaborative Arrangements**

In establishing regional and multi-modal transit systems consideration should be given to establishing system policies or incentives to promote longevity, stability and improvement in the performance of the systems over time. For example, one or more merging agencies perceiving opportunity may request a pre-establishment contract among the merging agencies in which contingencies are recognized and appropriate adaptations for each are stipulated; after establishment of the system, ex post deterrents and perceived opportunity among members of the former merged agencies would be monitored (Parkhe, 1993). Evidence from Parkhe (1993) suggests that the commitment of nonrecoverable investments by merging agencies are positively related to the longevity, stability and performance of the system. Nonrecoverable investments are those investments whose costs are largely sunk (i.e., whose value for alternative uses is greatly reduced, sometimes to the level of scrap value only).

System policies may be cooperative or coercive. The realization of consolidation of scope requires organizational arrangements that stress cooperation among divisions (Hill, Hitt and Hoskisson, 1992). Cooperative policies are more difficult to translate into practice than are coercive policies (May, 1995). The use of incentives is a key to inducing adherence to policy goals (May, 1995). For public agencies, incentives include grants to local or regional governments for conducting relevant studies, preparing plans, or developing relevant policy statements.



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## TYPES OF COLLABORATION

In this study we examine collaboration in urban transit systems. Three types of collaboration are distinguished. They are consolidation/merger, alliance, and contracting. Consolidation is an arrangement whereby firms combine under one management and the merging firms lose their individual identities. Alliance, on the other hand, is an agreement that combines services while the individual firms maintain their identities. Contracting involves a firm hiring another firm to provide services along a route or to perform such tasks as equipment and facility maintenance.

**Collaboration Statistics** - Table 3.1 shows the proportion of responding firms involved in collaboration. Clearly, contracting is the most dominant form of collaboration in transit systems. Of the firms responding to the survey 37.2% are involved in some form of contracting, compared to 27.5%, and 18.6% respectively that are involved in alliances and consolidation. The major areas of collaboration are in equipment and facility maintenance. In Table 3.2, approximately 57.6% of the firms collaborate in these two areas. Next in the order of importance are equipment purchases (8.4%) and passenger service (8.4%). Because firms collaborate in more than one area these percentages do not sum to one-hundred.

Collaboration is most often initiated by transit systems. Table 3.3 shows that in 69.7% of the firms this is the case, but in 22.7% of the firms it was initiated by the governments of the participating cities. Most likely this is because they are municipal systems. State and federal

**TABLE 3.1 - TYPES OF COLLABORATION**

		<b>Percent Firms</b>
A.	Consolidation/Merger	
	- Merged/Consolidated	18.6
	- Under Consideration	7.8
B.	Alliance	
	- Formed an Alliance	27.5
	- Under Consideration	3.9
C.	Contracting	
	- Contracted out Service	37.2
	- Under Consideration	4.9

**TABLE 3.2 - AREAS OF COLLABORATION**

	<b>% Firms Collaborating</b>	<b>Frequency</b>
Passenger Service	8.4	10
Equipment Purchase	8.4	10
Facility Maintenance	35.3	42
Equipment Maintenance	25.2	30
All Areas of Operations	22.7	27

**TABLE 3.3 - INITIATION OF COLLABORATION**  
(Who initiated it)

	% Collaborating
Governments of Participating Cities	22.7
State Governments and Legislature	4.5
Federal Government Mandate	3.0
Citizens	0
Transportation System	69.7

**TABLE 3.4 - PARTIES TO THE COLLABORATION**

	% of Firms Collaborating
County and County	1.2
County and City	4.8
County and Transit Agency	13.3
Transit Agency and Social Service Agency	15.7
	13.3
Adjoin Transit Systems	8.4
Overlapping Transit Systems	36.1
Transit Systems and Private Firms	7.2
<b>Others</b>	

**TABLE 3.5 - MODES INVOLVED IN COLLABORATION**

	%
Rail	1.9
Bus	33.7
Demand Responsive	50.0
Vanpool	10.9
Other	4.3

governments play very minor roles in initiating collaboration. Only in 4.5% and 3.0% of the firms

do we find that collaboration was initiated by a federal mandate or by state legislature.

The parties to the collaboration are generally transit systems and private firms. Approximately, as Table 3.4 reveals, 36.1% of the collaboration involve transit and private firms which is not surprising because it reflects the wave since the 1980's to contract out portions of transit operations to private firms. Other parties are transit systems collaborating with social service agencies (15.7%), counties and transit systems (13.3%), adjoining transit systems (13.3%), overlapping transit systems (8.4%) and counties and cities (4.8%). In addition, 1.2% of the collaboration involve counties, whereas 7.2% involved social service agencies or counties and social service agencies.

When collaboration occurs, Table 3.5 shows that demand responsive modes are generally those that are involved. Approximately half the collaboration in this study involved demand responsive transit systems. Bus modes account for 33.7% of the collaboration while 10.9% and 1.9% respectively involve van pool and rail. Other transit modes such as ferries are involved in 4.3% of the collaboration.

Throughout the public transit literature, it has been suggested that cost advantages are behind most contracting efforts. Since the public transit literature is devoid of studies on collaboration in general, the motivations behind it is unknown. Table 3.6 sheds some light on the motivations. Clearly, cost savings are behind most collaboration efforts. Specifically, 39.5% of the respondents indicate that cost savings are behind their collaboration. Increased effectiveness in providing service, and improved service quality, however, are also important reasons for collaboration. The table shows that almost the same percentage (32.6%) of the respondents indicated increased service effectiveness in collaborating whereas 23.3% indicated improved service quality as their reason for collaborating. Increased resources and government pressure were indicated by 14.7% and 12.4% of the respondents as their reasons for collaborating.

The desire to collaborate often is hampered or slowed by factors unforeseen or outside the

control of the collaborating parties. Table 3.7 shows a list of the factors that impede most collaboration in transit systems. Three factors, cost of daily service, resistance from other agencies

**TABLE 3.6 - MOTIVATIONS FOR COLLABORATING**

	%
Cost Savings	39.5
Government Pressure	12.4
Increased Effectiveness in Providing Service	32.6
Improve Service Quality	23.3
Increase Resources	14.7

\* Because firms checked more than one, the percentages do not sum to one.

**TABLE 3.7 - IMPEDIMENTS TO COLLABORATION**

	Frequency
C Cost	14
- Cost of Daily Service	14
- Cost of Overseeing Collaboration	1
- Cost of Vehicles, Equipment and Facilities	5
C Resistance from Other Agencies	17
C Difficulty Agreeing on Combined System Goals	14
C Difficulty Agreeing one combined System Cost Allocation Methods	8
C Difficulty Agreeing on Combined System Revenue Allocation Methods	6
	5
C Difficulty Making Personnel Decisions	7
C Government Finding Restrictions	6
C Lack of Citizen's Support	2
C Disagreement Between Elected Officials	6
C Disagreement Between Potential Members	4



**TABLE 3.8 - SOURCES OF FUNDS FOR COLLABORATION**

	% Firms Collaborating
Sales Tax	19.5
Gasoline Tax	6.9
Contributions from Members	13.8
Government Funds	51.7
Other	8.1

**TABLE 3.9 - EXPECTED LENGTH OF COLLABORATION**

How long is collaboration designed to last?	%	%
	Firms	Firms
One Year	4.8	16.7
Two Years	4.8	15.0
Three Years	14.3	5.0
Four Years	3.2	1.0
Five Years	17.5	11.7
Long Term	50.8	50.0

and difficulty agreeing on combined system goals are the most important impediments to collaboration. Of these factors, resistance from other agencies, perhaps because of competition, is the most important. Firms also are fearful that cost increases may result when they collaborate or that their operational goals may conflict with each other. Furthermore, collaboration may be thwarted because employees fear job losses which are more likely to occur in the cases of consolidation and contracting than in the case of alliances.

Among the remaining factors listed in Table 3.7, there is no dominant impediment to

collaboration. It is important to note that only one respondent indicated the cost of overseeing the collaboration as impediment. Similarly, too, respondents indicated lack of citizens' support as an impediment to collaboration. However, it is notable from the table that government funding restrictions may thwart collaboration efforts. This particularly is true when local funding does not permit extension of service to outlying areas where collaboration with adjoining or overlapping agencies is possible. Similarly, it is notable that difficulties in agreeing to cost allocation methods may thwart collaboration involving alliances, since it is not conceivable that this will apply to contracting and consolidation.

Though government funding restrictions were indicated by very few firms as inhibiting collaboration, their role in successful collaboration cannot be over emphasized. This is because the major sources of funding for most collaboration are government funds. As Table 3.8 shows, more than half of the respondents indicated that the government is the major source of funding for collaboration. The next most important funding source is sales tax followed by contributions from member firms. Gasoline taxes and other funding sources such as passenger revenue dedicated property and utility taxes are used by very few firms to fund collaboration. Besides Table 3.8, the data reveal that when the parties must contribute towards collaboration few, 8.5%, do so based upon a predetermined formula. Such is the case, for example, when counties and cities collaborate to provide transit services.

Collaboration in transit firms tends to be both short and long term. For the purposes of this study, collaboration spanning over five years is considered long term while all others are considered short term. Table 3.9 shows that 50% of the collaboration have been in place for more than five years and that the same percentage has been in place for five years or less. Of the short term collaboration, most (31.7% of the respondents) have been in place for two years. Similarly, in response to the question about how long the collaboration is designed to last, 50.8% indicated it is long term or more than five years. However, in this case we observe that very few collaborations are designed to last for two years or less. A three to five year collaboration was indicated by 35% of the respondents. Thus, collaboration tends to be medium term and long term. This is not surprising

since these lengths of time allow members to recoup any capital invested. Short term collaboration does not allow participating members enough time to adjust to their new environment. Also, initial start up cost may be so high that firms are unable to recoup their capital when the collaboration is for a short period and this is the reason for firms entering into medium and long term collaboration.

### **Determinants of Collaboration**

Having discussed collaboration statistics of our survey, let us now identify the significant factors that affect each method of collaboration (i.e., contracting, alliances and consolidation). To do so we developed specific models to explain contracting, alliances and consolidation.

**Contracting:** We postulate that the desire to contract depends upon the areas covered by the contract, the benefits and costs, who initiated it, the parties involved and firm size. Contracting in transit systems generally covers passenger service, facility maintenance, and equipment maintenance among others. In the early days of transit contracting most efforts were concentrated on passenger service. Today, transit contracting is diversified and includes other functions previously performed internally.

We hypothesize that contracting is positively related to the areas covered by the contract. However, a negative relationship is possible because the more areas contracted out the higher the level of resistance within the organization and that can reduce the contracting effort. Contracting is also positively related to the benefits from it. Conversely, higher cost or impediments will reduce the level of contracting. Thus, we expect the relationship between contracting and impediments to be negative. We also expect that contracting will be positively related to the roles of the government in initiating it since this is an indication of pressure on transit systems to contract out service. Since we have observed that most collaboration are funded by the government, the desire to reduce government funding is enough pressure in firms to contract out portions of their operations to save cost. However, government involvement can have negative impact on contracting if management feels it is being forced to do so. While government involvement can increase contracting, the success of contracting is expected to be higher when it is initiated by transit systems. Hence, we

expect the relationship between transit system involvement in the contracting process and contracting to be positive. Similarly, we expect a positive relationship between contracting and system size. That is, large firms are more likely to contract out service than small firms possibly to shed services they can no longer provide efficiently.

We investigate the above hypothesized relationships regarding whether a transit system will choose or not choose to contract out service by utilizing the statistical technique, probit analysis. Specifically, probit analysis is used to estimate the following equation:

$$Y = F(Z_i) \quad (3.1)$$

where Y equals one if the transit system chooses to contract out service and zero if it does not choose to contract out service.  $Z_i$  is the above set of ( $i = 1, 2, \dots, j$ ) variables or factors hypothesized to affect the contracting-out decision.

Probit estimation results of the contracting-out equation appear in Table 3.10. The asterisks besides the coefficients in the table indicate those coefficients that are statistically significant in explaining the decision to contract. These coefficients suggest that firms are more likely to contract out passenger service compared to other areas such as facility maintenance.

Also, the results clearly suggest that contracting out services is motivated by the availability of increased resources and government pressure. Both variables have positive and significant coefficients but their significance levels show that government pressure exerts more influence on contracting than cost savings. Surprisingly, and contrary to expectations, improved service quality is negatively related to contracting suggesting that firms do not consider improved service quality as the motivation to contract out service. In fact they are more likely to contract out poor services than better and profitable services. Additionally, cost savings have the correct positive sign but

insignificant coefficient.

**TABLE 3.10 - FACTORS AFFECTING CONTRACTING**

<b>Description</b>	<b>Probit Coefficient</b>	<b>Std. Error</b>
Same Service Contracting	0.2334***	0.1616
Different Services	0.4593*	0.1603
<b>MOTIVATIONS</b>		
Cost Savings	0.1910	0.1830
Government Pressure	0.2822***	0.1893
Increased Service Effectiveness	- 0.1068	0.1693
Increased Resources	0.2741***	0.1817
<b>IMPEDIMENT</b>		
Resistance from their Agencies	-0.5061*	0.230.3
Difficulty in Making Personnel Decisions	-0.0249	0.3389
Government Funding Restrictions	-0.4743***	0.3344
<b>OTHERS</b>		
Passenger Service Contracting	0.2634***	0.1751
City and County as Parties to Collaboration	-0.1182	0.4316
Transit System as Party to Collaboration	0.2517**	0.1325
Operating Cost	0.0208	0.0415
Intercept	2.1567*	0.1793

Pearson Goodness of -fit Chi-Square = 152.153, Sample Size = 114, P = 0.019; Convergence Criterion = 0.0009;

\* Significant at 0.01 level

\*\* Significant at 0.05 level

\*\*\* Significant at 0.10 level

Standard errors are in parentheses.

Among the impediments appearing in Table 3.10 only two have a statistically significant coefficient but all have the correct sign. Resistance from other agencies and government funding restrictions reduce the probability of contracting out services. These results also suggest that government pressure increases the probability of contracting out services and when transit systems are made parties to the collaboration this probability increases.

### **Merger/Consolidation**

The desire for transit systems to merge also depends upon similar factors as the desire to contract out service. Merger or consolidation, however may be a result of economies of scope and even economies of scale. Economies of scope allow merged firms to realize cost savings from producing a variety of services particularly if the same resources are used to produce different products. When firms merge, they are able to produce a large output (if they produce the same or similar services) and this may lead to lower average costs. If so we hypothesize a positive relationship between the desire to merge or consolidate service and the cost savings to be realized. Other motivations for merging are increased effectiveness in providing the service, improved service quality and government pressure. Here too, we hypothesize positive relationships between mergers/consolidation and these variables. We also hypothesize that lack of adequate resources will negatively affect the desire to merge.

Let  $M$  represent the choice a transit system faces in regard to a merger, i.e.,  $M$  equals one if the transit system chooses to merge and zero if it does not choose to merge. Further,  $M$  may be expressed as a function of the above set of  $Z_i$  ( $i = 1, 2, 3, \dots, j$ ) variables hypothesized to affect the merger decision.

$$M = G(Z_i) \quad (3.2)$$

Equation (3.2) is also estimated using the statistical package, probit analysis.

The probit estimation results for equation (3.2) are in Table 3.11. Again, as in Table 3.10, the significant coefficients are indicated by the asterisks. The results suggest that cost savings, government pressure, and the involvement of transit systems in the collaboration arrangements increase the probability of firms merging their operations. Increased service effectiveness is not a significant reason to merge, possibly suggesting that firms merge with the hope of realizing economies of scope and economies of scale. This result is supported by the fact that the probability of a merger increases when the types of transit services involved are different. Improved service quality is not a significant motivation to merge. Examining the table the coefficient of the impediment, lack of adequate resources, has the correct signs but is statistically significant. Thus, it can be argued that this is not a strong factor to consider in the decision to merge. The probability of a merger also reduces with network size though insignificantly. As evident from the table the coefficient of route mile is negative but insignificant.

**Table 3.11 - Factors Affecting Merger/Consolidation: Probit Estimation**

Description	Coefficient	Standard Error
Combination of Different Service	0.3077**	0.1949
<b>MOTIVATION</b>		
Cost Savings	0.4600**	0.2663
Increased Service Effectiveness	-0.1477	0.2875
Government Initiative	0.3055**	0.1813
Improved Service Quality	0.1127	0.2825
<b>IMPEDIMENTS</b>		

Lack of Adequate Resources (e.g Labor)	-0.2508	0.3840
<b>OTHERS</b>		
Route Mile	-0.0962	0.0921
Intercept	2.4626*	0.5092

Pearson Goodness-of-fit Chis Square = 175.678; Df = 116; P = 0.001.

\* Significant at 0.05 level

\*\* Significant at 0.010 level

**Table 3.12 - Factors Affecting Alliances**

Description	Coeff.	Std Error
Combination of Same Service	0.2170	0.2019
Motivation : Cost Savings	0.3221	0.2544
Motivation : Increased Service Effectiveness	0.7688	0.2771
Motivation : Increased Service Quality	-0.2496	0.2416
Motivation : Increased Resources	0.1494	0.2114
Impediment : Cost of Vehicles, Equipment and Facilities	-0.8840	0.4396
Impediment : Disagreement Between Elected Officials and Potential Members	-0.1015	0.3860
Impediment : Difficulty Agreeing to Goals, Cost and Revenue Allocation Methods	-0.1073	0.1144
Government Initiation of Merger	0.1208	0.1788
Transit System a Party to the Collaboration	0.0431	0.1574
Areas Covered : Equipment Maintenance	0.3323	0.1937
Duration : Long Term	0.3887	0.1852
Alliance Initiated by Transit System	-0.1453	0.2433
Operating Cost	0.0101	0.0507
Intercept	1.8120	0.2813



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Pearson Goodness-of-fit Chi square = 137.094, DF = 114, P = 0.069, \*\* Significant at 0.025 level,\* Significant at 0.01 level

**TABLE 3.13 - CONTRACTING, MERGERS AND ALLIANCES: STATISTICALLY SIGNIFICANT DECISION DETERMINANT**

Variables	Contracting	Mergers	Alliances
<b>MOTIVATIONS</b>			
Cost Savings		+	
Government Pressure	+	+	
Increased Service Effectiveness			+
Increased Resources	+		
<b>IMPEDIMENTS</b>			
Cost of Vehicles, Equipment and Facilities			-
Resistance from Other Agencies	-		
Government Funding Restrictions	-		
<b>OTHERS</b>			
Areas Covered: Equipment Maintenance			+
Duration: Long Term			+
Transit System as Party to Collaboration	+		

Passenger Service	+	
Same Service	+	+
Different Service	+	

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+ - positive relationship  
-- negative relationship

### **Factors Affecting Alliances**

Alliances constitute the second most important method of collaboration in public transit firms. As we have defined earlier, in alliances, firms maintain their individual identities but may cooperate in certain areas of their operation. Transit firms, for example, may collaborate to facilitate passenger transfer by issuing through tickets or they may form alliances to purchase equipment or lobby Congress for legislation beneficial to them. We hypothesize that the factors that motivate firms to form alliances (and, therefore, are positively related to their desire to form alliance) are cost savings, increased service effectiveness, improved service quality, and increased resources. On the other hand increased cost of vehicles, equipment, and facilities, difficulty agreeing to goals, cost, and revenue allocation methods, and disagreement between elected officials and potential members are impediments to the formation of alliances and, therefore have a negative effect on their desire to form alliances. Successful alliances may also depend on who initiated them and the types of firms involved. For example, if transit firms initiate alliances they will be committed to their success. When governments initiate alliances they do so for different purposes or to achieve goals that conflict with those of management. Under those circumstances managerial interest in the alliance will be low, suggesting a negative relationship between the government initiating the alliance and its success. If the government and management agree on goals, e.g., when management lobbies the government to pressure possible parties into the alliance, the relationship is expected to be positive. From these possible outcomes, the sign of the relationship between government initiation of the alliance and the desire to form it cannot be determined beforehand.

The desire to form an alliance will also be affected by the functional areas affected. Firms may form alliances for specific purposes. If a functional area is that mostly affected by alliances a positive relationship is expected between the two. If not, the relationship could be negative.

Let A represent the choice a transit system faces in regard to an alliance, i.e., A equals one if the transit system chooses to form an alliance and zero if not. In addition, A may be expressed as a function of the above set of  $Z_n$  ( $n = 1, 2, 3, \dots$ ) variables hypothesized to affect the alliance

$$A = A( Z_n ) \quad (3.3)$$

decision. Thus,

This equation is also estimated via the probit estimation technique.

The probit results are in Table 3.12. Clearly many of the variables hypothesized as affecting the desire to form alliances have no statistically significant relationship to alliance. The statistical results suggest that alliances are motivated by the desire to increase service effectiveness, but not by service quality, cost savings, or increased resources. A major impediment to alliance is cost of vehicles, equipment, and facilities. Although the coefficients in the remaining hypothesized impediments to forming an alliance have the expected negative signs, they are not statistically significant.

The estimation results also suggest that alliances tend to be long term (more than five years) allowing firms to recoup their capital expenses. Mostly, alliances are formed for equipment maintenance. By pooling equipment maintenance firms are able to realize economies in purchasing materials and parts particularly for vehicle maintenance. Also, the alliance can bargain with potential contractors to perform this function cheaply.

Table 3.13 summarizes those variables (or factors) found to have statistically significant coefficients in the Probit estimations investigating the decisions of transit systems to contract, merge, or form alliances. Two factors are common to mergers and contracting and have the same coefficient

signs. Government pressure increases the probabilities of a merger and contracting out services. Also mergers and contracting generally cover the same service.

Besides these common factors, it is obvious that the factors that negatively or positively affect alliances are not necessarily the same factors that affect mergers or alliances. While this may be seen as a result of the way we have modeled alliances, mergers and contracting, it is still true that different motivations are behind the ways collaboration is done in public transit systems.

Together these results clearly confirm most of the traditional arguments for contracting out services by transit systems. In addition, they suggest that we cannot use improved service quality as an argument for contracting, and government initiation of contracting increases the probability that the service will be contracted out to private firms. What should be encouraged is including transit in the initial program to contract out service.

## 4

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## PROCESSES AND OUTCOMES OF COLLABORATION

**The Process of Collaboration:** Prior to collaborating transit firms learn about each other. The learning process assures them that the partners to the collaboration share common objectives and can work together. To understand the process of collaboration, specific questions were asked. Table 4.1 shows the results of the responses obtained. Clearly, most respondents (78.2%) agree that before they entered into collaboration they assured themselves that their partners had compatible missions,

21.8% at least disagreed that compatibility of missions was important. However, most firms (90.6%) agreed that compatibility of objectives was important in their initial effort to collaborate.

Compatible organizational cultures also are very important in entering into collaboration. Such cultures relate to work habits, management values, styles, and decision making processes. An organization that is prone to delays in decision-making certainly will find it difficult to collaborate with that which makes decisions promptly. Among the transit systems studied slightly more than half (53.2%) agreed that they made sure of compatibility of organizational cultures before they collaborated with other firms. About 21.9% were undecided about the importance of organizational culture in their decisions to collaborate, and 25% at least did not consider it in their decisions. Similarly, when asked if they considered compatibility and complementarity of work habits and attitudes of partners before collaborating, 34.4% and 4.1%, respectively, agreed or strongly agreed that this was an issue they considered. Thus, a small percentage of the respondents felt that work habits should be compatible or complement each other in collaboration.

When firms collaborate, an important labor issue they must confront is assuring employees

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**TABLE 4.1 - FACTORS CONSIDERED IN THE PROCESS OF ENTERING INTO COLLABORATION**

Factors	Response Percentages				
	Strongly Disagree	Disagree	Undecided	Agree	Stongly Agree
. Compatibility of Mission	6.3	9.4	6.3	46.9	31.3
. Compatibility of Long Term Objectives		3.1	43.8	43.8	12.5
. Compatibility of Organizational Cultures	3.1	21.9	21.9	43.8	9.4
. Compatibility and Complementarity of Work Habits and Attitudes of Partners	6.3	18.8	37.5	34.4	3.1
. Assurance of Job Security	3.1	3.1	18.8	43.8	31.3

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. Customer Support	3.1	31.3	21.9	31.3	12.5
. Support of Elected Officials	3.1	9.4	12.5	37.5	37.5
. Assurance of Equal Motivation of Partners	3.1	6.3	18.8	46.9	25.0

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that their jobs are safe. This is important whether the collaboration is in the form of contracting, alliance or merger. Unless such assurance can be given, employees often feel less committed to the organization and might seek alternative employment. If key personnel are lost because of a feeling of less job security, the performance of the organization will be adversely affected. From Table 4.1, assuring employees of their job security is very important in collaboration. About 78.1% at least agree that job security must be assured. Only 6.2% of the respondents disagreed or strongly disagreed about assuring job security in collaboration. This leaves the impression that employees are often not strongly involved in the process of collaboration.

Other factors considered by firms in the process of collaboration include customers/rider support, ensuring that partners are equally motivated, and involvement of elected officials. The table shows that nearly half of the firms that collaborate agree that seeking customer support is necessary. Comparatively, 71.9% at least agree that the partners should be equally motivated about the collaboration while almost the same percent (75%) at least agree that the involvement of elected officials in the collaboration process must be sought.

In summary, all the factors that we have considered in this section are important and must be considered in the process of collaboration. Judging from the percentages of the respondents that at least agreed to the statements, compatibility of the long term objectives of the partners is the most important to consider in the collaboration process. Compatibility of missions, assuring employee job security, the involvement of elected officials, and ensuring that all partners are equally motivated are also important factors to consider when collaborating.

To further provide understanding of the role of top management in ensuring the continuity of the collaboration, we asked survey participants to respond to a series of questions. The responses are summarized in Table 4.2. All respondents agreed or strongly agreed that top management commitment to the collaboration is important. When the commitment of top management and elected officials to the collaboration is high as above, it could translate into giving management the authority to make key decisions that affect the organization. Thus, it is not surprising that most respondents, at least 71.5%, agree that the collaboration manager has the authority to establish strategic objectives for the collaboration, and 50% agree that strategic decisions are made by elected officials and city government. Also, because of the high level of commitment of top management to collaboration, it was not a surprise that 84.4% of the respondents agree that the authority to make system improvement decisions resides with the collaboration manager.

In most collaboration efforts, decisions are consensual and not based upon majority vote. For example only 28.2% of the respondents at least agreed that major decisions are by majority vote compared to 50% who at least agreed that such decisions are based on consensus. The effect of such decision making is to minimize the adverse impacts of decisions on the partners, and to create a cordial atmosphere for organizations to work together. Basing decisions on consensus opens up the organization to accept and evaluate new ideas; it creates an amicable environment for participation

**TABLE 4.2 - POLITICAL, MANAGEMENT SUPPORT AND EMPOWERMENT**

Factors	Response Percentages				
	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
. Top Management and Administrators' Commitment	-	-	-	68.8	31.2
. Support of Elected Officials	-	3.1	12.5	62.5	21.9
. Management Provides Sufficient Resources to the Collaboration	3.2		3.2	61.3	32.3
. Members of Collaboration Open to Ideas of Other Members	3.1	3.1	12.5	71.9	9.4

. Major Decisions by Majority Vote	15.6	28.1	28.1	21.9	6.3
. Major Decision by Consensus	9.4	9.4	31.3	40.6	9.4
. System's Management has Authority to Establish Long Term Objectives	-	9.4	18.8	62.5	9.4
. Authority to Make Strategic (Long Term) Decisions Reside with Elected Officials and City Government	9.4	18.8	21.9	37.5	12.5
. Authority to Make System Improvement Decisions Resides with the System Manager	-	9.4	6.3	62.5	21.9
. The Role of the Collaboration Manager is Limited to Implementation of the Decision of Elected Officials	9.7	48.4	19.4	16.1	6.5
. The Collaboration Managers are Involved in all Decisions Regarding the Operations and Future Direction of the Transit System.	3.2	6.5	9.7	64.5	16.1
. The Collaboration Managers are Empowered to Initiate Transit System's Improvement Ideas.	3.2	9.7	6.5	71.0	9.7
. Collaboration Managers are Sufficiently Empowered to Make Operations Decisions.	-	6.5	3.2	64.5	25.8
. The Organizational Structure of the Collaboration is Designed in a Way that Insulates it From Politics of the Participating Cities	6.5	22.6	29.0	29.0	12.9
. When Problems or Conflicts Arise there are Administrative Processes in Place to Quickly Resolve Them.	-	3.2	12.9	71.0	12.9

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and a process for conflict resolution. In fact, as Table 4.2 shows, most respondents (81.3% and 83.9%), respectively, agree that their collaboration arrangements are open to members to express their ideas, and that there is a process in place to quickly resolve problems.

We have alluded to the role of the collaboration manager in the above discussion in terms of making strategic decisions. The manager's role is however more involved than this. In most



transit organizations that collaborate, the manager is involved in all major decisions as indicated by 80.6% of the respondents in Table 4.2. This means that the manager is not subordinate to the process. Emphasizing this point, only 22.6% of the respondents agreed that the manager's role is limited to implementation of the decisions of elected officials. In addition, the collaboration manager is empowered to initiate transit system's improvement decisions in 80.7% of the responding firms, and to make daily operations decisions in 90.3% of the firms. Therefore, the collaboration manager plays an important role in both the strategic and short term initiatives of the organization.

**OUTCOMES OF COLLABORATION**

Collaboration among transit firms can lead to various outcomes including increased travel, service coverage, more service options, more revenues and lower costs. Table 4.3 shows the levels of agreement and disagreement among firms regarding the outcomes of their collaboration. In most firms collaboration has many positive impacts. For example, except in three questions, most respondents agree or strongly agree that collaboration has led to positive outcomes. About 93.8% and 93.7% respectively at least agree that collaboration promotes area-wide travel by public transportation, and enables firms to provide more public transit options. Comparatively, 87.1%, 74.2%, and 72.1% of the respondents respectively at least agree that collaboration improves route coverage, ridership, and access to public facilities. Although one would expect these effects (increased ridership, access and coverage) to result in higher revenues, only 48.4% of the respondents at least agreed that revenues have increased. Therefore, increased ridership from collaboration has not led to higher revenues. This is because perhaps the extent of collaboration is not extensive enough to have impact on revenues. Alternatively, we may argue that collaboration in its various

**TABLE 4.3 - RATINGS OF OUTCOMES OF COLLABORATION - % RESPONDENTS**

		Response Percentages				
Variables		Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
C	Collaboration promotes area-wide travel by public transportation (Q42)	0	3.1	3.2	68.8	25.0

C	Collaboration has improved overall route coverage (Q43)	3.2	9.7	12.9	58.1	16.1
C	Collaboration has enabled us to provide more public transit options (Q44)	0	0	0	65.6	28.1
C	As a result of collaboration people now see public transit as an attractive alternative to private automobile (Q45)	3.1	15.6	37.5	37.5	6.3
C	Collaboration has led to increased ridership (Q46)	0	15.6	12.5	62.5	9.4
C	Collaboration has increased access to public facilities (Q47)	0	6.5	6.5	67.7	19.5
C	Collaboration has enabled us to reduce overall transit system cost (Q48)	3.1	18.8	25.0	40.6	12.5
C	Collaboration has enabled us to reduce waiting time (Q49)	7.1	21.4	35.7	28.6	7.1
C	Collaboration has increased revenue from transit (Q50)	3.2	9.7	38.7	45.2	3.2

**TABLE 4.4 - MEAN RATINGS OF OUTCOMES**

	Outcomes	Mean	Standard Deviation
C	Collaboration promotes area-wide travel by public transportation (Q42)	4.23077	0.65163
C	Collaboration has improved overall route coverage (43)	3.76923	1.03180
C	Collaboration has enabled us to provide more public transit options (Q44)	4.1923	0.80096
C	As a result of collaboration people now see public transit as an attractive alternative to private automobile (Q45)	3.30769	0.97033
C	Collaboration has led to increased ridership (Q46)	3.69231	0.88405
C	Collaboration has increased access to public facilities (Q47)	4.03846	0.72004
C	Collaboration has enabled us to reduce overall transit system cost (Q48)	3.30769	0.88405
C	Collaboration has enabled us to reduce waiting time (Q49)	3.03846	1.04954
C	Collaboration has increased revenue from transit (Q50)	3.30769	1.07632

**TABLE 4.5 - CORRELATION MATRIX**

	Q42	Q43	Q44	Q45	Q46	Q47	Q48	Q49	Q50
Q42	1.0000								
Q43	0.2708 (0.0990)	1.00							
Q44	0.3714 (0.0309)	0.3463 (0.0415)	1.00						
Q45	0.5158 (0.0035)	0.3535 (0.0383)	0.3840 (0.0264)	1.00					
Q46	0.2671 (0.0936)	0.5768 (0.0010)	0.4823 (0.0063)	0.3946 (0.0204)	1.00				
Q47	2.361 (0.1228)	0.4670 (0.0049)	0.8190 (0.0048)	0.4976 (0.0048)	0.6477 (0.0002)	1.00			
Q48	0.3599 (0.0355)	0.1790 (0.1908)	0.0220 (0.4576)	0.1390 (0.2492)	0.2786 (0.0841)	-0.0163 (0.4685)	1.00		
Q49	0.4431 (0.0117)	0.6566 (0.0013)	0.4087 (0.0191)	0.4095 (0.0189)	0.6015 (0.0058)	0.4625 (0.0087)	0.4140 (0.0178)	1.00	
Q50	0.1496 (0.2329)	0.4756 (0.0070)	0.1955 (0.1692)	0.1184 (0.2823)	0.4331 (0.0136)	0.3577 (0.0364)	0.3681 (0.0321)	0.3234 (0.0535)	1.00

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One tailed significance shown in parentheses

forms affects only a small part of transit operations or that it occurs in areas that do not significantly affect revenues.

Collaboration too has not had a large impact on quality of service in terms of waiting time nor has it changed the views of transit as a viable alternative to the private automobile. Only 35.7% of the respondents at least agree that collaboration has improved service in terms of waiting time, and 43.8% at least agree that as a result of collaboration people now see public transit as an attractive alternative to the private automobile. The majority of the respondents clearly do not agree with these statements or are undecided about the impact of collaboration on service.

The mean ratings of the respondents regarding the above outcomes also are presented in Table 4.4. On the average the ratings are quite high indicating that most respondents feel collaboration has improved transit operation. Most impacts of collaboration are in terms of increased area-wide travel by public transportation, followed by increased transit options and access to public facilities. Its least impact is on cost and travel time reductions. Since the standard deviations of the outcomes are relatively small compared to the mean values, there are not large differences in the ratings between respondents.

Also, firms rate the impact of collaboration similarly as evidenced by the correlation matrix in Table 4.5. Specifically, an improvement in one outcome is associated with an improvement in another. Only the sign of the correlation coefficient for cost reduction from collaboration and access to public facilities is negative, suggesting that firms that responded that collaboration increased access are also those that indicated it had not reduced cost. This coefficient however, is not statistically significant. Similarly, at the 5% level, most of the correlation coefficients for cost reductions from collaboration and the other outcomes are insignificant, though their positive signs suggest that firms that rate cost reduction from collaboration highly also rate other outcomes highly. The other insignificant correlation coefficients are for increased revenues from collaboration on one hand, and promotion of area-wide travel, provision of more public transit options, reductions in waiting time, and increased customer perception of transit as an alternative to transit on the other.

### **Determinants of Collaboration Outcomes**

Given the results of the collaboration outcomes it is of interest to identify determinants of these outcomes (i.e., the factors that best explain them). To do so, we must develop models that relate these outcomes to hypothesized determinants or factors, e.g. top management commitment, the degree of authority given to the collaboration manager, and congruency of the goals and missions of the partners. The development of these models can be enhanced by reducing the number of hypothesized factors to a manageable number representing all the information contained in the original set of outcomes. We accomplish this by utilizing the statistical technique, factor analysis,

to convert the ordinal measures of outcomes into new interval measures. These new measures are

**TABLE 4.6 - FACTOR SCORE COEFFICIENT MATRIX**

Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Q42	-0.0172	-0.2147	0.5564	0.2801	-0.0699
Q43	-0.2872	0.6197	0.0281	-0.2997	0.0891
Q44	0.6798	-0.2500	-0.1288	0.1580	-0.1561
Q45	-0.2019	-0.0217	0.7768	-0.3443	0.1484
Q46	0.1733	0.2811	-0.2009	0.0724	-0.0277
Q47	0.4683	-0.0792	-0.0461	-0.1392	0.1049
Q48	0.0119	-0.1012	-0.1208	0.7917	0.0264
Q49	-0.0620	0.5723	-0.1287	0.2240	-0.4283
Q50	-0.0525	-0.2219	0.0415	-0.0240	1.0029

**TABLE 4.7 - ROTATED FACTOR MATRIX**

Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Q42	0.1821	0.0832	0.7578	0.4506	-0.0411
Q43	0.1415	0.8443	0.1780	-0.0433	0.3058
Q44	0.9282	0.1354	0.2041	0.0516	-0.0001
Q45	0.2203	0.2560	0.8575	-0.0859	0.0721
Q46	0.4979	0.6206	0.0854	0.1698	0.2403
Q47	0.8424	0.3316	0.2075	-0.1345	0.2209
Q48	-0.0632	0.1588	0.0965	0.9100	0.2167
Q49	0.2458	0.7917	0.2231	0.3745	-0.0368
Q50	0.1443	0.2304	0.0153	0.2110	0.9186

used in the subsequent development and estimation of models explaining given outcomes of collaboration.

Table 4.6 shows the factor score coefficient matrix from the factor analysis. Five factors were identified and explain 87.3% of the cumulative variation in the outcomes. In Table 4.7 the rotated factor matrix is shown and clearly identifies the outcomes associated with each factor. Factor one is closely associated with the availability of more public transit options to serve the transit captive population, and accessibility to public facilities. Therefore, it is an accessibility factor. Factor two is closely associated with increased ridership, improved route coverage, and reduction in passenger waiting time. Factor two is described as output factor. On the other hand, factor three is a measure of competitiveness, since it is closely related to increased area-wide travel by public transportation. Factors four and five relate to cost savings and revenue increases respectively. Interestingly, these last two factors, are independent of any other outcome. Also, notice that Table 4.7 gives a more identifiable variable structure than Table 4.6. Using the factor score coefficients we construct the new outcome factor variables (accessibility, output, competitiveness, cost, and revenue) and relate them to given outcomes of collaboration.

Certainly, the outcomes of collaboration depend upon how it was established, commitment of top level management, and the authority given to the collaboration manager over services. The outcomes also depend upon how the manager is empowered, compatibility, and complementary of work habits, missions strategic goals, and cultures. Firms that share common goals for example are likely to realize positive outcomes from the collaboration than firms that do not. Firms that rate output increases from their collaboration highly (i.e. strongly agree that collaboration has increased ridership) are those that are likely to agree strongly that collaboration has improved accessibility and competitiveness. Similarly, firms that rate output increases highly are likely to be those that involved their customers in the initial planning of the collaboration. That is, these are the firms that strongly sought customer support for the collaboration. Therefore, we hypothesized the following equation to explain output increases from collaboration.

$$Q = Q(A_c, C_{om}, M_D, C_I, P_M, X_1, X_2, X_3) \quad (4.1)$$

- Q = Output variable from factor analysis
- A<sub>c</sub> = Accessibility variable from factor analysis
- C<sub>om</sub> = Competitiveness variable from factor analysis
- M<sub>D</sub> = Management involved in all of the major decisions regarding operations and future directions
- C<sub>I</sub> = Customer involvement in the collaboration
- P<sub>M</sub> = Equal motivation of partners
- X<sub>1</sub> = Top management commitment
- X<sub>2</sub> = Major decision by majority vote
- X<sub>3</sub> = Authority to make system improvement decisions

Beside passenger increases, collaboration also may lead to cost savings. The amount of cost saving not only depend upon the ratings of ridership attraction (implying economies of scale), but also upon the ratings of top management commitment, availability of resources for the collaboration, authority to establish system goals, and how the manager is empowered to make decisions regarding operations.

Equation 4.2 is the hypothesized relationship between cost savings and the explanatory variables. Included in this equation are compatibility of long term objectives and cultures of the

$$C = C(Q, Z_1, Z_2, Z_3, Z_4, Z_5, Z_6, Z_7, Z_8, Z_9, Z_{10}, Z_{11}, Z_{12}, Z_{13}, ) \quad (4.2)$$

partners to the collaboration.

- C = Cost savings variable constructed from factor analysis
- Z<sub>1</sub> = Management provides sufficient resources to collaboration
- Z<sub>2</sub> = Employee job security
- Z<sub>3</sub> = Compatible long term objectives
- Z<sub>4</sub> = Compatible cultures
- Z<sub>5</sub> = Compatible mission



**TABLE 4.8 - MAXIMUM LIKELIHOOD ESTIMATION RESULTS**

Variable	Parameter Estimate	Standard Error	Probability >*T*
<b>A. Output Equation</b>			
Intercept	3.6647	2.8607	0.2174
Accessibility (A <sub>C</sub> )	0.5521	0.2144	0.0196*
Manager's Involvement in Major Decisions (M <sub>D</sub> )	-0.6915	0.3651	0.0753**
Competitiveness (C <sub>OM</sub> )	0.5651	0.2680	0.0501*
Customer Involvement (C <sub>I</sub> )	0.5240	0.2319	0.0372*
Equal Motivation of Partners (P <sub>M</sub> )	0.0772	0.3073	0.8047
Top Management Commitment (X <sub>1</sub> )	-0.2879	0.4885	0.5634
Collaboration Manager Empowered to Initiate Improvement Ideas (X <sub>3</sub> )	0.1504	0.2534	0.5591
Collaboration Managers Sufficiently Empowered to Make Daily Operation Decisions (X <sub>2</sub> )	-0.5048	0.3317	0.1464
Adjusted Rsq = 0.7981 F = 13.349 Prob > F = 0.0001			
<b>B. Cost Savings Equation - Ratings of Cost savings</b>			
Intercept	-1.0598	1.7062	0.5484
Output (Q)	0.2239	0.0743	0.0130*
Management Provides Sufficient Resources (Z <sub>1</sub> )	1.9441	0.6029	0.0091*
Assurance of Job Security (Z <sub>2</sub> )	-0.5327	0.1444	0.0042*
Compatible Long Term objectives (Z <sub>3</sub> )	-0.0637	0.2383	0.7946
Compatible Cultures (Z <sub>4</sub> )	0.3891	0.2208	0.1086
Compatible Mission (Z <sub>5</sub> )	-0.1312	0.1516	0.4071
Compatible and Complementary Work Habits (Z <sub>6</sub> )	0.5947	0.2450	0.0356*
Top Management Commitment (Z <sub>13</sub> )	0.3614	0.4804	0.4692
Decision by Majority Vote (Z <sub>12</sub> )	-0.7172	0.2194	0.0084*
Openness to Member's Ideas (Z <sub>7</sub> )	0.7364	0.3444	0.0582**
Decision by Consensus (Z <sub>8</sub> )	0.2450	0.1964	0.2406
Authority to Establish Strategic Objectives (Z <sub>9</sub> )	-0.3773	0.3530	0.3102
Authority to Make System Improvement Decisions (Z <sub>14</sub> )	-0.2886	0.2341	0.2459
Manager's Role Limited to Implementing Decision of Elected Officials (Z <sub>10</sub> )	-0.0643	0.1501	0.6775
Administrative Processes in Place to Resolve Problems (Z <sub>11</sub> )	-1.0307	0.3768	0.0210*
Adjusted Rsq. = 0.8660 F = 11.772 Prob > F = 0.0002			

\*Significant at 0.05 level; \*\* Significant at 0.10 level.

- Z<sub>6</sub> = Compatible and complementary work habits
- Z<sub>7</sub> = Openness to a member's ideas
- Z<sub>8</sub> = Decision making by consensus
- Z<sub>9</sub> = Authority to establish strategic objectives
- Z<sub>10</sub> = Managers role limited to implementing decisions of elected officials
- Z<sub>11</sub> = Administrative processes in place to resolve problems
- Q = Output variable from factor analysis.
- Z<sub>12</sub> = Decision-making by majority vote
- Z<sub>13</sub> = Top management commitment
- Z<sub>14</sub> = Collaboration manager's authority to make system improvement decisions.

If the objectives and cultures are compatible, the firms will be able to collaborate and save cost. However, incompatibility of objectives, missions, and cultures could lead to partners pursuing different objectives, and this could increase cost. Similarly, incompatibility of work habits is likely to result in delays in decision making, work flow, and increase cost. Cost saving will also be affected by decision making style, and the presence of administrative processes to resolve problems.

Equations (4.1) and (4.2) form a recursive system because output which is a dependent variable in the former equation is an explanatory variable in the second. Therefore, they are estimated by means of limited information maximum likelihood method. The estimation results are in Table 4.8. Considering the output equation, it is evident that accessibility, competitiveness of transit in relation to the automobile, and involvement of customers in the collaboration process lead to increases in output. Higher ratings of these variables are associated with strong agreements that collaboration has increased output. At the 8% level of significance higher levels of the collaboration manager's involvement in all major decisions are negatively associated with higher ratings of output. Though this result is puzzling it suggests that the collaboration manager must leave some decisions, particularly those related to service, to others who are closer to customers.

The cost impact equation explains 86.60% of the variation in the ratings of cost increase and

its F-value is highly significant. Many of the coefficients in this equation are also significant at the 0.05 level or better. Focusing only on the significant coefficients, the positive coefficients of output, management provision of sufficient resources to the collaboration, compatibility and complementarity of work habits and openness to the ideas of partners increase cost savings from the collaboration. However, assuring employees that their jobs will be secured in the collaboration reduces cost savings. This is plausible because such an assurance does not allow management to rid itself of labor that may become redundant from collaboration. Similarly, when decision making is by majority vote it could alienate minority views and reduce motivations to contribute to the collaboration. This alienation does not allow the partners to enjoy high cost savings from the collaboration. Also, the table shows that setting up administrative processes to quickly address problems reduces cost savings because they add to cost.

The table shows that though compatibility of mission, and cultures are important in collaboration they do not significantly affect cost savings. Similarly, though top management commitment is essential to collaboration it does not translate into cost savings. Top management commitment indicates the importance of the collaboration to the organization, and the need for employees to focus on its success. Cost savings also do not result from empowering the collaboration manager to establish strategic or system improvement decisions. Since these decisions affect all partners to the collaboration they (the partners) are the ones to make them. Moreover the collaboration manager is an agent of the partners, and though he acts on their behalf in some decisions he cannot make decisions that affect the long term viability of the collaboration. Finally, when the manager's role is limited to implementing the decisions of elected officials it could affect cost savings. Though the coefficient of this variable is insignificant, its negative sign suggests possible reductions in cost savings when this situation occurs. Therefore, the involvement of elected officials must be limited to seeking resources and support for the collaboration.

## CASE STUDIES

### 1. METRO ATLANTA RAPID TRANSIT AUTHORITY (MARTA)

**Alliance:** The Metro Atlanta Rapid Transit Authority (MARTA) was created to provide multi-modal transit services throughout the city of Atlanta. Over the years, however, the city has lost much of its working class and middle to upper income population to the adjoining counties of Fulton, Gwinnett, Dekalb and Clayton. Despite this population shift travel into Atlanta to work, shop, and conduct business continues to increase, resulting in traffic congestion, and the attendant problem of air pollution from automobile exhaust.

To solve the congestion and air pollution problems and to facilitate travel from the adjoining counties into and within the city of Atlanta, MARTA invited transit systems in the adjoining counties to join the full range of transit services which MARTA provides in a cross-jurisdictional collaborative arrangement. To fund this arrangement, the counties were required to increase their respective sales taxes by one percent.

All the adjoining counties refused to accept MARTA's invitation partly because of citizens' objection to the one percent increase in sales tax. In addition, most of the counties feared that such collaboration would make it too easy for inner city population to come into their neighborhoods, bringing with them inner city problems and crime that will erode their property values, and their quality of life. Also, MARTA's invitation was considered rigid, because it did not give the counties the option to join only the parts of MARTA's services they needed. Another reason was the

traditional anti-transit attitude of suburban population. Furthermore, the counties felt that MARTA was dictating to them the terms of the collaboration without much input from them, thereby threatening their independence.

According to MARTA officials, however, the primary motivation for proposing the collaboration was to enable it to tap into the fast growing population of the adjoining counties and to give the counties the opportunity of becoming a part of a larger transit system at a very small cost - 1% increase in the sales tax. When this quest for collaboration did not yield favorable results MARTA sought other ways to increase ridership. It made another proposal to the surrounding counties for collaboration under different terms. Instead of funding collaboration with an increase in sales tax, a reciprocal arrangement was proposed whereby the county and MARTA systems accept free transfers from each other's system, since they had adjoining but not overlapping services. Thus, passengers traveling from a county to Atlanta would pay their fares to the originating transit system and receive a free transfer for MARTA's service to Atlanta. These transfers would enable passengers to travel to Atlanta from the counties by MARTA's buses and trains without additional charge. The return fares would be collected by MARTA which will also issue free transfers to passengers to interline with the county transit systems. Again, MARTA's transfer tickets would enable passengers to travel to and within their counties at no additional charge.

This form of collaboration is equivalent to each firm quoting through fares. Unlike normal through fare arrangements, where there are revenue division methods, each system keeps its revenue from the transferring passengers. However, there is implied revenue division with the system originating the most one-way interlining trips receiving the most revenue. If individuals use these systems for work trips then the revenues generated by the interlining passengers are shared equally by the systems irrespective of passenger trip length.

Despite its appeal only one county, Dekalb, agreed to collaborate with MARTA. MARTA and Dekalb county expressed satisfaction with this arrangement. Both have observed revenue increases from increased ridership from this arrangement. An advantage of this collaboration is that

by increasing transit usage it reduces both congestion and air pollution. We must point out that this form of collaboration works if the marginal cost of each transferred passenger is very small which will be the case when there is excess capacity or during off peak periods. When there is congestion such as during peak periods the addition of the transferring passengers undoubtedly creates additional resource cost to the transit system and cost to passengers.

**Contracting:** Contracting at MARTA takes various forms ranging from janitorial services to capital improvements. For our purposes only recurring contracts or those that must be renewed are of interest. These contracts are those awarded for battery and tire replacement, janitorial services, industrial waste removal, plant maintenance, service repair for monitors, welding and first aid supplies and paratransit services. The contracts that are for the supply of materials are offered to avoid paying spot market prices that may be substantially higher than wholesale prices and are usually awarded to brokers. In addition to interagency contracting arrangements for passenger service, other recurring contracts also are discussed below for a number of reasons. First, they show that contracting/outsourcing is widespread in MARTA as a cost reduction method and not just limited to service. Second, as our survey also indicates transit firms in general and MARTA in particular are moving away from service contracting and are focussing more and more on contracting for supplies and maintenance. This perhaps reflects dissatisfaction with the quality of service provided by contractors. Of the recurring contracts most recent ones are discussed below.

*Paratransit Service:* MARTA contracts the provision of paratransit services to private providers.

This is a turnkey contract that requires the contractor to provide services according to specifications. The selection of the contractor is based upon several factors such as demonstrated ability in operating a similar scope of services. Also, the ability to undertake high performance contracts is a consideration in awarding the contracts. Paratransit contracts at MARTA include existing laws and regulations to which the contractor must conform. In particular, the contractor is required to respond to questions related to the Americans with Disability Act (ADA). This Act makes the provision of paratransit services, particularly those for the elderly and handicapped, expensive. A problem that often arises in MARTA's service contracting is the level of risk the

provider is to assume. This is because the contractor cannot be asked to assume all risks. Also, contracting does not indemnify MARTA against risks of nonperformance by the contractor. MARTA must still respond to its public when there is dissatisfaction with service. To reduce this risk, MARTA requires the contractor to post service performance bonds and carry liability insurance.

Another problem with paratransit service contracting arises when a new contractor must be hired because of nonperformance by the existing contractor. This creates administrative hassles in facing a new service provider whose performance is little known except as indicated by its references. Moreover, the new provider must be reoriented to what MARTA wants and expects to accomplish. Regardless how detailed the reorientation there is always a risk of poor performance because one cannot put enough details in contracts to ensure quality service.

*Battery Lease Agreement:* Until recently MARTA purchased batteries for its buses and maintained them in its shops. When purchased each battery costs \$120 and is used for approximately eight months and then replaced. Considering that each bus takes two batteries, and that MARTA operates about 2800 buses, it costs about \$403,200 each year to replace the batteries not counting labor cost, and allowing for 20% spare. MARTA was also required by law to properly dispose of old batteries. This approach meant that old batteries were taken off buses daily, serviced, and put back on the buses. It also meant that two or three maintenance employees were assigned full time to battery maintenance. Moreover, there was always the fear of acid spills and the possibility of employees hurting themselves from exposure to battery acid. To combat these problems, MARTA conducted an in-house study on battery replacement and proposed to its management and board to lease batteries instead of buying and maintaining them on site.

The new lease agreement requires MARTA to pay fifteen dollars (\$15) per month per bus or \$504,000 which is relatively more expensive than the old practice of buying batteries. The vendor delivers new batteries twice weekly to MARTA's maintenance facilities and picks up those taken off the buses. The old batteries are then sent to a factory where they are cleaned, shredded, and the material used to make new batteries. An advantage of the lease agreement is that MARTA does not

have to keep a large inventory of batteries so its inventory cost is low. Moreover because no employee is dedicated fully to battery maintenance, more employees now are available to perform other maintenance tasks.

The lease agreement is comprehensive. Perhaps the most important provision relates to contract cancellation. If the agreement is canceled, the contractor must leave the batteries on all the buses and must provide additional 20% spare batteries.

*Fuel Purchase Contract:* Beside the battery lease agreement, MARTA also is involved in contracting for fuel purchase. Again, the purpose is to avoid paying spot market prices for fuel. MARTA uses approximately 45 million gallons of fuel annually and in 1993 it spent approximately \$5.7 million on fuel. Because of the large amount of fuel needed and the large sum of money involved, MARTA contracts out its fuel purchase. Recently, it signed a \$27 million contract with a broker to supply fuel for five years, a saving of \$1.5 million based upon its 1993 cost. This contract has run into problems because the contractor could not deliver the fuel. The feeling at MARTA is that the broker's bid was too low (\$0.05/gallon lower) and the broker cannot provide the fuel at that bid. Consequently, MARTA is considering two options: to buy fuel at spot market prices, or to ask the current contractor to continue supplying diesel fuel beyond the contract date until a new supplier is found. Either option is likely to result in higher cost. But, the second option is particularly troublesome, because MARTA's regulations do not allow it to extend an existing contract at a higher price without offering it for bids. The experience from this failed fuel contract underscores the dangers in contracting. Selecting a contractor based upon the lowest bid may not be advantageous without considering the ability of the contractor to meet the obligations of the contract.

*Tire Service Contract:* Another long term MARTA contract involves tire service. This contract has been in existence for years and predates the contracting movement of the early 1980s. For years MARTA has depended upon an outside contractor to change the tires on its buses on site. This means that the contractor performs the tire service on the same premises where local union members



perform other bus maintenance jobs. The uniqueness of this is that it is contrary to what one would expect in other transit firms. In these firms, nonunion labor performing contract jobs cannot work side by side with union members in the same facility. The reason MARTA is able to maintain this arrangement is that it has been the practice for years without anybody questioning it.

**Lessons Learned:** From MARTA's experience, the following are some of the lessons to be learned:

1. Economic rationale alone is not sufficient to make a collaboration arrangement work. Citizens' attitudes toward transit service and tax implications or sources of funding are major considerations. As can be seen from MARTA's experience even a 1% increase in sales tax could be resisted if the citizens have an anti-transit attitude.

2. The support of local government leaders is extremely important especially in a political structure like in Georgia where citizens do not have the authority to bring an issue to a referendum. This political structure concentrates power and because of the general dislike for transit in the counties it makes it difficult to force a vote on transit issues.

3. Bilateral input is crucial when proposing a cross jurisdictional collaboration arrangement, especially when it involves smaller and much larger transit systems or local governments. Additionally, any proposal for a collaborative arrangement must be carefully crafted as not to be perceived as a threat to the independence of the smaller systems or governments.

4. In an effort to save cost MARTA concentrates on contracting not only service provision but functions that are traditionally performed internally. In most cases the rationale for contracting is cost saving but in others, as in the battery lease agreement, it is clear that the motivation was not on cost but orderly work flow.

## **2 - HAMPTON ROADS TRANSPORTATION DISTRICT (HRTD)**

In October, 1996 the Virginia regional public passenger transportation systems -- the Tidewater Transportation District (TTD) and the Peninsula Transportation District (PTD) -- entered into a non-binding memorandum of intent to consolidate to create a single (or greater) regional public passenger transportation system for the Hampton Roads region (which encompasses the Tidewater and Peninsula regions) of the Commonwealth of Virginia. This consolidated system is to be named the Hampton Roads Transportation District (HRTD). The memorandum is now before the individual cities of the region for their approval. Closure on the definitive agreement is expected May 1, 1997; if so, the assets and liabilities of the TTD and the PTD will be transferred to the HRTD. The functions, affairs and property of the consolidated regional transportation district will be managed and controlled by the Hampton Roads Transportation District Commission (HRTDC).

The TTD was chartered in 1973 to provide public passenger service in the cities of Chesapeake, Norfolk, Portsmouth, Suffolk and Virginia Beach (i.e., the Tidewater region of Virginia). The TTD is managed and controlled by the Tidewater Transportation District Commission (TTDC) whose members are appointed by the five cities and the Virginia Department of Rail and Public Transportation. The TTDC provides two transit (or fixed-route) services, motorbus (utilizing a fleet of 168 buses) and ferry (three in service), and several paratransit services including dial-a-ride, vanpool and subscription elderly and handicapped services. The latter service is provided under contract to local public and non-profit agencies. That is, these agencies are coordinating agencies in that they receive requests for elderly and handicapped services and contract the TTDC to provide the services.

The PTD was chartered in 1975 to provide public passenger service in the cities of Hampton and Newport News (i.e., the Peninsula region of Virginia). The PTD is managed and controlled by the Peninsula Transportation District Commission (PTDC) having members appointed by the two cities and the Virginia Department of Rail and Public Transportation. The PTDC provides fixed-

route bus service (utilizing a fleet of 130 buses), several shuttle bus services to and from major work centers, dial-a-ride service for the elderly and handicapped and contract public school transportation service for the City of Hampton.

**Motivations:** Motivations for consolidating two regional public transportation systems into the greater regional system, the HRTD, include: regional momentum, staff cost savings and political clout. The formation of HRTD is expected to provide momentum for the formation of other Hampton Roads regional authorities to address regional problems.

A number of duplicate staff jobs in the current systems would be eliminated, resulting in staff cost savings. The Executive Director of the TTDC and the Executive Director of the PTDC will develop a staffing plan for non-union employees of the HRTDC. Retention of staff members from the two districts will be based on performance and availability of positions. Reduction in the number of staff members due to elimination of positions will be accomplished by retirement, attrition and the use of severance packages and out-placement services where possible.

Hampton Roads is the twenty-six largest metropolitan area in the United States. Hence, the HRTD will have greater political clout (at federal and state levels) than the two present systems (the TTD and the PTD). At the federal level it will have the ability to obtain larger amounts of federal capital and specific project assistance funds. Its ability to obtain larger state transit capital and operating assistance funds will also be enhanced. Further, it will have greater political clout in pressuring the state's General Assembly for passage of tax legislation providing for local transit earmarked-tax revenue.

**Impediments:** The primary impediments so far to the formation of HRTD have been parochialism, allocation (service, revenue and cost) agreements and distribution of property if HRTDC ceases operation. The concern for protection of local government authority and the interests of the Tidewater and Peninsula regions is evident in the proposed governance structure. Specifically, the HRTDC will initially have 15 voting members, two appointed by each component government of

the HRTD and an ex officio member, the Chairman of the Commonwealth Transportation Board (or his designee). After the initial meeting of the HRTDC, proposed legislation will be presented to the General Assembly of Virginia providing that one member of the House of Delegates and one member of the Senate who reside within the boundaries of the component governments of the HRTD also be voting members of HRTDC: One member must reside within the boundaries of a component government of the Tidewater (or Southside) region and the other of a component government of the Peninsula region. A majority of the Commission shall constitute a quorum, but must include one Commissioner from a majority of the component governments. The vote of the majority of members present (assuming a quorum) must include an affirmative vote from the majority of the represented component governments for any action to be taken.

The Executive Director of TTDC recently retired and was replaced by an interim director. The current Executive Director of the PTDC has been named to become the first Executive Director of the HRTDC. Unlike the situation in the present districts, the HRTDC will also have a Chief Operating Officer who will be responsible for the day-to-day operation of the system and will report directly to the Executive Director. The Executive Director will have the authority to appoint the Chief Operating Officer; however, the initial appointment will be subject to approval by the HRTDC and can not be currently employed with either current district.

Each year, as part of the budgeting process, the HRTDC will propose a transportation service program (TSP) for the region, i.e., service by route, hours of service to be provided, estimated cost, estimated revenue and estimated city share of the service cost. The TSP will identify each city's service program and its estimated contribution based on estimated costs and revenues. Each participating city will have final determination of the type, amount and location of transportation service within its borders. By approving its portion of the TSP, each participating city agrees to pay monthly in advance its portion of the administrative, capital and net operating costs of the approved TSP.

There will be two divisions for the allocation of operating revenues and costs -- the

Southside Division consisting of the cities of Chesapeake, Norfolk, Portsmouth, Suffolk, Virginia Beach and other cities or counties on the Southside which may become members of the HRTD and the Peninsula Division consisting of the cities of Hampton, Newport News and other cities or counties on the Peninsula which may become members of the HRTD. All passenger revenue collected within the borders of a participating city will be credited to the service and the participating city in which it was collected. Auxiliary revenues will be allocated based on the relative share of "in-service hours" or "in-service miles" operated by that division and will be used to finance overhead costs. Federal and state funds received to reimburse net eligible operating expenses will be allocated to each division based upon its proportion of the HRTD's net operating expenses. The formula funds will then be distributed to the transportation services operated within the division on the same basis. Dedicated revenues such as a tax on gasoline will be allocated by the HRTDC.

Administrative costs will be borne equally by each participating city. Overhead costs for a division which operates multiple transportation services will be proportioned on the basis of total participating city "in-service hours" received from that division to total "in-service hours" of the division. Federal and state governments are expected to provide significant financial assistance to the HRTDC for capital acquisitions. Participating cities are required to provide matching funds, i.e., local capital shares. Since these local shares may vary significantly on an annual basis, each participating city's annual local capital share contribution will be a percentage of the HRTDC's depreciation expense pro-rated to each city on the basis of its percentage of total transportation services received measured "in-service hours".

Transportation operating costs will be allocated among the participating cities in the following manner: For express services, the total operating costs of providing the service on each route will be assigned to the participating city having the open-door portion of the service. For regular route services, the total operating costs of each route will be allocated to each participating city in the division based on the relative share of "in-service hours" operated by the division in each participating city. When specifically authorized by the HRTDC, a maximum of seven percent of federal and state operating assistance funds received by the HRTDC each year will be used to cover

the operating costs of cross-roads service (i.e., service between the Peninsula and Southside regions).

Once the revenues and costs by route and/or city have been determined, the former are subtracted from the latter to determine if deficits exist. If funds are required after revenues, federal and state funds and any other assistance are applied to costs, the participating cities will provide the necessary funds to finance the remainder of the deficits.

If for any reason the HRTDC is dissolved, except for the purpose of transferring the entire operation to another agency, the HRTDC will distribute all of its property and funds to participating cities in the following manner: The value of the property distributed to each participating city shall be in proportion to the capital contribution each participating city has made to the HRTDC up to that time; the HRTDC will first offer to each participating city any land and building or other property with a useful life greater than twenty years, acquired by the HRTDC and located in the participating city; and the value of all property will be determined by an independent appraisal and the participating cities will agree to use the values so determined in negotiations among themselves for the ultimate distribution of property among the participating cities.

### **3. CAPITAL AREA TRANSIT AUTHORITY**

Capital Area Transit Authority (CATA) is a small operation in Lansing Michigan. Its contracting efforts exemplify transit operations in small communities. This system provides both fixed-route and demand responsive services to Lansing and the surrounding communities. For many years its contract operations were classified as supplemental services by its management and Board though they covered 80% of CATA's paratransit services and were a major component of CATA's overall operations. About three years ago (1994) change in management brought about a change in philosophy by recognizing the importance of CATA's paratransit services and their contribution to the viability and effectiveness of the organization. Paratransit contracting at CATA is offered on competitive bid basis, and until 1993 it was a turnkey operation whereby the contractor provided the vehicles as well. This involved substantial expenditures on the part of the contractor. The biggest disadvantage was the realization by CATA that at the end of each contract it had no equipment to operate the service itself. Despite this disadvantage CATA continued this turnkey operations and

relied upon a local contractor to provide the service for many years thus allowing the contractor to recoup its capital. However, this increased the cost of the contract so in 1994 when a new contractor was selected based upon competitive bids CATA purchased the vehicles itself. The new contract requires that CATA remains the contact agency for service. Thus, all service calls are received by CATA thereby providing CATA the opportunity to maintain contact with the customer or users of this service. Also, CATA and the contractor schedule their portions of the service themselves.

CATA has three contract services. One is a shopping bus systems for seniors, and the others are rural bus and ADA operations. While the ADA system is dedicated to those with disabilities, the other services are open to those who qualify; particularly, the rural service is open to everyone. For every certified customer carried in the shopping and ADA operations the contractor receives \$8.63. Comparatively, the rural service operators are paid on revenue-hour basis. If one compares the \$8.63 paid to contractor to the \$12.00 it would cost CATA to directly provide the service, one gets the impression that contract operations at CATA is low cost. It should be noted however, that the \$8.63 which CATA pays to contractor does not include CATA's overhead in administering the system and maintaining passenger contact. The contract arrangement requires CATA to provide the the vehicles, receive service call from customers while contractors maintain vehicles, provide operating personnel and manage the scheduling system. There are certain advantages to this arrangement. First, it makes it easier for CATA to change contractors who do not perform with minimum switching cost and service disruption since vehicles are owned by CATA. Secondly, it provides CATA a direct link to customers for the purpose of monitoring the quality of service provided by contractors.

**Motivation:** CATA's efforts at contracting predate the federal initiatives of the 1980's by almost a decade. There are several factors that motivated the initial desire to contract out paratransit services in Lansing. Foremost were cost savings; it was realized initially that labor costs would be reduced if cheaper labor were used in paratransit operations instead of the highly unionized labor in Lansing. Though today this motivation is still true, compliance with the Americans with Disabilities Act is perhaps the driving force behind the paratransit service contracting in Lansing. Every contract

includes sections dealing with how the contractor will meet the requirements of this act. Quality of service is also a motivation for contracting at CATA. In fact CATA's contracts always include service quality provisions; service quality components are quantified into standards and are included in the contracts. These standards are monitored to ensure compliance and the assessment of penalties when quality requirements are not met.

**Impediments:** A major impediment to service contracting at CATA is labor unions. Transit labor is highly unionized but in the case of CATA the situation is worsened by the fact that it operates in an area where the labor market is dominated by unions. When CATA started its paratransit service it received the support of the unions because the union leadership felt the paratransit service would increase its ranks. Because CATA's contractor is not using unionized labor this has created union resistance because of fears widespread contracting within CATA that would eventually lead to slow rate of job growth which may eventually lead to losses of union jobs. The unions have proposed to the CATA board that their drivers operate the paratransit services.

Another impediment is finding a capable contractors with current communication and scheduling technology. While this may not be a problem in large communities it is in small communities as Lansing. Also, lack of contract renewal guaranty makes it difficult for contractor to invest in up-to-date communication and scheduling technology. Additionally, the market for paratransit services in small communities like Lansing is not large enough to attract nationally known management firms to bid on contracts. Besides, the thinking among taxi companies in such small communities is that they should be offered the contract (though they cannot offer the service), and the political pressure they put on decision makers to sway decisions in their favor.

Yet another impediment concerns technology. Paratransit scheduling and operation requires softwares for dispatching. The cost of these softwares and the time it takes to train personnel to use them can be quite high. Similarly, communication systems must be in place to effectively run paratransit operations and their costs are an impediment.



Fortunately for CATA it is able to avoid some of these costs because of the way it is set up. CATA is a quasi-public entity established by state legislature and has taxing powers. It generates 55% of its revenues from dedicated funding sources, i.e., property taxes.

**Outcomes:** There are few if any complaints about the contracting at CATA. The complaints are generally about scheduling.

**Lessons Learned:** From the Lansing experience, the following lessons could be learned:

1. In a union environment, the inclusion union input into the decision-making process is of paramount importance the success of any contracting arrangement.
2. In any effective contracting arrangement, a system of selective controls is necessary to enable the contractor to monitor the quality of service that is being provided by the contractors.
3. Contract renewal should be based on measurable quality standard and NOT on mere appearance of quality.
4. Whenever possible the Board of Directors should be appointed and not elected. By having them appointed, they are shielded from political pressures.

## CONCLUSIONS AND RECOMMENDATIONS

This study examined three types of collaboration in urban transit systems - consolidation/merger, alliance, and contracting. Consolidation is an arrangement whereby firms combine under one management and the merging firms lose their individual identities. Alliance, on the other hand, is an agreement that combines services while the individual firms maintain their identities. Contracting involves a firm hiring another firm to provide services along a route or to perform such tasks as equipment and facility maintenance.

Results from a survey of U.S. transit systems clearly indicate that contracting is the most dominant form of collaboration in transit systems. Of the firms responding to the survey 37.2% are involved in some form of contracting, compared to 27.5%, and 18.6% respectively that are involved in alliances and consolidation. The major areas of collaboration are in equipment and facility maintenance; approximately 57.6% of the firms surveyed collaborate in these two areas. Collaboration is most often initiated by transit systems (69.7%), followed by governments (22.7%) of the participating cities. The collaborative parties (36.1%) are generally transit systems and private firms, reflecting the wave since the 1980's to contract out portions of transit operations to private firms. Fifty percent of the collaborations to provide passenger transport services involve demand responsive modes.

The most frequently mentioned reason for collaboration in the survey was cost savings, i.e., 39.5% of the respondents indicated that cost savings were behind their collaboration. Increased

effectiveness in providing service and improved service quality were also frequently mentioned. The survey results also indicate that cost of daily service, resistance from other agencies and difficulty agreeing on combined system goals are impediments to collaboration. Of these factors, resistance from other agencies, perhaps because of competition, was most frequently mentioned. The survey also reveals that firms are fearful that cost increases may result when they collaborate or that their operational goals may conflict with each other.

Collaboration tends to be medium to long term; three to five year collaboration was indicated by 35% of the respondents and 50% of the collaborations have been in place for more than five years. These lengths of time are not surprising, since they allow members to recoup capital investments. Short term collaboration (of less than three years) does not allow participating members enough time to recoup their capital nor to adjust to their new environment.

The survey data were also used to identify factors which are statistically significant in explaining the likelihood of transit collaboration (i.e., either contracting, a consolidation/merger or an alliance). The contracting results suggest that firms are more likely to contract out passenger service compared to other areas such as facility maintenance. Also, the results clearly suggest that contracting out services is motivated by the availability of increased resources and government pressure and government pressure exerts more influence on contracting than cost savings. When transit systems are made parties to the collaboration, the probability of contracting increases. Surprisingly, and contrary to expectations, improved service quality is negatively related to contracting, suggesting that firms do not consider improved service quality as the motivation to contract out service. Among impediments, resistance from other agencies and government funding restrictions reduce the probability of contracting out services.

The statistical results for the likelihood of a consolidation/merger suggest that cost savings, government pressure, and the involvement of different types of transit services in the collaboration increase the probability of firms merging their operations. The statistical results for the likelihood of an alliance suggest that alliances are motivated by the desire to increase service effectiveness, but

not by service quality, cost savings, or increased resources. A major impediment to forming an alliance is cost of vehicles, equipment, and facilities. Alliances tend to be long term (more than five years) allowing firms to recoup their capital expenses and are generally formed for equipment maintenance, enabling the alliance to realize economies in purchasing materials and parts for vehicle maintenance. Also, the alliance can bargain with potential contractors to perform this function at reduced cost.

The survey was also used to obtain information about the processes and the outcomes of transit collaboration. Slightly more than half (53.2%) of the respondents agreed that they made sure of compatibility of organizational cultures (e.g., work habits, management values, styles, and decision making processes) before they collaborated with other firms. When firms collaborate (whether contracting, a merger or an alliance) an important labor issue they must confront is assuring employees that their jobs are safe. Approximately 78% of the respondents agreed that job security must be assured. Further, nearly half of the respondents agreed that customer support is necessary, partners should be equally motivated (71.9%) about the collaboration, and elected officials should be involved (75%) in the collaboration process.

All respondents agree or strongly agree that top management commitment to the collaboration is important. Further, the collaboration manager should have the authority to establish strategic objectives for the collaboration and to make system improvement decisions (i.e., he should not be limited to implementation of the decisions of elected officials). The survey reveals that the collaboration manager is empowered to initiate transit system's improvement decisions in 80.7% of the responding firms and to make daily operations decisions in 90.3% of the firms. The survey also reveals that most collaborative decisions are consensual and not based upon majority vote, thereby minimizing the adverse impacts of decisions on the partners and creating a cordial atmosphere for organizations to work together (i.e., an amicable environment for participation and a process for conflict resolution).

Survey outcome results for transit collaboration reveal that 93.8% and 93.7% of the

respondents agree that collaboration promotes area-wide travel by public transportation and enables firms to provide more public transit options. Comparatively, 87.1%, 74.2%, and 72.1% of the respondents respectively agree that collaboration improves route coverage, ridership, and access to public facilities. Although one would expect that increased coverage, ridership, and access would result in higher revenues, only 48.4% of the respondents indicate an increase in revenues. Also, collaboration has not had a large impact on quality of service (e.g., waiting time) nor has it changed the view of transit as a viable alternative to the private automobile.

An estimate of an output equation (using the survey data) reveals that accessibility, competitiveness of transit in relation to the automobile, and involvement of customers in the collaboration process result in greater transit output. An estimate of a cost savings (from collaboration) equation reveals that output, management provision of sufficient resources to the collaboration, compatibility and complementarity of work habits, and openness to the ideas of partners increase cost savings from the collaboration. However, assuring employees that their jobs will be secured in the collaboration reduces cost savings. Similarly, cost savings are reduced when decision making is by majority vote, and when administrative processes are set up to quickly address problems. Although compatibility of mission and cultures and commitment of top management are important in collaboration, they do not translate into cost savings. Cost savings also do not result from empowering the collaboration manager to establish strategic or system improvement decisions.

Lessons learned from the experience of two transit systems, Metropolitan Atlanta Rapid Transit Authority (MARTA) and Capital Area Transit Authority, Lansing Michigan (CATA), which we visited offer the following conclusions:

### **FROM MARTA'S EXPERIENCE**

1. Economic rationale alone is not sufficient to make a collaboration arrangement work. Citizens' attitudes toward transit service and tax implications or sources of funding are major considerations. As can be seen from MARTA's experience even a 1% increase in sales tax could be

resisted if the citizens have an anti-transit attitude.

2. The support of local government leaders is extremely important especially in a political structure like in Georgia where citizens do not have the authority to bring an issue to a referendum. This political structure concentrates power and because of the general dislike for transit in the counties it makes it difficult to force a vote on transit issues.

3. Bilateral input is crucial when proposing a cross jurisdictional collaboration arrangement, especially when it involves smaller and much larger transit systems or local governments. Additionally, any proposal for a collaborative arrangement must be carefully crafted as not to be perceived as a threat to the independence of the smaller systems or governments.

4. In an effort to save cost MARTA concentrates on contracting not only service provision but functions that are traditionally performed internally. In most cases the rationale for contracting is cost saving, but in others, as in the battery lease agreement, it is clear that the motivation was not on cost but orderly work flow.

#### **FROM CATA= EXPERIENCE**

1. In a union environment, the inclusion of union input into the decision-making process is of paramount importance to the success of any contracting arrangement.
2. In any effective contracting arrangement, a system of selective controls is necessary to monitor the quality of service that is being provided by the contractors.
3. Contract renewal should be based on measurable quality standard and NOT on mere appearance of quality.
4. Whenever possible the Board of Directors should be appointed and not elected. By having them appointed, they are shielded from political pressures, though not totally.

## **RECOMMENDATIONS**

The results of this study suggest that factors that positively or negatively affect the formation of one type of transit collaboration may differ from those factors that affect the formation of another type. Consequently, recommendations for forming transit collaborations may differ by type of collaboration.

The results of this study suggest that factors that positively or negatively affect the formation of one type of transit collaboration may differ from those factors that affect the formation of another type. Consequently, recommendations (based upon the results of the study) for forming transit collaborations may differ by type of collaboration. Based on the findings of this study, we offer the following recommendations:

For transit systems or agencies seeking the contracting form of collaboration, we recommend that they limit third party contracts to passenger-related services rather than core functions such as facility maintenance because of the need for better control of core functions that could cause major disruptions of system-wide services. Once a transit system decides that it could benefit from contracting-out certain functions, the funding entity such as federal, state or local government could be asked to exact necessary pressure to bring it about. This kind of pressure is especially needed when resistance from certain parts of the transit system including unions and other agencies is anticipated. For any contracting arrangement to be successful, the transit agency must ensure that there are adequate resources to allow the contractor to effectively provide the service he or she is contracted to provide. Additionally, whenever a transit system decides it could improve system's performance through contracting, it should lobby for the removal of any government restrictions which prevents or prohibits it from contracting some parts its functions to a third party.

For transit systems or agencies that seek the consolidation or merger form of collaboration, we recommend that they justify it by cost savings that will result from the consolidation or merger. This is particularly important because the promise of significant cost savings is a powerful tool when seeking the approval of funding agencies. In some cases, however, the promise of potential

significant cost saving may not be sufficient to convince all parties involved especially those who perceive their security to be dependent on the existing structure. In such a case, we recommend that government pressure is needed to make sure that the needed consolidation or merger takes place. To facilitate the understanding of the intent of a proposed consolidation or merger, it is important to fully involve all agencies that are to be affected. This goes a long way to minimizing the fear of the unknown and other uncertainties which usually fuels resistance from those whose are threatened by the consolidation or merger.

For transit systems or agencies that seek the alliance from of collaboration, we recommend that such alliances be in the areas of equipment purchase and maintenance because this type of alliance was found to strengthen the bargaining power of the alliance when negotiating the price of operating equipment. It also eliminates unnecessary duplication of costly maintenance equipment. Because of the substantial capital investment that is usually involved, we recommend that this type of alliance be designed to last for at least five years. The longer the term the better. Because most alliances tend to breakup as a result of conflicts caused by disagreement about cost sharing, we recommend that clearly defined cost sharing terms be negotiated and agreed upon by all members at the beginning of alliance formation discussions.

Finally, for any form of collaboration, we recommend that steps be taken to ensure that all parties to have compatible organizational mission and strategic objectives and culture including decision-making style. This is necessary because it helps reduce the possibility of conflicts arising from differences in organizational priorities. All collaboration arrangement, whenever possible should be designed to equally benefit all agencies involved and no member should feel threatend by it. This gives all involved a stake in the arrangement which in turn serves as the major motivating factor. Significant structural changes are always perceived as potential threat to employees= job security. Therefore, it is recommended that steps be taken to ensure employees of their job security when possible. If some jobs will be affected, every effort should be made to communicate this to those who will be adversely affected humanly. Also, efforts should be made to relocate those who will be adversely affected.



Most transit agencies or systems depend on funding from federal, state or local governments. It is therefore necessary to fully involve political leaders in the process since their support and involvement is critical to the approval of any form of collaboration. In addition the support of political leaders, the involvement and commitment of transit systems= or agencies= top level managers and employees at all levels are essential to the success of any collaboration arrangement.

