1. Introduction of a low-cost alternative to bus service in low-bus-ridership areas,
2. Purchase of service from private providers,
3. Acceptance by public officials, and
4. Heightened awareness of changes by the transit union and the public.

The major problems encountered are

1. Challenges by the transit union;
2. Opposition by some private service providers;
3. Public resistance to change; and
4. Lack of experience in planning, marketing, monitoring, and evaluating the service.

The major impacts of this project with respect to the service provided to Tidewater citizens are that

1. Bus service would have been discontinued without alternative service, thereby leaving riders without any public transportation, and
2. Maxi-Ride failed in new service areas due to the lack of riders.

One can understand that change comes hard. Changing the traditional fixed-route public transit system into a variety of services tailored to people's travel needs is definitely hard. However, with the outlook for restricted and even reduced public funding for transit, transit operators must change their ways of doing business if they are to continue to provide services.

TTDC's service delivery program incorporates the belief that there is a high potential for payoff in less-costly and more useful services through offering a wide range of public transportation services. The effort required to change will be repaid many times over if TTDC can continue to provide services that would otherwise be discontinued because they are too expensive to fund. In the example of substituting neighborhood van-type services for bus routes, both taxi company and transit system employees have been noted as resisting the change. However, if transit is to continue in many neighborhoods for the benefit of all citizens, new ways must be found to provide at least a basic public transportation service. As the agency responsible for the public transportation in Tidewater, TTDC must balance the needs of the people for transportation with the difficulties involved in providing the appropriate service.

ACKNOWLEDGMENT

This report is based on demonstration projects financed by grants from the Virginia Department of Highways and Transportation, FHWA, and UMTA. Janice Hurley, research assistant, assisted in the data collection and analysis.

Publication of this paper sponsored by Committee on Paratransit.

Urban Bus Transport in Buenos Aires: The Colectivos

JOHN HIBBS

The urban bus system in Buenos Aires, which carries more than 50 percent of all trips and is provided by profitable medium-sized companies, is discussed. The developments of urban transport in the city, and the nature and organization of the component companies that have evolved there, are reviewed. Particular attention is drawn to the combination of medium-sized buses and high frequencies that is characteristic of Buenos Aires, and information is given about one particular company. It is concluded that the Buenos Aires experience has relevance for urban bus operation in Europe and North America. Conventional wisdom, which assumes that large business units and large vehicles are the optimum solution to the problems of urban transport, is questioned.

Conventional wisdom, at least in Europe, holds that urban passenger transport in public transport modes can only be provided through a subsidy out of public funds. In the course of research into the licensing and control of public road passenger transport in various countries, reference was found to the colectivos of Buenos Aires, and that city was visited in order to examine this bus system. It must be stressed, however, that this paper represents only a brief examination of the system.

It may come as a surprise that urban bus services can be operated at a profit, especially in a city as established and sophisticated as Buenos Aires. Because the city is more similar to cities in Europe and North America than to those of Third World countries, examination of the transport pattern of Buenos Aires makes for a relevant critique of the conventional wisdom--more so than many Oriental cities, whose paratransit systems might not transfer well to western countries.

Buenos Aires has rail commuter services, a metro, and a large number of taxis, but, as seen in the table below, the colectivos provide the majority of trips by all modes (note that this table gives the 1970 modal split):

Mode	No. of Trips (000s)	Percentage
Bus	9,458.0	54.3
Rail	1,216.4	7.0
Private car	2,680.5	15.4
Taxi	1,177.0	6.7
Metro	948.1	5.4
Walk	1,410.0	8.1
Other	537.6	3.1

The routes lie close together, and the services run on headways often between 1 and 3 min, with bus stops about 275 m apart. There is no prohibition on getting on or off the bus between stops when speeds permit. People do not have to stand in line. The buses seat about 25, and there is room for at least 30 more passengers. Most buses are built locally by Mercedes (with locally built bodies) and are painted in bright colors. Route numbers, destinations, and route details are painted on the exteriors. The services are shared among 142 firms that run 172 routes; and the average fleet size is about 55. Al-

though fares are fixed by the authorities, routes coincide over long distances, and competition is keen.

Traffic congestion is severe in the city center, which is characterized by a grid pattern of narrow streets, and where only wider avenues provide access. Transport policy is designed to discourage private car traffic, partly by imposing high parking fees in certain areas and partly by physical limits. Access by private car to certain streets within a 7x9-block downtown area is prohibited during the day. In addition, 3.8 km of streets in the central business district (CBD) are restricted to use by colectivos and taxis, and a further 1.4 km are restricted to colectivos alone.

BACKGROUND

Buses first appeared in Buenos Aires in 1920. These early buses appear to have been similar to early buses in the United States: saloon cars with extended chassis to take a larger body; they might be called limousines. (In Britain there was a similar period between 1896 and 1906.) The colectivo started as a 7 to 11 seater, growing first to 14 to 16 seats and then to the current average of 23 to 25 seats. From the beginning, there was a tendency for individual proprietors to form cooperatives, which resembled the associations that dominated the London horse-bus trade in the 19th century (1).

The colectivos soon became serious competitors of the trams and metro. After the fall of President Irigoyen in 1930, there followed a series of conservative administrations, one of which in 1936 established the Transport Corporation of Buenos Aires, which was supervised by a Control Commission that had a monopoly on urban public transport, except for railway services. The parallel with British experience is interesting (2), but already there were differences: firms that had been licensed in 1934 received grandfather rights and, although the Corporation had powers of compulsory acquisition, it also had powers to license other operators for services that it did not wish to provide.

Acquisition began in 1938, but not without resistance. It was not yet completed when in 1942 the government stopped the process and left many of the original firms in operation. The Corporation, however, started to introduce larger buses and to distinguish between omnibuses and micro-omnibuses. By 1951 the Corporation was in financial difficulties, and the government took control. Urban public transport thus came to be split between the remaining private firms, which ran the colectivos, and the state-owned Transportes de Buenos Aires, which ran the buses, trams, trolley-buses, and metro.

After this, according to the official history (3), "the public transport system, in the hands of the state, continued to deteriorate." By 1959 its deficit amounted to $120,000/day (U.S. dollars). In 1962 Transportes de Buenos Aires was itself defunct, and the buses and services were handed over to private enterprise. (The tramways were abandoned in the same year, except in the neighboring city of La Plata, where they lingered on until 1965; trolley-buses ceased operation in 1966.) The colectivo operators thus returned to the forefront in a form of privatization.

COLECTIVOS OF BUENOS AIRES

The early cooperatives consisted of owners (usually possessing one bus each) who kept their own revenue and met their own expenses, although they permitted the association to regulate routes and timetables. This led to the formation of firms called component companies, in which each partner has an internal work contract with the company as a whole. The company then contracted with the drivers, although they may have been chosen by the partners, or may even have been partners themselves.

Currently, operating schedules are produced by the company. Each partner is responsible for the expenses of the vehicle(s) but, although in some companies the partners keep their own revenue, in others it is pooled and then shared in proportion to the mileage run by each partner's vehicles. The company charges each partner on a proportional basis in respect to its overhead and management costs, and also charges an allowance against depreciation for each vehicle.

The partners control the company on the basis of a one-bus, one-vote system. There is, on average, one partner per vehicle, and although some partners may own more than 1 vehicle (as many as 10 in some cases), in other cases a vehicle may be owned by several partners. The typical colectivo thus has a large number of members, where about half work as drivers of their own vehicles. Members benefit from successful trading through the increase in the value of their investment, but the shares cannot be sold on the open market.

The component companies appear to be an unusual form of enterprise, although the cooperatives on the west coast of Scotland may be similar. There are records of similar cooperatives in the English Midlands in the 1920s, but these did not survive the introduction of licensing in 1931. The advantage of the component company lies in the direct responsibility of each partner for his own vehicles and in his contribution to the management of the company, usually with limited financial reward. The disadvantage is financial weakness due to lack of central financial reserves.

Not all of the colectivos are run by component companies, but none of the firms is large by British standards, and there is no overlapping of ownership. In 1970, of the 310 routes in central Buenos Aires, about a third were shared between two or more firms, and a few among as many as nine. The state sets the fares and also defines the routes, although it is not difficult for the firms to make route alterations; permission is often given verbally. The number of vehicles and the frequency on each route are subject to little control, but safety is the responsibility of a government inspectorate, and the mechanical condition of the vehicles appears to be satisfactory.

Tickets are issued on a modified zonal basis. The fare enables a passenger to travel up to a maximum distance, which is about twice the length of the average transit trip. Fares are relatively low. The maximum distance at the lowest fare is 25 km, and at this fare the ratio of distance traveled to distance paid for is about 0.65 in the central area to as much as 0.85 on routes running to and from the outer suburbs.

Frequencies are often high by British standards, so there are often no fixed timetables, but rather a set number of trips per day. On only about 5 percent of the routes are frequencies hourly or less. The basic (peak) frequency on the majority of routes is from 5 to 25 trips/hr (with duplication), and 9 percent is more frequent than that. (The peaks are from 6:00 to 8:00 a.m. and from 5:30 to 7:30 p.m., with a less-pronounced peak from 12:00 to 2:00 p.m.) For the entire system, 8 percent of the routes are covered for 24 hr/day, 80 percent for 20 hr/day, and only 6 percent run for less than 18 hr/day. Seasonal peaks are not significant. The yearly average load is about 90 percent of the average for the busiest month.

The company that was visited, Nuevos Rumbos, operates one route. It starts at a suburban terminus, goes into and through the city center, and ends at the railway station. The company was something of a showpiece, but its vehicles were not exceptional.

The firm owns 62 buses, and employs 150 drivers, 25 administrative staff, 4 inspectors, and 6 mechanics. There are 20 shareholders, some of whom work in the business, even though this is not a component company. With roughly 2.5 drivers/vehicle, each tends to stay with the same bus. The route has three main traffic points. One point is at the university, which gives it a different peak structure--7:00 to 9:00 a.m. and 4:00 to 8:00 p.m. The buses run until 2:00 a.m. and recommence at 4:00 a.m.; the frequency of every 2 min is doubled between 6:00 and 8:00 p.m. Mondays through Fridays and then is reduced to 3 min after 3:00 p.m. on Saturdays and Sundays. The round trip is 29 km.

Drivers work an 8-hr day, 24 days/month. Maintenance facilities are adequate, but it appears that major docking is contracted out. The oldest vehicles in the fleet date from 1968, whereas the newest consist of a class of air-conditioned buses. The driving position, with a posture seat, is equipped with automatic ticket-issue and change-giving equipment. (With so many on-and-off passengers, rapid ticket issue is vital, and fare dodging is a problem.)

Drivers' pay is considered low by British standards; wage costs amount to only 50 percent of total costs. The table below gives the numbers of staff per bus in Britain and Argentina for comparison purposes:

Undertakings	Persons Employed per Vehicle
Great Britain	
London Transport	5.63
Provincial Passenger Transport Executives	4.19
Smaller provincial cities	3.31
State-owned companies	3.28
Private firms	1.23
Argentina: Nuevos Rumbos	2.98

The severe restrictions imposed on the trade unions might account for the wages, but it is said that pay is adequate. (The constant inflation makes it difficult to make valid comparisons.) Because of the computerized accounting system, administrative control is impressive.

CONCLUSIONS

There appear to be two main lessons to be drawn from the Buenos Aires experience, and both concern aspects of scale. It can be argued that there is too great a difference between Argentina and the United Kingdom for comparisons to be drawn, but that is not the purpose of this paper. Rather, it is suggested that the organization of public transport in Buenos Aires should make transport administrators rethink much of the conventional wisdom. The comparison of the level of car ownership in the two countries may offer an argument that will appear sufficient to some to reject the lessons that may be drawn. It appears, however, that the Buenos Aires system (and comparable systems in other South American cities) concentrates on high efficiency at low cost, which is a worthwhile goal.

The first significant aspect to examine is the size of the firm. Because public transport functions under constant returns to scale, there is no economic argument for the large European undertaking; the South American firms are probably nearer to the optimum fleet size for the industry. This may be determined by behavioral factors, such as span of control. In seeking to harness the profit motive, the Argentine approach encourages effective profit centers, and not the bureaucracy that places a cost burden on large-scale enterprises. Clearly, then, there is no need for urban bus operators to be large in order to be efficient.

In transport, there are significant economies to be gained from the increased use of the fixed plant, and many railway mergers have been justified by the subsequent rationalization that has achieved this end. It is a false analogy to extend this to the road transport industry, where the investment threshold is much lower. The British have pursued largeness almost for its own sake, and this has meant ever-larger and more expensive vehicles; therefore, the investment threshold is currently unnecessarily high. This leads to the second significant aspect--unit of output.

Operators in the United Kingdom are generally regarded as being eccentric because of their preference for the double-deck bus, but European and U.S. operators concur in the pursuit of high labor productivity by using ever-larger buses. (Perhaps the significant difference is the poor quality of ride that is inherent in double-deckers, especially when they have power-assisted steering.) The smaller buses of Buenos Aires, with their high frequencies and the ability of passengers to hop on a bus, demonstrate the fallacy inherent in the pursuit of labor productivity, irrespective of elasticity of demand.

In simple terms, by doubling the size of the buses on a given route, there will be a need to halve the frequency in order to obtain the full benefit of labor productivity. What this equation ignores, and what has been consistently ignored in Britain, is that the quality of the service worsens because passengers value frequency--and there is good reason to assume that they greatly value frequency. In simple economic terms, the cost to passengers is increased because they are being charged the same price for a less-desirable product. The volume of demand then falls because of elasticity (and this price and quality elasticity is probably high), and so the service carries less traffic overall and fares have to be raised. The cycle that is thus initiated has undermined urban public transport in Britain, but it has been avoided in Buenos Aires (4). What is more, labor productivity is actually higher in Buenos Aires than in British cities (see the previous in-text table on staff and vehicles).

It is probably not too late to apply the lessons of the Buenos Aires experience elsewhere. There are various methods of doing this: autonomous work groups as cost centers within existing overall structures; the encouragement of cooperatives of various kinds, including outright coownership; or small entrepreneurial businesses such as Nuevos Rumbos. The bu- reaucracies of local and central governments may not approve of these methods, and the manufacturers may have to be pushed into building buses as satisfac- tory as those in South America, but transport man- agers should attempt to have open minds concerning the lessons to be learned from the Buenos Aires ex- perience.

ACKNOWLEDGMENT

The support of the Rees Jeffreys Road Fund and the courtesy of the Argentine Ministry of Transport are gratefully acknowledged.

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Publication of this paper sponsored by Committee on Paratransit.

Conducting Transportation System Management Studies of Taxicabs: Lessons from the Milwaukee Experience

BRIAN F. O'CONNELL

From 1978 through 1980, the city of Milwaukee conducted a transportation systems management type study of taxicab service and regulation. In order to provide guidance for other cities considering undertaking similar studies, an evaluation of the Milwaukee study was made. The Milwaukee study was compared against 13 evaluation criteria suggested in the transportation planning literature. The findings of the evaluation were that future taxicab studies could incorporate the strengths of the Milwaukee study and avoid its weaknesses by following 11 guidelines: develop measurable objectives, limit data collection to data needed for problem identification and problem analysis, do field work, maximize use of existing data, emphasize problem identification, set priorities for problems, involve other agencies, involve affected parties, develop alternate solutions, develop strategies for implementation of the recommendations, and require recommendations to be compatible to the maximum extent feasible, but allow early implementation of solutions to serious problems.

In September 1977 and January 1978, the Milwaukee Common Council held hearings on problems affecting the city's taxicab service and on national developments in taxicab service and regulation. The participants in these meetings agreed that a thorough review of the city's taxicab regulations and cab operators' problems was needed.

As these meetings were being held, the Southeastern Wisconsin Regional Planning Commission (SEWRPC) was completing its 1978 transportation system management (TSM) plan (1). The SEWRPC recognized that taxicabs, as providers of an estimated 3.3 million person-trips annually in the Milwaukee area, are a significant part of the urban transportation system.

The SEWRPC was aware of the meetings that had been held in Milwaukee and the attendees' consensus that the cab regulations needed revision. The SEWRPC planners believed that revision of taxicab regulations in Milwaukee would be an appropriate TSM action because reform of the city's regulations could foster improved efficiency and productivity in a part of the transportation system.

The SEWRPC included a recommendation in its 1978 TSM plan that the city undertake a TSM study of the city's taxicab fare and regulatory policies, including the evaluation of policies for encouraging innovative services such as shared-ride taxis. The Department of City Development (DCD), which is Milwaukee's planning department, was designated as the lead agency for the study.

The SEWRPC included in its TSM plan the statement that "similar (taxicab) studies for the remainder of the region will be recommended when the city study is completed as a model." In the interest of providing a useful model for future taxicab studies, a critical evaluation of the Milwaukee study was undertaken (2). The findings of that evaluation are reported, and the caveats and desiderata that should be followed in future taxi studies are emphasized.

DESIGNING THE MILWAUKEE TAXI STUDY

Work on the taxicab study began with the drafting of a study design. Ten criteria guided the study design preparation:

1. The taxi study should be compatible with the TSM planning process and its results relevant to subsequent TSM planning.
2. The ultimate and essential product of the study would be revised taxicab regulations.
3. Because the taxicab ordinance is a written reflection of public policy, the study must be relevant to policy decisions.
4. The study design must allow for consideration of a range of problems and issues, some interrelated and some independent.
5. The study must produce recommendations that are mutually compatible.
6. The study should seek short-range, low-cost solutions to problems.
7. In anticipation of the study, the Milwaukee Common Council created the advisory committee to guide the study. The study design had to give meaningful responsibilities to this committee.
8. The study design should use the expertise of all agencies involved in taxicab regulation.
9. The principal focus of the study should be on taxicabs as providers of public transportation.
10. The study recommendations should produce an efficient and effective transportation service that has a maximum of positive and a minimum of negative impacts.

Examples of taxicab studies meeting these criteria were sought, but none was found. The lack of an existing taxi study that could readily be used as a model for the Milwaukee study prompted the study staff to adapt the SEWRPC's overall short-range planning process (3) to the needs of the study. This planning process is shown in Figure 1 (1).