4. FINANCIAL VIABILITY OF BUS AND JEEPNEY SERVICES IN METRO MANILA

4.1 Introduction

This chapter presents the results of additional runs of the Vehicle Operating Cost Model (VOCM), adapted to estimate costs for public transport vehicles under the special circumstances they encounter in Manila. Costs are presented per km. run and per hour of (on street) running.

Costs are then compared with the marginal revenue per hour and km. that an operator can expect to receive at the tariff rates authorized by LTFRB in October 1997. The resulting estimates of the theoretical financial viability of bus/jeepney operations on congested roads indicate that true, long-run financial viability can only be achieved under a very limited (and generally unlikely) set of circumstances.

These findings, which suggest that it is not worth an entrepreneur's while to become involved in Manila's road-based mass transit industry, are then compared with data from MMUTIS surveys of bus and jeepney operations, identifying a number of ways in which operators have adapted to the regulatory and traffic conditions they experience to create circumstances under which their services are profitable. It would appear that, in practice, most Metro Manila bus and jeepney operations generate sufficient revenue (at least since the December 1996 and October 1997 tariff revisions) to justify the continued involvement in the industry not only of the vehicle crew but also the entrepreneurs who invest in the vehicles.

This outcome does not apply to all services, however. Some services do not appear able to generate sufficient return on capital employed to warrant the replacement of the existing vehicles when their life expired. Furthermore, there are new threats to the financial viability of both bus and jeepney operations, at least at the existing level of service offered to the traveling public.

Finally, consideration is given to changes in both the regulatory structure of the industry and in operating practice which could produce both better services for the traveling public and greater financial viability for the operators and workers in the industry.

4.2 Costs of Operating a Bus or Jeepney Service

4.2.1 Assumptions

The set of vehicles for which operating costs have been generated, at speeds from 10 km./hr. to 90 km./hr. bands, for Master Plan and scheme evaluation includes both bus and jeepney. These cost estimates assign all individual cost elements to either:

- Distance covered - fuel, oil, tires, maintenance parts and labor, a proportion of depreciation; or

- Hours of use (standing and running) - the balance of depreciation, interest on capital, crew costs, organizational overheads (including insurance, vehicle taxes, etc.).

However, while these costs can be generated for full financial expenditure on the vehicle and as behavioral costs, reflecting only the cost elements taken into account when determining routes and time of travel, they are not ideal for estimating the long-run financial viability of public transport services in Manila.

In particular:

- They are summarized as distance related costs per 1,000 km. run and "standing" costs per hour or km. run, which would be more suitable measures for comparison with revenue streams; and
- There are no costs for speeds below 10 km./hr., which are commonly experienced by buses and (in particular) jeepneys in Manila.

Also, the use of second-hand Japanese buses, reconditioned and converted to left-hand drive, is common in Manila. These vehicles typically have a purchase cost to the Philippine end-user that is only a fraction (1/3 to 1/4) of a new vehicle of equivalent carrying capacity. The VOCM estimate for bus is an average for the whole fleet, based on a mix of new and re-conditioned vehicles. While this is adequate for evaluating traffic flows in which there will be a mix of vehicles, the financial viability of a route or operator may depend on the specific vehicles used.

Additional runs of the VOCM were, therefore, undertaken to generate separate costs new and second-hand buses. It was assumed that annual utilization, tire, and fuel consumption, would be the same for both sub-types. However, the reconditioned vehicles would have a shorter useful life and would have maintenance costs 20% higher per 1,000 km. run (averaged out over the vehicle's useful life in the Philippines) than new vehicles, for both parts and labor.

The VOCM computes maintenance parts as a percentage of the cost of a new vehicle per 1,000 km. As similar parts will be consumed by both new and reconditioned vehicles, the share of parts consumed by reconditioned vehicles was calculated by reference to the purchase cost of a new vehicle, rather than a reconditioned one.

The different assumptions adopted regarding buses in the main VOCM runs and in the additional runs for the estimation of financial viability are summarized in Table 4.1.

4.2.2 Vehicle Utilization

The VOCM incorporates formula relating vehicle utilization to average speed - the lower the speed the fewer km. performed each year but the longer the vehicle lifetime. DPWH estimates of operating cost per vehicle km., under free-flow conditions on an inter-urban road, incorporate assumptions on average speed and vehicle utilization. These have been used to calibrate VOCM to Philippine vehicle use patterns, with the latter model then generating estimates of utilization at other average speeds.

TABLE 4.1
OPERATING COST MODEL INPUTS FOR NEW AND RECONDITIONED BUS

Cost Head/Item	Main VOCM Runs "Bus"	New Bus	Reconditioned Bus
Capital Cost	1,453,000	2,522,624	691,130
Tire Cost	14,200	14,200	14,200
Useful Lifetime	8 years	10 years	6 years
Annual Utilization (km.)*	80,000	80,000	80,000
Annual Utilization (hours)	3,000	3,000	3,000
Maintenance Parts per 1,000 km.			
(as % of cost of new bus)	0.182%	0.165%	0.200%
Maintenance Hours per 1,000 km.	4.61	4.19	5.07
% of Depreciation that is Distance-Related	85%	85%	85%

* At an average of 60 km./hr.

The output from the main VOCM runs is shown in Figures 4.1 (Jeepney) and 4.2 (Bus). Standing and running hours are indicated by the stacked bars, referenced to the scale on the left. Distance run is indicated by the line, referenced to the scale on the right.

Running hours are calculated as a function of distance run and average speed. Standing hours adjust in proportion to distance run (equivalent to assuming that average trip length remains the same; number of trips changes in proportion to distance run; and layover time between trips remains the same per trip). Summing running and standing hours gives the hours of use—the number of hours over which overhead, interest, etc. are apportioned.

While producing reasonable utilization implications at higher speeds (both the DPWH utilization values and the VOCM itself were originally developed to cost inter-urban travel), there had been doubts about the realism of the relationships at lower (urban) speeds. However, the model's predictions would seem to be reflected quite closely in observed Manila public transport behavior.

The results obtained by extrapolating the model's implicit assumptions about vehicle utilization to low speeds, are shown in Figures 4.3 (Jeepney) and 4.4 (Bus). The left-hand Y scales on these charts have been capped at the number of hours in a year, (i.e., 8,760). It can be seen that the annual distance-average speed relationship has to break down at low speeds. It does not regress to 0 km. at 0 km./hr. and there are not enough hours in the day to run the forecast number of km. at the lowest speeds.

Indications that the model's projections are realistic include the following:

- VOCM extrapolates the DPWH assumption of 80,000 km./yr for bus, based on an average speed of 60 km./hr., to 36,000 km./yr at an average speed of 10 km./hr., equivalent to 120 km./day for 300 days per year—typical of observed bus utilization on urban routes in Manila;

- If an allowance is made for hours off the road for maintenance, refueling, etc., a practical cap on the number of hours a year a vehicle could be in use is probably about 6,500. VOCM/DPWH assumptions suggest that this figure would be reached at between 3 and 4 km./hr. by jeepneys and at between 5 and 6 km./hr. by buses. MMUTIS surveys observed jeepney routes with average speeds as low as 3.1 km./hr. and bus routes with average speeds as low as 6.4 km./hr., suggesting that the model's assumptions on the relationship between average speed and utilization reflect reality even at these extremely low speeds.

4.2.3 Annual Operating Costs

Costs output by VOCM per 1,000 km. on a "good" road (roughness of 2,500 mm/km.) and per hour of use were combined with VOCM estimates of km. run and hours of use were combined with VOCM estimates of km. run and hours of use were combined with VOCM estimates of km. run and hours of use to generate annual operating cost estimates for each 10 km./hr. speed band.

Figures 4.5 (Jeepney), 4.6 (New Bus) and 4.7 (Reconditioned Bus) illustrate the results. Costs are represented by the stacked bars (left hand scale), the curve indicates total annual cost expressed as cost per km. run (right hand).

It can be seen that total costs for all vehicle types rise at higher speeds, due more to the higher vehicle utilization at those speeds (more km. run and more hours of use) than to the higher distance related costs per 1,000 km. (fuel, oil, tires, etc.) at higher speeds. However, towards the lower end of the range of speeds considered, the percentage increase in km. run with increasing speed is greater than the percentage increase in cost, and cost per km. run falls as average speed increases.

While this relationship reverses at higher speeds, it is worth noting that over the whole range of speeds likely to be encountered in urban conditions (up to 50 km./hr.), an increase in average speed means a decrease in cost per km. run. This reversal of the slope of the cost/km. run means that, for reconditioned bus, the speed curve occurs at the lowest speed (this cost curve is dominated by distance related costs), whereas for New Bus and Jeepney, the dilution of capital charges on their (relatively) higher capital cost over the greater number of km. run at higher speed means that total cost per km. run continues to fall with increasing speed until 60-70 km./hr.

Despite the relatively low cost of diesel for road vehicles in the Philippines (not much above Singapore wholesale price plus transport and distribution), fuel comprises quite a high proportion of distance related costs. Table 4.2 shows fuel cost per 1,000 km. as a percentage of distance related costs per 1,000 km. run.

FIGURE 4.1
ASSUMED JEEPNEY UTILIZATION

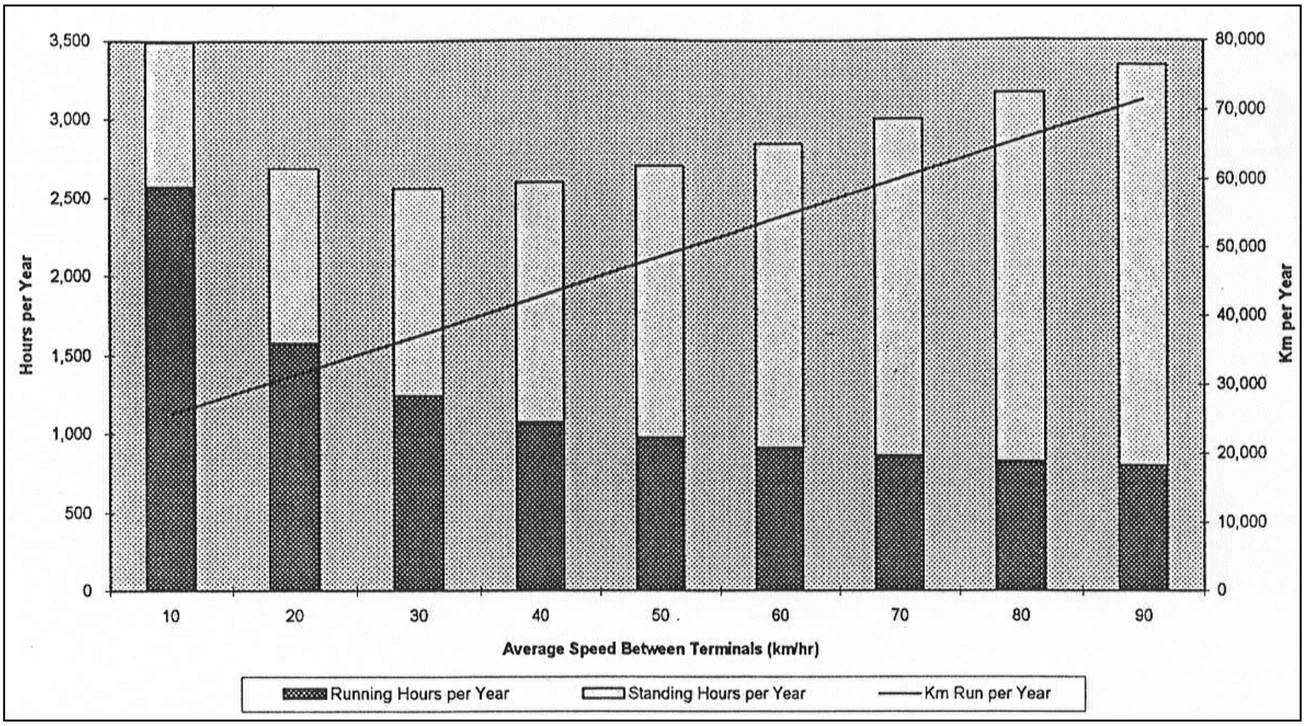

FIGURE 4.2
ASSUMED BUS UTILIZATION

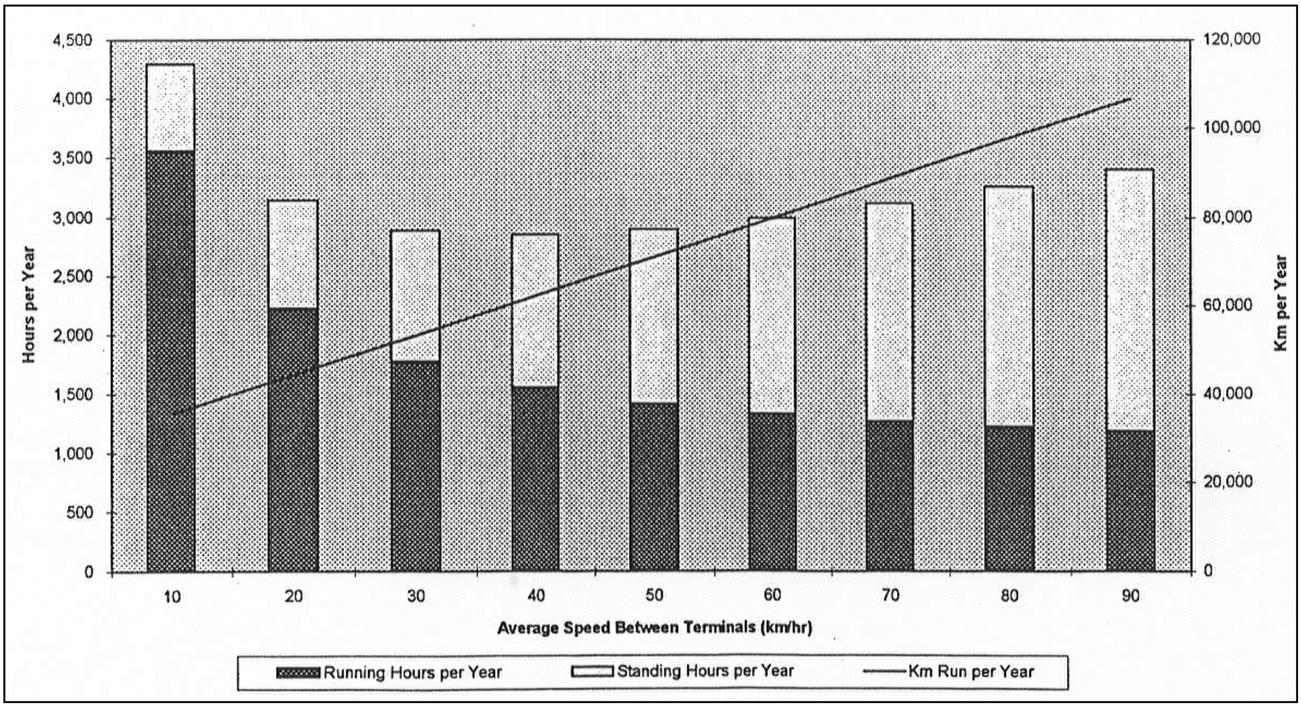

FIGURE 4.3
EXTRAPOLATION OF VEHICLE OPERATING COST MODEL ASSUMPTIONS TO LOW SPEEDS –JEEPNEY

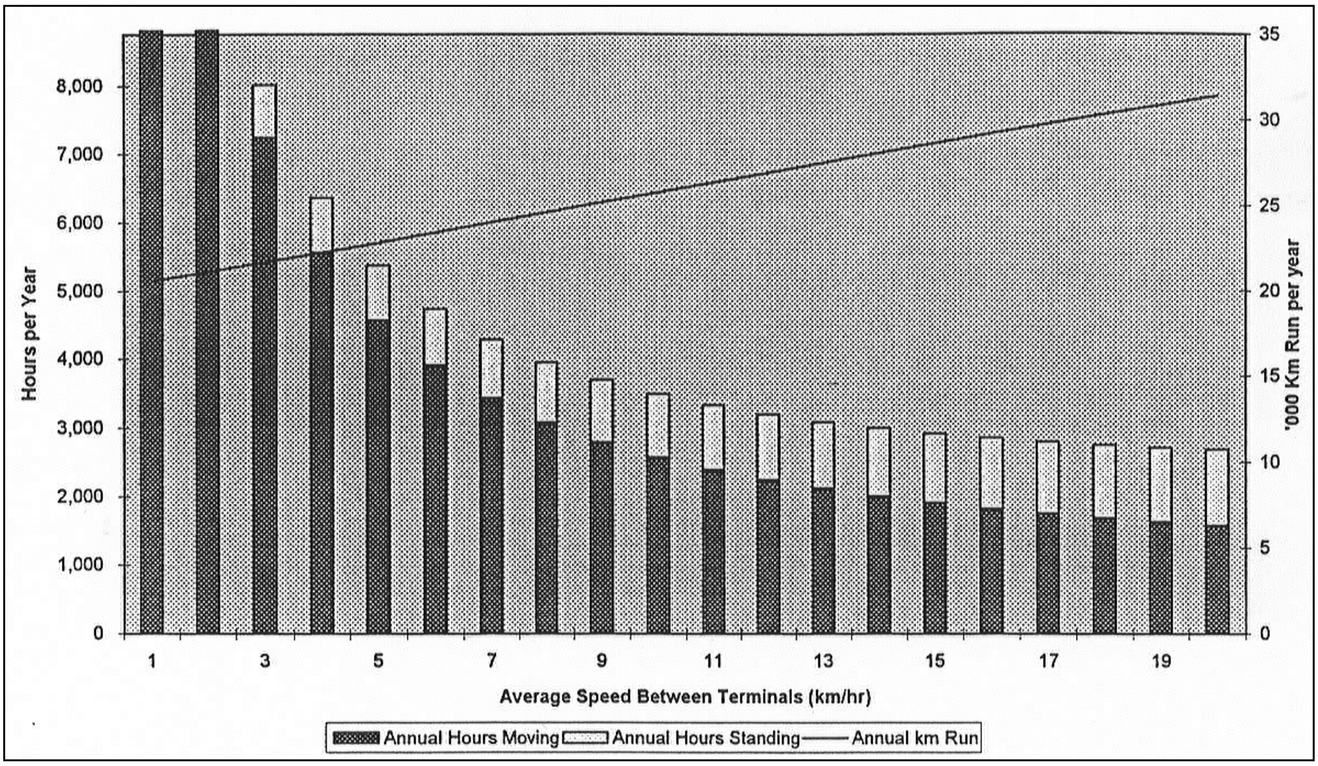

FIGURE 4.4
EXTRAPOLATION OF VEHICLE OPERATING COST MODEL ASSUMPTIONS TO LOW SPEED – BUS