

# Determinants of Superior Performance in Public Transit: Research Opportunities Using Section 15 Data

GORDON J. FIELDING AND LEE HANSON

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To identify determinants of efficient public transit performance, a small, varied group of highly efficient public bus agencies was compared through a series of case studies. Of particular interest was the role of strategic management in achieving or maintaining efficient operation. Three findings emerged from the research: (a) two styles of management, characterized as "quasi-private" and "quasi-strategic," were identified; (b) all seven of the agencies that were studied lacked dedicated local operating support; and (c) all but the largest of the systems had been contract managed for the majority of the time they had been publicly owned. Findings of the research are to be used as research hypotheses in ongoing research using Section 15 data.

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This paper presents the findings from a reconnaissance study that comparatively evaluated a small, varied group of highly efficient public transit agencies (1). The objective of the research was to determine whether a consistent set of factors could be identified that underlie superior performance and whether these factors might be hypothesized to be general determinants of transit efficiency. A research hypothesis emphasizing strategic management as a determinant of efficiency was initially advanced and then modified. Although the findings result from case studies and are not statistically validated, they illuminate several major issues debated in the literature on transit performance, and they will be more fully analyzed in ongoing research.

## METHODOLOGY

A group of bus transit agencies was selected through a quantitative performance evaluation process that ensured that the sample consisted of highly efficient systems. Managers of these systems were interviewed during a series of site visits, and the results were compared to identify important characteristics common to these systems.

The agencies were selected through use of the Irvine Performance Evaluation Method (IPEM) (2), a statistically valid transit evaluation procedure that uses data from the Urban Mass Transportation Administration's Section 15 system of accounts and records, reported annually by the approximately 300 systems receiving federal operating assistance. The IPEM

procedure consists of two main elements: a set of nine performance indicators that measure specific dimensions of efficiency and effectiveness (Table 1) and a set of 12 peer groups that cluster similar systems based on size, peak-to-base ratio, and speed for purposes of comparing performance. Comparison is achieved by standardizing the actual values for the performance indicators for each year of data; systems with standard scores above the peer group mean are above average for that indicator compared to similar systems. By selecting systems that had the highest overall efficiency standard scores for their peer groups between 1980 and 1983 (the years for which data were available at the time the study commenced), IPEM provided an objective, although not random, selection of a diverse group of systems from a variety of regions and service environments. Scores on the effectiveness indicators were not used for agency selection.

Thirty-one highly efficient systems were identified among the total of 281 systems for which 4 years of Section 15 data had been reported. From the 31 candidate agencies, eight were ultimately selected for study based on actual performance values. These were the most outstanding agencies in their peer groups. In some peer groups there was no consistently high performing agency. One of these eight systems was subsequently eliminated for statistical reasons, leaving seven from which the findings were derived (Agencies 1 through 7). Characteristics of the seven agencies are shown in Table 2.

Initially, the study was guided by a hypothesis that strategic management would be a determinant of superior efficiency. The hypothesis was advanced because, first, strategic management has been recommended for use in transit agencies to improve their ability to cope with financial uncertainty, and second, a recent survey has shown that various "strategic-like" practices are prevalent (3). In evaluating whether strategic management was a determinant of consistently superior performance, four features were required in an agency to establish it as being strategically managed. Managers had

1. Comprehensively assessed the environment of the organization, established a basic mission and goals for the agency, and developed a 5-year plan for achieving them;
2. Instituted an ongoing, participative management process for implementing the plan involving the entire management of the system;

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G. J. Fielding, School of Social Sciences and Institute of Transportation Studies, University of California, Irvine, Calif. 92717. L. Hanson, Graduate School of Management, University of California, Irvine, Calif. 92717.

TABLE 1 IPEM PERFORMANCE INDICATORS

Indicator	Measurement
Cost efficiency <sup>a</sup>	Revenue vehicle-hours/operating expense
Service effectiveness	Unlinked passenger trips/revenue vehicle-hours
Cost effectiveness	Corrected operating revenue/operating expense
Labor efficiency <sup>a</sup>	Total vehicle-hours/total employees
Vehicle efficiency <sup>a</sup>	Total vehicle-miles/peak vehicles
Maintenance efficiency <sup>a</sup>	Total vehicle-miles/maintenance employees
Maintenance efficiency (duplicate measure)	Total vehicle-miles/maintenance expense
Safety effectiveness	Total vehicle-miles/collision accidents
Safety effectiveness (duplicate measure)	Total vehicle-miles/collision insurance expense

<sup>a</sup>Used to select study agencies.

TABLE 2 KEY CHARACTERISTICS OF SYSTEMS, 1985

	Agency						
	1	2	3	4	5	6	7
Study class	Quasi-strategic	Quasi-strategic	Quasi-strategic	Quasi-private	Quasi-private	Quasi-private	Small, simple, basic
Ownership form	Municipal	Special district	Transport authority	Special district	County	Transport authority	Municipal
Region	Midwest	Southeast	East	South	Midwest	Southeast	Deep South
Management	Contract <sup>a</sup>	Contract	Public	Contract	Contract	Public contract <sup>b</sup>	Contract
Peak vehicles	20	65	760	90	480	150	11
Peak-to-base ratio	1.13	1.15	2.18	2.16	1.96	2.01	1
Average speed (mph)	14.2	14.6	13.5	14.2	12	14.7	14.6

<sup>a</sup>Management contract terminated in 1985.

<sup>b</sup>Fully contract managed through 1982; maintenance and operations under contract management thereafter.

3. Incorporated annual budgets into the larger 5-year planning framework and integrated annual programs within the strategic programs; and

4. Monitored the efficiency, effectiveness, and overall performance of the system against the plan as it was being implemented.

To determine whether the seven agencies were managed strategically, site interviews focused on the extent of the strategic process within each agency, rather than whether or not management labeled their approach "strategic." Focus on the process rather than the label was necessary because many agencies regard the compilation of Short-Range Transportation Plan/Transportation Improvement Program (SRTP/TIP) reports as a strategic activity, but do not adhere to the four features inherent in strategic management (4).

## PRIMARY FINDINGS

Based on the site visits and on material selected from agency reports and studies, as well as comparison between each selected agency and the performance of other agencies in its peer group, three main findings emerged:

- Two distinctive approaches to management were identified: "quasi-private" and "quasi-strategic." While both of the management approaches gave the systems strategic qualities, neither fulfilled the four requirements for strategic management.

- None of the seven agencies was supported by dedicated, local, operating assistance.

- Six of the seven agencies had been contract managed for the period for which IPEM data were available.

The latter two findings suggest that additional research would be productive. The first suggests situations in which strategic management might be helpful.

## Quasi-Private and Quasi-Strategic Systems

Two distinctive styles of managerial response to constrained budgets and local service environments were observed in the study systems: three of the agencies were what was termed quasi-private, and three were quasi-strategic. (An exception which fit neither category was a small contract-managed, municipal system in the Deep South, Agency 7, whose "simplicity" as an organization and almost marginal facilities made for a unique case which was difficult to relate to the other systems.)

The distinguishing characteristic of the quasi-private agencies, two of which were medium sized (Agencies 4 and 6), one large (Agency 5), and all of which served central city markets with steady or expanding demand, was that they had continued to operate somewhat like private bus companies following public takeovers in the early or mid-1970s. Transit services in these systems had not declined seriously before public takeover. Many original personnel, including managers, had remained with the agencies, and subsequent turnover had been comparatively low (although chief executives had changed several times). As a result, services, goals and objectives, attitudes, and organizational styles continued to reflect those that had prevailed under private ownership. Infusion of public

assistance had brought change as it related to the need to meet new government requirements and broader public sector goals, but in the absence of dedicated assistance, the contract managers had continued to base deployment of service on use and farebox recovery and had not expanded into high-cost, low-revenue service areas.

Further, these three agencies had not developed bureaucratically oriented approaches to management. Rather, fairly informal work environments had been maintained in which small administrative staffs performed a variety of functions. Because long-standing practices had remained highly effective, managers had felt little need to make use of formal planning. Rather, their strategic approach was intuitive and anticipatory (5). Proposals for change were based on a knowledge of organizational capability and market possibilities.

The three quasi-strategic systems (Agencies 1, 2, and 3) represented a clearly different type of organization and style of management. They were more varied, in the sense that only one, Agency 3, served a central city (which had declining demand), while the systems and their communities ranged from small to large in size. Additionally, as organizations, they were more "public-like." In Agency 1, personnel were organized under the local civil service system, administration was heavily supported by city services, and the goal structure had long been shaped by career public sector staffs. In Agency 2, growth had been so rapid after 1980 that there were now proportionately far fewer persons who had been with the original private firm. Agency 3, a multimodal transportation authority and the most bureaucratically developed of the systems, was an amalgamation of small private companies that had been established as a public agency in the 1960s. Like the quasi-private agencies, the three quasi-strategic systems were comparatively lean and were highly cost conscious (Agencies 1 and 2 had also been contract managed), but they were not so strongly market oriented as the quasi-privates. For example, in Agency 3, union and community pressures had substantially restricted the range within which adjustments and reductions in service could be made to reduce costs.

The difference in management between the quasi-private and quasi-strategic systems was that managers in the three quasi-strategic agencies had turned to systematic multiyear planning when they recognized that major changes in management were required to cope with changing markets and external assistance. In doing so, the managers had become more strategically oriented (quasi-strategic), although in no case had the four-step strategic management approach, as outlined earlier, been instituted.

The quasi-strategic approach had been most effective in the smallest of the three systems, Agency 1. This system was established as a planning-based municipal system in the early 1970s in order to avoid a repeat of failures that eventually drove the private operator out of business. Short-range planning has been used over a nearly 15-year period to provide a framework for orderly adjustment and expansion. Planning in this system had involved a small proportion of staff and had been adapted to available funding rather than initiating different funding strategies; in this respect, the quasi-strategic process fell short of being more nearly like strategic management.

Agency 2, a small-to-medium transit authority in the South, had expanded the SRTP/TIP process into an approach similar to that outlined earlier in the paper. Demand in the service area had been increasing because of steady local growth and offered the opportunity for major expansion. In 1983, the system's board and management attempted to exploit these conditions by implementing an ambitious 5-year plan for an integrated light rail and bus system. The size of the projects required some form of secure funding, however, and when put to the vote in 1986, the funding initiative was defeated. As a result, the strategic plan had to be abandoned, although strategic approaches to service development and labor relations were retained.

In Agency 3, the largest in the study, management in 1984 had begun to develop and implement a formal strategic plan in response to a badly deteriorating market. Urban population, ridership, and revenues were all declining, and the agency had reached the point that a program of steady retrenchment had come very near to its practical limits. One of the key objectives of the system's strategic plan was to obtain a dedicated source of funding, and not only the strategic management effort in the system, but the future of the system itself, was seen by management to be contingent on obtaining a more predictable source of local funding. While the agency was making a serious effort to implement strategic management, the impact and outcome could not be determined as of 1986.

Comparing the two types of systems, the essential difference between the quasi-private and quasi-strategic agencies was that for the former, service areas based on expanding central business districts had facilitated a smooth transition from private to public ownership. The agencies had thereafter preserved a market-oriented approach to service which had discouraged implementation of high-cost, low-revenue service. The quasi-strategic agencies either lacked or had begun to lose their market advantage. As a result, their managements had become more strategically oriented in order to avoid policies and services that might jeopardize performance.

### Lack of Dedicated Local Subsidies

Absence of dedicated local support, common to all seven of the systems, may have been the single most important determinant of their high efficiency. Budgets were tightly constrained, with the result that strong cost-consciousness had developed, leading managers to pursue practices that contributed to consistently efficient operation.

The question of whether dedicated local subsidies may have affected efficiency has been widely discussed in the literature. Pucher et al. (6) suggest that "dedicated funds have reduced local transit authorities' incentive to eliminate highly unprofitable services, to bargain for moderate settlements in wages and fringe benefits, and increase productivity." Cervero (7) concluded after analyzing 17 California transit agencies that "the effects of local support have generally been far more onerous (on productivity declines) than federal and state subsidies."

The obverse of these conditions prevailed in the seven agencies included in this study. Fare recovery rates in all seven were above average for their peer groups, despite average fares and moderate levels of passengers per vehicle-hour. The basic explanation for the higher cost-effectiveness appeared to be



that managers had either avoided, or tried to reduce, costly routes and service. As a result their services were more narrowly focused than might have been the case if the agencies had had the fiscal capacity to subsidize high-cost service.

Managers in the agencies had also sought to limit increases in contract costs. In all but one system (Agency 1, a small municipal system in the Midwest) they had been successful in negotiating multiyear agreements that had provided greater predictability of labor expenses, if not always reduced annual costs. Further, six of the systems (all but Agency 3, a large transit authority in the East) were conspicuous for either the quality of their bargaining relationships or for the strong positions management had established in negotiations.

Finally, most of the managers expressed the belief that they had leaner and less bureaucratic organizations than other transit agencies with which they were familiar. This was partly substantiated by analysis of 1983 Section 15 data, which revealed that proportions of employees in management and administrative categories were generally smaller than in those of their peer systems, and all had a higher proportion of revenue vehicle-hours to administrative employees. Additionally, all of the systems were above average compared to their peer groups on the labor efficiency indicator, suggesting that overall productivity was higher.

The degree of financial constraint created in the systems by the absence of dedicated assistance varied. In the largest system (Agency 3), it was so severe that the future of the system was in doubt; however, in another (Agency 5, also a large system), a combination of fairly generous state support (30 percent of operating budget), and steady, though not exceptional central business district demand had resulted in a somewhat more secure fiscal prospect. But the consistency of the finding and the emphasis all of the managers placed on ensuring economical operation suggested that a basic factor in the agencies' performance had been the constraint of uncertain local funding. These transit agencies had to compete with other local services, like highways, public safety, and public welfare, for local assistance: the merit of continued service had to be determined annually in a public forum and in competition with other public services.

### Contract Management

The third main finding was that in six of the seven systems (all but Agency 3), contract managers had overseen operations during the period for which IPED data were available, as well as for some years before. As with dedicated subsidies, the question of the comparative efficiency of contract versus publicly managed systems has been widely debated. No definitive conclusion has been reached and the significance of the present findings is not entirely clear.

The argument for contract management is that the profit motive and competitive environment of service contractors increase their incentive to operate efficiently. Further, the expertise of transit management companies, their capability of providing centralized support services to on-site managers, and strong competition among the management firms can give contract management a comparative advantage over public managers in achieving efficient operation. These advantages of contracting vary with the actual level of competition that exists;

the degree to which legal, political, and community factors supersede management in determining service decisions; and the effectiveness of the governing body in monitoring contractor performance (8). The contract literature additionally suggests that while cost savings can be considerable in contracting for relatively straightforward services, such as data processing or refuse collection, its advantages in more complex functions such as management may be limited (9). A recent statistical study of the 300 transit systems reporting Section 15 found no significant differences in the cost and operating efficiency of contract and publicly managed systems, and suggested that contract managers are no more able to overcome conditions that cause systems to be inefficient than are public managers (10).

If that conclusion is correct, what do the present findings imply? Conceivably, they could support claims that contract-managed systems are more efficient. But it could also be hypothesized that the prevalence of contract management in the study systems is more related to their lack of dedicated local assistance than to the inherent advantages of service contracting.

Unwillingness to dedicate funding and preference for private rather than public management may reflect the community's attitude toward transit; transit is regarded as neither a vital public service as are police and fire protection nor a natural monopoly where competition would increase cost. Local government is merely serving as a trustee for a service that should be operated by private enterprise.

State legislation is another complicating factor in this apparent relationship between highly efficient operation and contract management. Three of the six contract-management systems are in states that restrict collective bargaining by public employees. Contract management is a business strategy that circumvents the statutes.

The largest of the highly efficient agencies (Agency 3) is not contract managed. Perhaps there is a size factor involved: small and medium-sized transit operators may benefit from the expertise that contract management can provide, but this may not be valid for large agencies that can afford specialization in management.

It should also be noted that one of the systems in the study (Agency 1) had terminated its contract in 1985 because of dissatisfaction with a new contract manager and was now under public management. In another (Agency 6), noncontract managers had assumed the senior positions in the organization in 1982 although contract managers remained in charge of operations and maintenance. In these cases, the contract relationships had become unsatisfactory to governing boards.

The finding that a majority of the systems in the study were or had been contract managed warrants more critical analysis. Slightly more than one-quarter of the transit systems considered for this study were contract managed and many others contract for a portion of their service. Reasons why six out of the seven agencies selected as highly efficient were contract managed have been suggested. Statistical analysis using Section 15 data to test alternative hypotheses could clarify when, and under what circumstances, contract management is more efficient.

## CONCLUSIONS

The findings from the study must be interpreted cautiously. Given the small size of the sample, the subjective assessment inherent in the case study methodology, and the absence of comparisons from systems of average or below average efficiency to serve as control groups, the extent to which results can be generalized is severely limited. Additionally, performance in the study was defined in terms of internal efficiency; had more weight been given to effectiveness criteria such as high ridership and fare recovery, a different or at least somewhat different set of findings might have resulted. Thus, it would be premature to conclude that a consistent pattern of transit performance has been identified in the study. Rather, the results are presented as suggested hypotheses for conducting more focused studies on transit performance.

With regard to strategic management, the results suggest that classic strategic management may not be common in highly efficient agencies. For high-efficiency systems of the quasi-private type, strategic management may not offer sufficient improvement to warrant the investment. The intuitive and anticipatory approach used by managers appears to be satisfactory. And for quasi-strategic systems, a reasonably predictable source of funding may be essential to sustain strategic management. In two of the cases discussed here, lack of funds was cited by managements as the factor that jeopardized strategic-management efforts and caused the abandonment in one system. This suggests the hypothesis that full (four-step) strategic management will be feasible only in fairly "affluent" agencies (efficient or otherwise) that seek to plan for more productive use of their resources. Data on levels of operating support in the Section 15 data set could be used to test this hypothesis.

The effect on efficiency of dedicated local subsidies for transit should be analyzed more fully. Several studies have documented the apparent negative impact, but each study has been limited by the data available. Given that dedicated subsidies are available to the majority of transit operators, a careful statistical analysis ought to be conducted using Section 15 data. Regression analysis could elucidate situations where dedicated subsidies are not as detrimental to performance.

The quasi-private characterization used here has a possible implication for divestiture of transit (i.e., returning systems to private ownership). While the three quasi-private systems were probably the most stable organizations in the sample, they were not so cost efficient and effective as to operate without public assistance. Their greater stability compared to the quasi-strategic systems resulted from their more favorable markets, and despite their business-like approaches, they remained crucially dependent on governmental assistance. Managers in two of the systems, Agencies 4 and 6, expressed a desire to obtain dedicated local support; in Agency 5, generous state support reduced the incentive. This suggests that the potential for privatizing public transit systems could be limited, and that thoughts of returning systems to private ownership may be financially impractical in most circumstances, unless private operators were to be subsidized with service contracts.

Further study of the comparative performance of public and contract management is clearly warranted. Longitudinal anal-

ysis across a range of operating dimensions, controlling for factors such as size of agency, characteristics of the service area, and possession or lack of a local dedicated support would help to determine much more conclusively whether there has been a consistent trend toward more efficient performance in contract-managed agencies. If so, this would suggest that contract transit-management practices offer significant lessons for public managers and warrant detailed study. If not, the implication would be that the form of management may be far less important to an agency's performance than specific local factors. This is not to underrate the potential significance of the present findings but merely to caution that the evidence is too inconclusive to make any assumptions about the impact contract management can have on the performance of the transit industry in general.

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## REFERENCES

1. G. J. Fielding and L. Hanson. *Determinants of Superior Performance in Transit*. UMTA, U.S. Department of Transportation, 1987.
2. G. J. Fielding, M. Brenner, O. de la Rocha, T. Babitsky, and K. Faust. *Indicators and Peer Groups for Transit Performance Analysis*. Report UMTA-CA-11-0026-2. UMTA, U.S. Department of Transportation, 1984.
3. B. Hemily. *Strategic Planning in Small and Medium-Size Transit Agencies: A Discussion of Practice and Issues*. Report UMTA-IN-11-0011-3. UMTA, U.S. Department of Transportation, 1986.
4. G. J. Fielding. *Managing Public Transit Strategically*. Jossey-Bass, Inc., Pubs., San Francisco, Calif., 1987.
5. G. Steiner, and J. Miner. *Management Policy and Strategy*. Macmillan Publishing Co., Inc., New York, 1977.
6. J. Pucher, A. Markstedt, and I. Hirschman. Impacts of Subsidies on the Costs of Urban Public Transport. *Journal of Transportation Economics and Policy*, Vol. 17, 1983, pp. 155-175.
7. R. Cervero. Cost and Performance Effects of Transit Operating Subsidies in the United States. *International Journal of Transportation Economics*, Vol. 10, 1983, pp. 535-562.
8. R. De Hoog. Human Services Contracting Environmental, Behavioral, and Organizational Conditions. *Administration & Society*, Vol. 16, 1985, pp. 427-454.
9. J. Pack. Privatization of Public-Sector Services in Theory and Practice. *Journal of Policy Analysis and Management*, Vol. 6, 1987, pp. 523-540.
10. J. Perry. *Organizational Form and Transit Performance: A Research Review and Empirical Analysis*. Report UMTA-CA-11-0027-2. UMTA, U.S. Department of Transportation, 1984.

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