Locally Generated Transportation Modes of the Developing World

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Most people in the world today depend for their routine travel needs on what American transportation planners would call paratransit or public automobiles. Fortunately, these travelers are not aware that they are doing anything unusual, and the teeming metropolitan areas and the primitive rural villages of Asia, Africa, and Latin America are unthinkable without their jeepsneys, matatus, or publicos.

A few billion people cannot all be wrong, and there is really no need for us to painfully invent a new urban transportation mode when there are literally thousands of jitney systems in flourishing operation. At first glance they all appear to be different, but this is primarily because of variations in hardware—from bicycle rickshaws to sleek European minibuses. The institutional structure and basic operations are quite similar: Private individuals acquire the highest technology vehicle that they can afford and respond to the mobility demands of their neighbors at a tariff that most of them can pay.

The following discussion is structured in several sections. First, three cases are described in some detail—one each from Asia, Africa, and South America. The next section provides five brief descriptions of similar systems in other areas of the developing nations. The last section attempts to summarize and generalize, particularly highlighting the administrative, financial, and regulatory features, such as they are.

MOTORIZED TRICYCLE RICKSHAWS OF KARACHI

The coolie-drawn rickshaw as we know it from countless exotic novels and Hollywood movies is largely gone. Even its direct successor—the much more efficient bicycle rickshaw—is being pushed back into the hinterland of Asia. It is giving way to technological progress, national pride, and concern with human dignity. It is true that in some places (Hong Kong, for example) the persistent tourist can still have his picture taken sitting in a "real" rickshaw, but he will not travel very far in it. Most large cities of this immense continent, not to mention the People's Republic of China, have taken actions similar to that of Ayub Khan of Pakistan, who some years ago simply outlawed bicycle rickshaws because "a man pulling a man represents degrading servitude and is unacceptable to the country.

But this nonmotorized vehicle also had an immediate successor on the Indian subcontinent (as elsewhere), since it filled a transportation niche that is difficult to satisfy by employing any of the industrialized world's models. There is a need for a mode with very low cost distribution that has flexible schedules and operational patterns but still maintains a small degree of passenger comfort. Above all, it cannot be capital intensive or have involved maintenance problems.

To summarize a complex situation in many Asian communities, the standard buses are too crowded and inconvenient in large cities; they are out of scale for villages; taxis are too expensive; private cars are not yet available to the vast majority of the population; and bicycling is too tiring in the hot climate. The many proposals for an underground rail system are usually unrealizable dreams inspired by worldwide perceptions of civic status. The remaining choices, thus, are either walking or the motorized rickshaw, which differs from the traditional vehicle only in its hardware. There can be no question that it performs a very useful service and, if its days are also numbered, this is to a large extent due to governmental policies rather than operational inadequacy.

These vehicles are still very common in many cities in South Asia, except in places and districts where they have been specifically outlawed. Thus, there is a definite conflict between the official attitude that finds motorized rickshaws unsatisfactory, particularly because of the image that they present and the public dangers and nuisances that they often generate, and the popular attitude of the users who find them very convenient, indeed indispensable. The operators maintain a precarious foothold on the bottom rungs of the economic ladder, but this means that they are self-sufficient and considerably better off than the really desperate urban masses who have few means of survival.

The central question is whether this mode has a legitimate and useful function in Asian—or, for that matter, any—metropolitan areas. Its adaptability is shown by the fact that in large cities with regular bus or rail operations motorized rickshaws serve as feeders and local distributors; in small communities they are the only public transportation mode. The recent events and current situation in Karachi, the principal city of Pakistan, which has grown from 0.43 to 3.50 million people in the metropolitan area during 30 years (1941 to 1971), is indicative of the general observations outlined above.

Physical Configuration of Vehicles

The Karachi motorized rickshaw is built around the European heavy-duty scooter. The most common type by far is a small tricycle unit that has a seat in front for the driver, who operates a handlebar steering gear behind a plastic windshield, and a seat in the back that can accommodate two paying passengers. The chassis, engine, and mechanical systems are imported but in a stripped-down version. About 95 percent of the vehicles are Vespa commercial models that were originally intended to be small enclosed vehicles for carrying goods. To the basic unit is added a superstructure that is produced in local workshops.

Like the jeepsneys of Manila, these vehicles give rise to a full expression of Pakistani folk art and decorative traditions. The result can be striking and elaborately beautiful, although nobody has apparently yet paid any particular attention to this feature, which makes the otherwise rather depressing street environment of Karachi a vibrant kaleidoscope of color. It specifically involves the canopy that, supported by simple metal rods,
extends from the back and provides a roof for the three occupants. The dominant artistic device is the use of cutout and collage arrangements of plastic cloth of various colors (especially silver, gold, and mirrored surfaces). The sides may be protected by similarly elaborate removable panels that incorporate transparent sections. A serious scholar of folk art should be able to trace evolutionary patterns from decorations applied to the more traditional animal-drawn wagons, carts, and carriages of earlier days.

Registration and Regulation

The first motorized tricycle rickshaws were introduced gradually in Karachi in the middle and late 1950s, but they received their greatest boost in registration in 1961, the year after the man-propelled bicycle rickshaws were outlawed. The development of the motorized vehicles was actively encouraged by the government.

<table>
<thead>
<tr>
<th>Year</th>
<th>New Registrations</th>
<th>Type of Vehicle</th>
<th>Average Daily Vehicle Kilometers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1956</td>
<td>18</td>
<td>Private automotives</td>
<td>55</td>
</tr>
<tr>
<td>1957</td>
<td>25</td>
<td>Buses</td>
<td>198</td>
</tr>
<tr>
<td>1958</td>
<td>427</td>
<td>Rickshaws</td>
<td>219</td>
</tr>
<tr>
<td>1959</td>
<td>132</td>
<td>Motorcycles</td>
<td>42</td>
</tr>
<tr>
<td>1960</td>
<td>132</td>
<td>Animal carts</td>
<td>18</td>
</tr>
<tr>
<td>1961</td>
<td>549</td>
<td></td>
<td>198</td>
</tr>
<tr>
<td>1962</td>
<td>1004</td>
<td></td>
<td>198</td>
</tr>
<tr>
<td>1963</td>
<td>1549</td>
<td></td>
<td>198</td>
</tr>
<tr>
<td>1964</td>
<td>578</td>
<td></td>
<td>198</td>
</tr>
</tbody>
</table>

The second important date is 1968, when the authorities decided to progressively freeze registrations until there were no new registrations. The total fleet became fixed at about 8,500 vehicles; this represented a complete reversal of official policy within a span of 8 years, while the city continued to mushroom.

The specific licensing agency in Karachi is the Regional Transport Authority, which is responsible for all commercial road permits and the enforcement of road and fare regulations. The registration of vehicles is under the jurisdiction of the provincial (Sind) excise and taxation department, and driving licenses are issued by the traffic police.

The Karachi drivers' test is quite rigorous, although it is rumored that other arrangements can be made to obtain licenses. The permit from a quiet rural province is also valid in the metropolis, and general observation on the street is sufficient to indicate that rickshaw drivers may be naturally skilled but are only faintly aware of proper traffic behavior.

The greatest opponents of motorized rickshaws are the owners of private automobiles, who also, of course, happen to occupy influential positions. One suspects that this distaste is caused primarily by the usurpation of the limited street space by these commercial vehicles whose drivers do not appear to have the proper reverence toward the presumed priority status of a luxury sedan with only one occupant.

Separate well-disciplined unions exist for rickshaw owners and drivers. They have been quite successful in negotiating with official agencies; their major weapon—calling strikes—has also been effective in protecting the interests of their members.

Ownership, Procurement, and Use

The imported components of a vehicle cost about $1100 in 1973; this price was set by the authorized agents of the European companies in consultation with the Ministry of Commerce. The general assembly and body construction are done by local workshops and cost about $50 to $60.

An additional expense is entailed in the meter—$50 to $90. Because of the relatively low investment required, acquisition is possible out of family savings or small business profits for persons of rather modest means. Installment buying is not practiced, but private loans are arranged. As a survey by Esso Eastern, Inc., indicated, this is an owner-driver activity—74 percent of the owners possess a single unit and fewer than 1 percent have fleets of more than six rickshaws. The vehicles are used, however, quite intensively; the owner-drivers put in many hours or hire people to drive second shifts. Thus, 40 percent of the drivers surveyed at a given time were owners, and 60 percent were operating on a contract basis.

To be more precise, actually hiring drivers at a fixed salary is quite rare. The dominant procedure for small fleet owners is to arrange contracts for one or two 8-h shifts with a driver who, in effect, leases the vehicles and pays for fuel himself. This assures that the rickshaw is in maximum use, averaging more than 15 h/d. Service is available from 6:00 a.m. to 2:00 a.m. in some districts. These units represent 9 percent of Karachi's vehicle registration but accumulate 26 percent of the region's vehicle-kilometers traveled.

The point about intensive use cannot be overemphasized; it is in the nature of the beast. The owner-driver can control every aspect of everything he can to generate revenue, and necessity, coupled with experience, does bring results. The average vehicle is off the streets only 3.4 d/month; it travels more than 219 km/d (136 miles/d), of which only 26 km (16 miles) are nonrevenue. This can only be believed if one watches the motorized rickshaws scurrying around on the streets of Karachi.

It is also interesting to note that (according to 1971 data from the Karachi Master Plan Department), while the vehicle occupancy of taxis with four seats available was about 1.5 persons (excluding the driver), the rickshaws carried an average of 1.2 paying customers during a regular weekday. This 1971 traffic survey also produced the following comparison of the average daily vehicle-kilometers traveled by the various types of vehicles in Karachi (1 km = 0.6 mile).

The motorized rickshaws operate in the taxi mode (they go anywhere the passengers request), but their tariffs—4 cents for the first 1.6 km (1 mile)—are well below that of regular taxis (7 cents for the same distance), and consequently they are economically accessible to residents who fall into the lower and middle-income groups ($30 to $60/month). Buses in Karachi are so overcrowded, uncomfortable, tied to rigid routes, and slow that, even though their fares are very low (0.2 cent/km), they are discouraging even to the low-income families. Yet rickshaws are also socially acceptable as a travel mode to people in the higher income groups (more than $100/month).

The vehicles can penetrate with ease the narrow alleys of many residential districts and thus gain almost universal accessibility. Their maneuverability, abetted by the skill of the drivers, is unsurpassed. Generally speaking, short or long trips throughout the metropolitan area can be readily requested. There are two specific exceptions to this free operational mode. Some rickshaws run along the most heavily traveled radial corridors during peak hours as shared vehicles (jitneys); all
of them are barred from two of the principal shopping streets in the city center (Saddar), which are thus ironically made the preserve of the less efficient private automobiles and taxis. This is no major problem for the nimble rickshaws, however, since they can enter the district anyway along cross streets and back alleys. On major roads, a solid yellow line is painted along both sides and is supposed to segregate slow-moving vehicles, including rickshaws and animal carts, from fast traffic. Any compliance with this is accidental.

It was estimated in 1971 that motorized rickshaws made slightly more than 300,000 revenue trips/day with an average length of 5.6 km (3.5 miles). Work trips constituted about 15 percent of this total and were slightly longer than the overall mean.

Operational Problems

The undermanned Karachi traffic police have maintained an expressively negative attitude toward motorized rickshaws. They are noisy and smoky, and the drivers cannot afford to, or do not wish to, observe all the formal traffic regulations in their effort to make a living.

In normal use and with average care, the rickshaw will last more than 5 years, depending heavily on the owner's own ability to keep the machine going. Small repair places abound throughout the city, but there are two specialized districts in Karachi where body-making shops (8 to 12 employees/establishment) and maintenance shops are concentrated. Many drivers also reside nearby.

The engine must be fed a mixture of gasoline and oil in a ratio of 4 to 1, but this mixing is done by eye; since the drivers believe (erroneously) that more oil will provide better lubrication and smoother operation, the result is air pollution of high visibility. The engine is also basically noisy, and very poor maintenance of mufflers intensifies the problem. Any elaborate attenuation devices have been vigorously resisted or ignored.

The most serious problem of motorized rickshaws, however, is their poor safety record. No specific figures are available, but everybody in Karachi is aware of this situation. One contributing factor is the recklessness of the drivers; the other is the inherent instability of the vehicle. It does not take much to turn it over, either by negotiating a fast turn or by coming in contact with another vehicle. Since the body of the unit offers scant protection in the heavy traffic streams of the city, fatalities are regrettably common. While the maximum speed for rickshaws has been fixed at 40 km/h (25 mph)—and it is so stated on the vehicles' sides—65 km/h (40 mph) and more are not uncommon and invite disaster. Other than that, there are the usual complaints about rigged meters, refusal to carry passengers for short trips, and similar practices that authorities continually promise to stamp out.

The drivers, unfortunately, tend to observe traffic regulations only when a policeman is visible. The deplorable habits of ignoring stop signs and speed limits, of failure to signal directional changes, of changing lanes and seeking gaps in the traffic stream at any minor opportunity are prevalent among most local drivers. Mobile courts authorized to fine traffic violators on the spot do not seem to be able to make much headway.

Income

Because of the nature of the activity, reliable financial information is almost impossible to obtain, but data from the Esso Eastern survey mentioned above indicate that the owner-drivers earn a personal income that averages $36.50/month. This figure becomes meaningful only if it is noted that 60 percent of all workers in Karachi in the early 1970s earned less than $30/month. Contract drivers, on the other hand, were able to net only about $21.40. These drivers pay about $2/day to the owner for the use of the vehicle.

The income was generated in 1973 by a fare of 4 cents for the first 1.6 km (1 mile) and 1 cent for each 400 m (0.25 mile) thereafter. While fuel costs had more than doubled from 1963 to 1973, the fare had gone up only from 2.5 cents for the first increment originally. The following presents a hypothetical balance sheet for a motorized rickshaw in Karachi using 1973 data.

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital costs</td>
<td></td>
</tr>
<tr>
<td>Acquisition of parts and construction</td>
<td>1160</td>
</tr>
<tr>
<td>Registration, insurance, road permit</td>
<td>40</td>
</tr>
<tr>
<td>Rickshaw meter</td>
<td>70</td>
</tr>
<tr>
<td>Total</td>
<td>1270</td>
</tr>
<tr>
<td>Annual expenses</td>
<td></td>
</tr>
<tr>
<td>Amortization of capital</td>
<td>238</td>
</tr>
<tr>
<td>Tires and tubes</td>
<td>60</td>
</tr>
<tr>
<td>Other mechanical maintenance</td>
<td>60</td>
</tr>
<tr>
<td>Traffic fines</td>
<td>30</td>
</tr>
<tr>
<td>Fuel</td>
<td>686</td>
</tr>
<tr>
<td>Total</td>
<td>1130</td>
</tr>
</tbody>
</table>

The figure for the amortization of capital assumes a 10 percent interest on investment and an 8-year life of the vehicle, while the fuel costs are based on 219 km/d (136 miles/d) for 324 operational d/year at 23 km/L (53 miles/gal) of fuel that costs 21 cents/L (79 cents/gal). These expenses amount to approximately 1.6 cents/km (2.6 cents/mile).

The calculation for annual revenues is based on 192 revenue km/d (120 revenue miles/d) at 2.5 cents/km (4 cents/mile) for 324 d/year, for a total of $1550 or 2.2 cents/km (3.5 cents/mile).

The annual net income (annual revenues of $1555 less annual expenses of $1130) thus leaves $425 or $35.40/month (out of which the owner presumably would have to pay a part-time relief driver to complete a working day of more than 15 h). If a contract driver is employed, the owner's annual expenses would be $444 (no fuel costs) and his income would be $546 ($2 leasing fee/d for 324 d), leaving a net profit of $204, or $1.70/month.

Conclusion

The motorized rickshaws swarm almost all over Karachi. They will go wherever the customers want them to go. The drivers know all the shortcuts and will use them. They are a highly popular service—readily available at all locations (except during the very peak hours), reasonably cheap, superbly convenient, and very responsive to customer needs.

Yet the obvious safety and environmental nuisance problems have made it easy for official bodies and special committees to take a strong stand against these vehicles per se rather than attempting to analyze the basic issues. Cooler heads have pointed out that replacement by minicabs, as has been recommended, is an interesting idea, but that they would not be able to do the same job and be economically accessible to the same degree.

It should be apparent that the real problems associated with rickshaws and their use in Karachi are either due to undisciplined driver behavior in traffic, which is not helped in the least by the present inadequate enforcement of traffic regulations, or to deficient maintenance of...
equipment and misguided operational practices. The countermeasures in each instance are direct and simple; they are also quite obvious. The rickshaw's usefulness as an urban transportation mode is indicated by the fact that it is impossible to think of a reasonably comparable substitute device in Karachi and in many other places.

It is satisfying to be able to report that in 1974 the authorities relented, and new registrations started to be accepted again. At the same time, the fare for the first 1.6 km (1 mile) was raised to 5 cents.

PUBLIC SERVICE TRANSPORT OF PASSENGERS ON ST. LUCIA, WEST INDIES

If one had to isolate the single most important component of the transportation system of St. Lucia— or of most other islands in the West Indies for that matter— it would undoubtedly be the so-called minibus operations. This is the service that, more than anything else, allows the island to function by transporting the bulk of passengers going to work and to market and by carrying an unknown but obviously significant amount of goods. Curiously, it has received scant attention in local planning studies.

It is an activity that has emerged naturally in response to local travel demands, without any encouragement from our support by public agencies and within the strict limits of the existing technological and economic constraints. It is a pure example of private enterprise filling an identified service gap. While the St. Lucia minibus operations are very similar to those found in many developing countries around the world, there is no reason to suppose a transfer of experience. Because the basic mobility needs are similar almost everywhere, a community at a given level of economic advancement will unavoidably respond in a certain way. The service on this island is by no means perfect, but it is founded on direct cause-and-effect relationships, it is flexible, it works, it keeps people gainfully employed, and it is an indigenous (not artificial) solution. Also, it is in scale with the environment.

On St. Lucia, the basic characteristics of the systems are quite simple. Individuals have acquired a total fleet of several hundred small pickup or regular-sized trucks that they have equipped with seats and a roof and that they operate in more or less regular fashion between the main town (Castries) and all the other villages to carry people and small shipments of freight.

Some general background facts about St. Lucia should be noted. The island has an area of 616 km² (238 miles²) and a population of slightly more than 100,000. As a rule of thumb, 60 percent of them can be placed in the low-income group, 30 percent in the middle, and 10 percent in the upper. Its political status is that of an associated state with Great Britain, and it has a full panoply of government.

The land is extremely rugged; of the total space only about 363 km² (140 miles²) are suitable for agriculture. An additional 47 km² (18 miles²) are utilized for various urban activities. There is a total of 692 km (430 miles) of all-weather roads. While they are not particularly wide or well repaired, they do provide motorable access to all villages. About 250 km (155 miles) are classified as highways, i.e., speeds upward of 32 km/h (20 mph) can be maintained on them.

Physical Configuration of Vehicles

There are two types of vehicles in general use. The first of these is based on a standard truck (almost always a Bedford) that has semihard benches placed across the cargo compartment and that accommodates about 35 seated riders. The roof, which carries a rack for goods, is supported by posts along the sides that form open windows that can be closed during inclement weather by rolling down plastic sheets. Entry and exit are from the back by a small stepladder; the passengers have to climb across the benches. The seats are easily removable to convert the vehicle to carrying goods only. The timber body produced by local carpenters is painted in combinations of gay colors. Very often the vehicle has a name on the front, such as Industrious, Trial, Believe in Him, Think of Me, or other imaginative expressions of faith, ability, or exhortation (but inflation and Yonkers have also been seen).

The other type—overwhelmingly more popular in recent years—is built around a pickup truck (a Datsun 1500, a Toyota Hi-Lux, a Ford, or a similar vehicle). The passenger compartment is constructed exactly the same way as for the large truck except, of course, that it is much smaller and has two longitudinal benches that can seat 10 to 14 passengers in reasonable comfort. Many more, not counting small children and large packages, can be crowded in.

These public service vehicles do not have any common, widely used name or designation. They are simply called a van, bus, minibus, pickup, truck, or transit without much specific differentiation. Real minibuses (called coaches locally) have also started to appear, but they are predominantly used for tourists and by various business establishments and institutions for their own personnel. They are thus in private service and will not be considered in this discussion. However, judging from experience in other countries, they might soon enter public service significantly, particularly for those links on which riders expect greater comfort, can afford higher fares, and do not need to carry goods. So far, the few experiments with such vehicles in public service have not been successful. A 25-passenger unit costs much more than the basic pickup truck ($17,000 to $19,000), it has a very high insurance premium ($1,100), and it is not particularly suitable for carrying freight.

Registration and Regulation

A hard statistical analysis of the buses in St. Lucia is not possible: First, their relatively free mode of operation would preclude assembling precise data and, second, the format of vehicle classification for registration and licensing purposes was changed a few years ago; before 1973 minibuses (pickups) and buses were not separated. The following information on the number of licensed motor vehicles was obtained from the St. Lucia Police, Traffic Department.

<table>
<thead>
<tr>
<th>Year</th>
<th>All Motor Vehicles</th>
<th>Buses</th>
<th>Minibuses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968</td>
<td>3333</td>
<td>215</td>
<td></td>
</tr>
<tr>
<td>1969</td>
<td>3687</td>
<td>197</td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>4031</td>
<td>189</td>
<td></td>
</tr>
<tr>
<td>1971</td>
<td>4692</td>
<td>129</td>
<td></td>
</tr>
<tr>
<td>1972</td>
<td>5041</td>
<td>246</td>
<td></td>
</tr>
<tr>
<td>1973</td>
<td>5753</td>
<td>174</td>
<td>155</td>
</tr>
<tr>
<td>1974</td>
<td>5314</td>
<td>157</td>
<td>184</td>
</tr>
<tr>
<td>1975</td>
<td>5734</td>
<td>157</td>
<td>221</td>
</tr>
</tbody>
</table>

The trend of all licensed motor vehicle registration indicates a steady growth from 3333 units in 1968 to 5753 units in 1973, but a definite leveling off has taken place since that time, probably because of the recent economic difficulties of St. Lucia. Public service vehicles, on the other hand, started at 215 in 1968, dropped steadily to 129 in 1971, rose sharply in the next 2 years, and have continued on an upward trend, reaching 378 units in 1975.
It is significant that during the last 3 years, for which breakdowns are available, regular buses have slightly decreased in number, while minibus registrations have more than made up the gap (the two local Datsun and Toyota dealers, who are across the street from each other and are the only real competitors, have sold 50 to 75 units between them during the last few years). It can only be assumed that the smaller units can respond better to the relatively small volume demands on any given corridor and can better negotiate the very steep, winding, and often rough roads of St. Lucia. Both types are dual-purpose vehicles, but the goods that are shipped tend to be small in bulk.

There are no business entry restrictions by the government. A person with a commercial driver’s license can, each year, register it (if about $3.60), and then obtain or renew an operating license every half year—$20 for a vehicle with a capacity of up to 0.9 Mg (1 ton), $26 for 0.9 to 2.7 Mg (1 to 3 tons), and so on. These vehicles carry an H license plate, as do all taxis, trucks, and rental cars. Insurance is compulsory.

The license allows carriage of both goods and persons without any scheduling or geographic restrictions. This leaves open the question of competition on any specific link, and that is resolved at the local level privately. A new owner-driver can only expect to be successful if he is accepted by the people of the village he intends to serve. This welcome will not be extended to a stranger or somebody who encroaches on an established route that has no excess transport demand. Stories about sabotage of vehicles have been heard. Knowledgeable people refer to cutthroat competition, and this term is not used only in a figurative sense. Clearly, this is one of the weak, and potentially dangerous, elements in the whole system. A lot happens below the surface of public cognizance.

Each vehicle must have a small black sign painted on the right-hand side (St. Lucia has left-side driving) that gives in white letters the owner’s name, the location (town or village) in which the vehicle is registered, the tare weight in pounds, and the maximum gross weight.

The government has deliberately maintained a hands-off attitude in this area of public service. Suggestions are occasionally made that some control should be exercised, but this passes, partly because of fears that public agencies might have to subsidize some operations on some links. The exception to this attitude is fare levels. Many complaints about abusive charges a few years ago forced the government to step in, to survey the situation, and finally to set specific tariffs for all runs. These rates are published and must be posted in every vehicle. They are calculated to give the owner-drivers a fair return on their investment and labor.

According to a 1975 government memorandum, the official fares should be placed at a level that would yield 1.2 cents/passenger-km (1.3 cents/passenger-mile) to pickup trucks and 0.9 cents/passenger-km (1.5 cents/passenger-mile) to bus drivers. There have been recent increases, however, and the rates today appear to be closer to 2.2 cents/passenger-km (4 cents/passenger-mile). For true minibuses (coasters), the amount was calculated at 1.7 cents/passenger-km (2.5 cents/passenger-mile). The following describes some representative routes and the fares charged:

- Castries to Gros Islet covers about 13 km (8 miles) over a very good road—30 cents.
- Castries to Ciceron, which is a small village 4 km (2.5 miles) away, runs over a narrow road—13 cents.

Ownership and Procurement

The financial and administrative conditions under which a new owner-driver starts his business are fairly involved. If a person got the urge in 1976 to enter this industry and received some moral encouragement from his neighbors, he would find that a new Toyota Hi-Lux, a pickup truck with a 1.65-m (78.2-in) deck, cost $5200 (the Toyota Stout is a more rugged model and would last longer but, since it costs $7200 and carries the same passenger rating, it is not particularly popular). One way or another, he must assemble 30 percent of this amount and go to the bank. The bank becomes the real regulator of entry because it must decide whether the prospective entrepreneur is likely to make a reasonable return in the corridor that he intends to serve. Assuming that the decision were favorable, the bank would extend a loan for the remaining $3600 for 36 months at 14 percent interest.

The new owner must obtain full insurance and be able to pay for the coming year. This costs $570 to $600 for a new entry, and the money may have to be borrowed. A lawyer must be paid $28 for executing a bill of sale. The person is now very close to being a businessman, and he goes to the police, pays $55.70 for the first year of registration and licensing (the government gives him no trouble), and gets a number and a rated capacity of the vehicle—in this case, 12 passengers or 1.016 Mg (2240 lb) of payload (the dealer actually takes care of these formalities). The dealer has the basic vehicle waiting, and he manufactures the license plate (another $12) and paints the black sign on the side.

The owner now is legitimate and he can drive out, but he still needs a passenger box (the bus body). He can manufacture it himself, but he would probably go to a local carpenter (at least $38 for labor and $95 to $115 for materials). The owner-driver is ready to start making money and will have a celebration, but he has spent so far more than $2400 (not counting fuel in the tank) and has incurred a debt of $3600.

Fuel costs 22 cents/L (85 cents/gal) and, with the necessary aggressive driving over the rough roads, one gets about 6.5 km/L (15 miles/gal) in a pickup truck. Some informed people insist that the tires (which cost about $45 each new) last only 4 to 6 weeks. This could easily be true if the regular run is along a badly rutted and potholed road that has steep gradients that cause a lot of braking and slipping and if the driver is a bit exuberant and tends to overload his vehicle. He is also likely to wear the tires bald before he replaces them. Under more regular conditions and assuming that treaded tires are used, they would last up to 14,500 km (9000 miles). One way or another, the amount spent for tires in St. Lucia is considerable. The stabilizer bars go early, as do shock absorbers; the brakes do not last long; and the mufflers tend to deteriorate fast. While different drivers have differing abilities to keep the vehicle running, prudent practice would suggest allotting $380/year (excluding tires but including oil and filters) for maintenance and repairs. After 4 years at most of driving 150 to 300 km/d (100 to 200 miles/d) under these conditions, the vehicle is ready for the scrap heap. Most drivers will trade it in after 2 years and recover $1000 to $2200.

The ownership pattern on St. Lucia is one of small business: one vehicle and one owner-driver, although
a fare collector may be hired for the larger vehicles. The largest known "fleets" consist of three vehicles and they are held by a family. Drivers are not hired from the outside. Nor are there apparently any associations or other self-protective groups. The taxi drivers have such an association, but the minibus operators so far have reacted to common problems on an ad hoc basis. When a real crisis occurs (such as a need for fare increases to cover spiraling operating costs), they will send a delegation to the government. Otherwise, most of their energies seem to be devoted to the protection of each individual's rights and position vis-a-vis his colleagues. The island has not experienced any organized strikes in recent years, but the possibility is always present, and it is difficult to anticipate what consequences might result.

Use, Service Characteristics, and Operational Problems

Since the government exercises no control over the operations of the vehicles (except fare regulation), the drivers and owners have established their own procedures, which are quite simple: They operate from their home villages to other centers, particularly Castries, which is the only significant urban area and the island's capital. There are no schedules; the vehicles carry no specific origin and destination information, except for the owner's name and place of residence. Passengers are also picked up along the road. The largest passenger volumes are generated by the Saturday market in Castries and during the last business rush of late Friday afternoon.

Any traveler must be intimately familiar with the system to use it, but this does not appear to be any problem because of the small size of the operations. Regular passengers will recognize their bus and their driver, or one can always ask. In the villages, the vehicles have specific central locations from which they operate, and one is likely to find a bus there waiting. In Castries itself, which has a total population of about 40,000, there are several well-known locations at which the buses terminate, generally on both sides of the city near the main streets, and also near some central service stations whose use is within easy walking distance from these locations.

Buses begin a run when they are reasonably full or when it is considered appropriate to move. In effect, the driver must at all times balance consumer satisfaction against his economic performance, i.e., do a continuous marginal utility analysis of whether to wait for one more fare or to begin driving and generate revenue. This lack of schedule does not interfere too much with such activities as going to the market, which is only approximately regulated by the clock, but getting to jobs is another story. This is accomplished by making more or less regular arrangements, but it is not completely reliable. A particular difficulty is found in service to and from scattered locations or very small population centers. Obviously, a purely profit-based system cannot be expected to operate on links that cannot pay their way.

As a consequence, small and remote villages, while they have some service, remain isolated for all practical purposes, and there have been instances in which serious damage or the temporary loss of some of the riders will cause the bus operators to suspend service. They can also be enticed to undertake any variations from the regular patterns for compensation. This then represents the most serious problem with the St. Lucia transit system: The public objectives of providing reliable service to all places that need it are not always satisfied. Also, many employers who are located off the major routes have to arrange transport for their workers by using their own vehicles or chartering service.

Rider complaints about fare gouging have dropped significantly, but there are still some reports of illegal practices. This would appear to be unavoidable in this mode of operation. A similar situation exists with taxis (which have no meters). Their fares for an equivalent distance are easily 10 times higher; they serve primarily tourists and the upper income groups.

The most commonly heard user complaints relate to the availability and reliability of service—either because of long waiting time for a vehicle to a specific destination or because all bus service tends to disappear after 4:00 p.m. in Castries. There is also no urban service as such, not even from the suburbs or nearby villages of the capital, since they are considered to be within walking distance. It is also interesting to note that, although it is not the case in many other countries, using the pickup buses carries no social stigma, and middle-class people too will use them if they are convenient.

In May 1975, the government (the Ministry of Communications, Works, and Labour and the Police Department) undertook an investigation of bus operations during the busy days of Friday and Saturday. This was not a controller survey but only attempted to determine general load factors to allow an equitable determination of fares. Three stations were set up at the entry points of Castries, and the following information was obtained for each passing public-service vehicle: license plate number, capacity, actual number of passengers, origin point of the run, destination, time of day, and type of vehicle (bus, pickup, or coaster).

The summary data shown in Tables 1 and 2 will serve for illustrative purposes, but there are many gaps (including time out for enumerators to have breakfast, some misplaced field sheets, definitional disputes, and so on). They do indicate clearly, however, the pattern of rush hours and their volume and the rather good load ratios (particularly on Saturday mornings). On late Friday afternoons—at the end of the business day but while banks are still open—a total of nearly 700 passengers move in and out of Castries during an hour.

Income

It is not possible to obtain data on the net or gross income of drivers and owners. There is no reason these private individuals should disclose this information to anybody and run the risk of governmental curiosity, even though at present people in their economic group pay no income taxes. It can only be assumed that they make a reasonable living above the average of their neighbors. A farm laborer on St. Lucia earns $40 to $60/month, a construction worker about $75, a clerk between $50 and $125, a professional engineer or accountant about $200 to $280, and a government driver $60 to $75. This assumption can be supported by the facts that bus registration is increasing and that the service is in continuous demand.

There is a serious problem here, however, caused by the ignorance of most drivers of prudent business practices: They neglect to account for vehicle amortization. This is a common failing among individual operators and can be traced back to the first motor vehicle jitney operators after World War I in Los Angeles. It is noted on St. Lucia the original entry is fairly easy since a piece of property can be mortgaged to the bank to obtain a loan for vehicle acquisition. After that, most drivers unfortunately regard all income as profit and neglect to set aside enough for replacement of equipment. Many are bankrupt after the vehicle's useful life is over. This also suggests the need for the government to help protect the bus owners from themselves.
Table 1. Number of public-service vehicles entering the Castries stations during a Friday and Saturday.

<table>
<thead>
<tr>
<th>Time</th>
<th>South Station</th>
<th>East Station</th>
<th>North Station</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In  B</td>
<td>P</td>
<td>C</td>
</tr>
<tr>
<td>Friday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:00 to 9:00 a.m.</td>
<td>1</td>
<td>27</td>
<td>2</td>
</tr>
<tr>
<td>9:00 to 10:00</td>
<td>3</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>10:00 to 11:00</td>
<td>0</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>11:00 to 12:00</td>
<td>0</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>12:00 to 1:00 p.m.</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2:00 to 3:00</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3:00 to 4:00</td>
<td>0</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>4:00 to 5:00</td>
<td>0</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>5:00 to 6:00</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Saturday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7:00 to 8:00 a.m.</td>
<td>1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>8:00 to 9:00</td>
<td>0</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>9:00 to 10:00</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10:00 to 11:00</td>
<td>0</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>11:00 to 12:00</td>
<td>0</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>12:00 to 1:00 p.m.</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
| Note: B = buses, P = pickups, C = coaches. Data are incomplete for Friday, 9:00 to 10:00 a.m., North Station; 12:00 to 1:00 p.m., 2:00 to 3:00 p.m., and 5:00 to 6:00 p.m. everywhere given, and for Saturday, 7:00 to 8:00 a.m., 10:00 to 11:00 a.m., 2:00 to 3:00 p.m., and 4:00 to 5:00 p.m. at South Station and 8:00 to 9:00 a.m., 11:00 to 12:00 a.m., and 4:00 to 5:00 p.m. at North Station.

Table 2. Actual passenger loads and rated capacities of public-service vehicles entering Castries.

<table>
<thead>
<tr>
<th>Time</th>
<th>South Station</th>
<th>East Station</th>
<th>North Station</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>In  Actual Load</td>
<td>Rated Capacity</td>
<td>Out  Actual Load</td>
</tr>
<tr>
<td>Friday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:00 to 9:00 a.m.</td>
<td>274</td>
<td>394</td>
<td>3</td>
</tr>
<tr>
<td>9:00 to 10:00</td>
<td>127</td>
<td>287</td>
<td>42</td>
</tr>
<tr>
<td>10:00 to 11:00</td>
<td>74</td>
<td>142</td>
<td>42</td>
</tr>
<tr>
<td>11:00 to 12:00</td>
<td>9</td>
<td>38</td>
<td>15</td>
</tr>
<tr>
<td>12:00 to 1:00 p.m.</td>
<td>5</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>1:00 to 2:00</td>
<td>54</td>
<td>128</td>
<td>25</td>
</tr>
<tr>
<td>2:00 to 3:00</td>
<td>87</td>
<td>154</td>
<td>24</td>
</tr>
<tr>
<td>3:00 to 4:00</td>
<td>5</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>4:00 to 5:00</td>
<td>87</td>
<td>154</td>
<td>24</td>
</tr>
<tr>
<td>5:00 to 6:00</td>
<td>5</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>Saturday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7:00 to 8:00 a.m.</td>
<td>59</td>
<td>78</td>
<td>59</td>
</tr>
<tr>
<td>8:00 to 9:00</td>
<td>40</td>
<td>130</td>
<td>22</td>
</tr>
<tr>
<td>9:00 to 10:00</td>
<td>231</td>
<td>256</td>
<td>10</td>
</tr>
<tr>
<td>10:00 to 11:00</td>
<td>191</td>
<td>216</td>
<td>18</td>
</tr>
<tr>
<td>11:00 to 12:00</td>
<td>16</td>
<td>37</td>
<td>18</td>
</tr>
<tr>
<td>12:00 to 1:00 p.m.</td>
<td>4</td>
<td>36</td>
<td>16</td>
</tr>
<tr>
<td>1:00 to 2:00</td>
<td>3</td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>2:00 to 3:00</td>
<td>10</td>
<td>12</td>
<td>14</td>
</tr>
</tbody>
</table>

If the minibus owners were to keep proper records, an annual balance sheet (let us say for the second year) would look approximately like this for a total of 56 000 km (35 000 miles):

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed expenses</td>
<td></td>
</tr>
<tr>
<td>Depreciation</td>
<td>1195</td>
</tr>
<tr>
<td>Interest on loan</td>
<td>340</td>
</tr>
<tr>
<td>Insurance</td>
<td>530</td>
</tr>
<tr>
<td>Licensing</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>2115</td>
</tr>
<tr>
<td>Operating expenses (not including labor)</td>
<td></td>
</tr>
<tr>
<td>Fuel</td>
<td>1860</td>
</tr>
<tr>
<td>Maintenance and repairs</td>
<td>225</td>
</tr>
<tr>
<td>Tires</td>
<td>660</td>
</tr>
<tr>
<td>Total</td>
<td>2745</td>
</tr>
<tr>
<td>Annual total</td>
<td>4860</td>
</tr>
</tbody>
</table>

The figure for depreciation assumes that the value of the vehicle at trade-in time is sufficient down payment for the next vehicle, that for maintenance and repairs assumes that the driver is careful or can make minor repairs himself, and that for tires assumes that he needs 4 new tires ($45 each) and 16 retreads ($30 each).

The total annual expenses thus amount to $4860, to which a personal income of $1380 should be added ($115/month). To accumulate this total of $6240, a gross income of $25 per working day is required. If the operator, for example, services a regular run of 11 km (7 miles) that has a fare of 28 cents/passenger and he makes 10 round trips/d, each one-way trip would have to earn $1.25 (or carry an average of 4.4 paying passengers, not counting freight). Or, looking at it another way, the driver can earn the necessary $25/d with seven or more one-way loads. This is quite possible but, as it is expressed locally, one has to hustle.

Or, to look at this example in still another way, the operator will generate 2704 seat-km/d (1680 seat-miles/d); if he can maintain an average load factor of 50 percent (75 percent in one direction and 25 percent in the other), he will accumulate 1352 passenger-km (840...
INTERCITY TAXIS OF EGYPT

There is a wide variety of transportation systems operat-
ing in Egypt. In Cairo an underground rail system has
been designed but not yet built, while donkey carts per-
meate the city (they are barred from certain areas and
there is a program to trade them in for small pickup
trucks). Likewise, a range of modes serve interrural
and regional needs too. Besides airplanes, trains, a
few boats on the Nile, and private cars, there are public
buses and arabea ogra (literally, fare cars). These
intercity taxis, as they are formally called, are in ef-
fect long-distance jitneys, very similar in mode of
operation to the sherutim of Israel.

There is variety even among the buses: express ser-
vice at premium fares using the best available hardware
(fair-conditioned Mercedes Benz buses), regular opera-
ations with intermediate stops at major centers providing
basic long-distance service, and some rather broken-
down vehicles that meander through the back villages
along extended routes. All of this is supplemented—or
surpassed, depending on one’s point of view—by the in-
tercity taxis. The description presented here is not a
case study but rather represents research in progress.

The function of the intercity taxis is to provide re-
regional and intercommunity service at a level of flexibility
and demand responsiveness that only profit-motivated
entrepreneurs can provide. The operations focus on
large cities, particularly Cairo, and they exist because
they can compete successfully in terms of speed and
convenience with the public buses on the major routes
or because no other public service is available to the
more remote villages. These two situations characterize
the most obvious types of service.

The first uses new vehicles (Peugeot 504 station wags-
ons) imported in full operating order. They connect
important points and use major highways, e.g., travel
between Cairo and Alexandria along the 200-km (125-
 mile) Agricultural Road through the Nile Delta. The
main advantage of these taxis over the buses is speed:
One does not have to wait very long before a vehicle fills
up, and the line-haul has no interruptions. The main
disadvantage is also speed: After the drivers take off
there is no slowing down for anything, and they overtake
everybody. Serious accidents are quite common, and
the faint of heart are better advised to take the bus. A
very common sight on the Alexandria road, which has
two lanes in each direction, is a truck stopped on the
edge of the pavement being passed by another vehicle,
which in turn is being overtaken by a careening jitney
shooting the gap at 100 km/h (60 mph).

At the other end of the scale are services to the rural
hinterland. The age of the service vehicle is inversely
related to the size and importance of the village. These
taxis tend to be American sedans of ancient vintage, re-
equipped by the ingenuity of their owners. A definite
filtering-down process of equipment seems to exist. The
cars serve as the real communications links in many
respects between the small villages and the big city:
They will carry messages and perform small chores for
their neighbors.

It is interesting to observe that the retail price of one
liter (0.265 gal) of diesel fuel in 1975 was about 5 cents,
of which 2 cents was tax. The corresponding figures for
regular gasoline were about 13 and 7 cents, which would
explain the diesel conversions.

It should be noted that none of the jitneys provide in-
ternal urban service, nor do they enter the larger cities
haphazardly. There are very definite terminal points,
and in Cairo they are located at major transportation modes (large bus terminals, railroad stations, markets) at which transfers to other modes are easily possible. On the other hand, these areas are completely undesigned and unequipped. An open lot or a wide street is used, and the appearance is completely chaotic. The surrounding buildings tend to be occupied by low-grade commercial establishments; cars, taxis, vendors on foot, and stray animals mix through everything, and the environmental sanitation level is often deplorable. There are no passenger waiting spaces or other amenities here, except perhaps accidentally or in conjunction with other activities, but the system is understandable to regular users.

Organizational efforts are applied where it counts: Dispatchers supervise the operations and even sell tickets. These men are the visible expression of the private associations that maintain functional order at each terminal. They know at any given time which vehicles are present and also how many seats are still open in any one of them. At the time of departure, the driver pays a small fee to the dispatcher.

The fact that all the new units are the same model vehicle brings obvious efficiencies in purchase and maintenance. The latter is done in numerous small storefront workshops that specialize in one part of an automobile, but all cluster together in definite districts.

The vehicles on a given run are painted the same color and carry information about their terminal on the sides. Hard data on the use and operations of intercity taxis are not available at this time; information on motor vehicles in general is also scattered, and its analysis and interpretation are made very difficult by the interruptions in trends due to recent military and political events.

An example is provided in the case of the city of Ismailia (1) on the Suez Canal, which has very close linkages to Cairo but has also been in a state of flux; its social and economic life is being reestablished after the last Arab-Israeli war. In 1974 a total of 2309 motor vehicles were registered in this region, 470 of which were taxis. The population at that time was about 370,000, but it is expected to grow by 2000 to close to a million. In 1966, the rates for intercity passenger trips between Ismailia and Cairo were 15.7 daily trips/1000 population for buses, 8.6 for rail, and 6.3 for taxis and private cars.

Planning consultants have roughly estimated that the operating costs for intercity taxis are about 10 cents/km (16 cents/mile). It is a rather hopeless task at present to attempt an economic analysis of this industry; it is the nature of this business not to disclose information. But a few external observations should permit the reader to draw his or her own conclusions.

The vehicles are expensive by any standard. (The basic price of a Peugeot 504 station wagon in New York is $7500, and Egypt has heavy import duties.) The intercity taxis charged on runs for which competing modes are available are higher than those of public buses but below those of trains. During peak demand periods, the fares have been known to rise sharply. The drivers pay a business tax on profits, a defense tax, and a progressive personal income tax; their liability, however, is obviously not easy to determine because of the nature of the business.

It is said that today, with most economic enterprises heavily controlled by the state, only the operators of taxis (2) and heavy trucks are in a position to reap good profits. Observable evidence supports this contention, and some taxi owners have purchased a second vehicle after a year and a half in business. Large fleets are reported not to exist, but some families have several units under their control. This is also one of the most capital-intensive activities in Egypt at the present time outside of large-scale manufacturing.

Clearly, the taxi industry is most attractive to active people who wish to advance rapidly; the service is highly popular with almost everybody.

FIVE BRIEF SKETCHES

Venezuela—Carros por Puesto

In the city of Caracas, the carros por puesto run along fixed routes and charge fares on a zone basis. In the late 1960s there were about 6000 jitney vehicles in operation on 60 routes (3). This service emerged spontaneously and quite rapidly after 1950 in response to the extremely poor conventional bus service. It soon established a definite place in the social hierarchy of transportation systems as a public mode that has enough status to be used by the middle class. The very poor, of course, have to walk or cope with the regular buses (fare—about 11 cents); the carros por puesto serve those who can afford to pay about 22 cents, usually four times a day since workers return home for lunch. Regular use of taxis is definitely a notch above that (about 90 cents a ride), but all of these modes are eclipsed by the private car as a measure of one's station in life.

The data that are available (late 1960s) indicate that the Caracas jitneys serve about half a million people daily and accommodate about 16 percent of the trips in the city. On some streets 1000 carros por puesto pass a given point hourly during rush periods. They operate from outside terminals but stop anywhere along the route and even let out people from both sides of the vehicle, which is a definite hazard, particularly since there are no insurance requirements. Their overall running speeds for all practical purposes are identical with those for private cars: The time lost for stops is compensated for by aggressive driving—apparently an inherent characteristic of jitneys operated by private owners.

The government controls the rates and the number of vehicles allowed on the streets. Furthermore each car, according to a designation on its license plate, cannot be used during a specific day of the week and is expected to undergo maintenance at that time. At the operational level, even stricter controls are exercised by the 50 or so associations (many with 150 to 300 jitneys) that are largely responsible for specific routes.

The vehicles themselves are of all possible types, tend to be about 9 years old, and are operated by owner-drivers who have to go through the following entry process: (a) obtain a permit and license from a ministry office, (b) be approved by a city department, (c) be accepted by an association, and (d) join a transport union that is also a fraternal organization. After all that, a driver can expect a gross daily income of $15 to $16. About a third of this has to be allocated for operational expenses, maintenance, and depreciation, usually leaving less than $11/d as net income; this represents an adequate but modest wage and would place the driver's family in the upper stratum of the low-income group.

The future of the Caracas jitneys has been and remains uncertain. It is probable that a better bus system—in terms of speed, cleanliness, and comfort (not cost)—could push them out of business. Also, as local employment opportunities grow, the long hours and bare subsistence returns could encourage many drivers to give up this way of life. On the other hand, others may wish to fill their places in an effort to struggle up the economic ladder. Another factor that will affect the situation is the subway that is now under construction. It is assumed that when the new subway is opened most travelers will switch to this service, since it fits in well with the linear
configuration of the city. However, it is also expected—and hoped by some—that the jitneys will then be able to operate as a responsive feeder and distribution service for the heavily used public mode.

**The Philippines—Jeepneys**

The jitneys-jeepneys of Manila were created after World War II when the American Army dumped its surplus vehicles in the Pacific region. The mode that emerged did not just fill a temporary vacuum in the public transportation field; it has also established and maintained a secure position in this area as an extreme free-enterprise operation in quite an open economic situation (4). Perhaps even more importantly, the jeepneys express the individualistic values and national life-styles of their drivers and patrons. The vehicles are among the most colorful transportation devices found anywhere; they are examples of true folk art in the best sense of the word.

As the name indicates, the chassis and mechanical parts of the vehicle come from the jeep, but this is covered by a locally produced body that accommodates up to 14 seated passengers. The outside is covered by a wide variety of decorative elements, ranging from elaborate paintwork and plastic streamers to chrome ornaments. The total effect is one of exuberance and flamboyance that highlight the utilitarian character of the vehicle and the imagination and skill of the local craftsmen.

In Manila the operations of buses and jeepneys almost completely overlap. The fares are also the same, and they are equally acceptable socially. Thus, specific choices are purely personal, and the major distinction is that buses are perceived to be more comfortable for longer journeys, while the jeepneys are more agile and thus faster. At the administrative level the two systems maintain a continuous state of confrontation as competing private industries.

In 1960, there were 7300 jeepneys owned by 3600 persons in operation in Manila; in 1970 the jeepney fleet had grown to 15,000. Few hard figures are available on their actual use, but this service is unquestionably the dominant public mode. In the late 1950s, about two-thirds of all passenger trips were accommodated by it and, although this ratio has certainly decreased, the most visible element on most major Manila streets is still the jeepney. As they do everywhere else, the Filipino vehicles capitalize on responsiveness, maneuverability, and speed; thus they are able to cope reasonably well with the chronic problems of congestion in Manila. Street surveys indicate that they can carry more than 7000 passengers/h/lane.

Some of the more interesting features of this mode concern its labor implications and organizational structure. The jeepney industry employs a significant number of workers not only in direct operation but also in their local manufacture. The ownership and control systems are quite complex and often not fully recognized or known officially. There are many owner-drivers, but there are also entrepreneurs who control hundreds of vehicles that they rent out to individuals daily under illegal but unstoppable private agreements. Since these drivers have to fend for themselves, fierce competition for fares is generated on the street, and there are frequently many other abuses in terms of service.

Public agencies control the entry of new operators through a certification process that has no overall service criteria and little follow-up enforcement. The effective control of the industry is provided internally by associations that are well organized and disciplined and can exert political influence at the national level.

The take-home income for a driver was about $2.50 to $3.25/d in the early 1970s, although up to $4.25 could be earned in a long day. Since the legal minimum daily wage in the Philippines at that time was $1.25, the income is regarded as quite adequate within a modest style of living. However, the price of a vehicle (about $2400) compared with the average income levels makes it extremely difficult for an ordinary worker to enter this business through regular savings. It is interesting to note that the ratio between the cost of a vehicle and a reasonable annual wage for a driver in Manila is about 3 to 1, while it would be exactly the opposite—1 to 3—in the United States ($3300 for the car and $10,000 in salary).

**Nigeria—Kia-Kias**

In Lagos the kia-kias (translated as quick-quicks) are true jitneys with a few other free-enterprise features added. Since undoubtedly the overall transportation situation in Lagos is among the worst in all metropolitan areas of the world today, the kia-kia service is crucial to the life of the city, although it is looked at askance by the authorities and is considered somewhat of an embarrassment because of its freewheeling and improvisational nature. The vehicles themselves are almost without exception regular minibuses with simple seats added (5).

The major public service is provided by conventional, albeit obsolete, overcrowded, and uncomfortable buses. They struggle along badly congested streets, and trips during rush hours are usually measured in hours. The jitneys are the only vehicles that can penetrate the dense low-income residential districts, which have narrow and often unpaved alleys. Thus they operate mostly as feeders, focusing on a few modes that are usually business centers and bus stops on the primary arteries. The conditions here, to the outside observer, appear chaotic, and the waste of time, fuel, and human energy is staggering.

It is hard to imagine how an official agency could operate a local service under these conditions. It is instead accomplished by the kia-kias under the reported control of powerful individuals and associations in each district. They run a tight ship, and fatalities resulting from "organizational efforts" are not unknown. All this has not been a particular concern of the government, which largely maintains a hands-off attitude.

As far as the passengers are concerned, they need a lot of experience and experimentation in their own districts to cope with the system. Their complaints regarding the kia-kias are numerous, ranging all the way from fare gouging to the absence of service in many areas. However, on the whole, the system works, and there really is no choice or alternative that could be identified in the near future. The operators only want the public agencies to leave them reasonably alone and to provide physical improvements at the interchange points between the buses and the kia-kias.

**Ecuador—Colectivos**

The city of Guayaquil has two public systems: the buses and the colectivos. The latter were originally of the pure jitney type but have undergone an interesting rapid process of evolution. The colectivo lines were organized as a higher quality service using small vehicles. Since they have remained very popular, the units have grown through the microbus type to regular bus size. Today they are usually good European-built vehicles, and the average colectivo is now physically larger than the bus, locally improvised vehicle and rather dilapidated.
The lines have increased in number and become more fixed. There are an approximately equal number of bus and colectivo lines, and their configuration is about the same: radially oriented toward the center. The only difference is that relatively more colectivos serve the higher income districts, while buses, of course, have an edge but no monopoly in poorer areas.

Furthermore, both services operate in the jitney mode, i.e., they stop on demand even though this is against regulations. It is also interesting to note that the colectivos are not allowed to carry standees but, since they do anyway, occasionally the driver will ask everybody to crouch down if he thinks that he is passing a checkpoint. Fares have remained fixed for a long time, and there is no substantial difference between buses and colectivos—about 3 versus 4 cents. These extremely low fares are completely unsubsidized, but clearly the private operators can make a profit. However, it may be a matter of economic survival to take various shortcuts. Some of these are good (such as responding immediately to user demands in various districts and on special occasions); others are not so good (squeezing in the maximum number of seats and not providing any service in light-density corridors).

Israel—Sherutim

The sherut system is well developed and institutionalized in Israel. The major difference between this case and the others discussed previously is that the service in Israel is intercity in nature, and thus each line is relatively long. Fares, therefore, have to be zoned. The service is strictly controlled by the government and operates as a regular and major component of the entire national transportation system. Indeed, the buses alone would not be able to cope with the loads.

Terminals may be at the periphery of urban areas, or the lines may reach to the very core of cities, in effect thus also offering localized metropolitan service. The vehicles are usually of very good quality and are like specialized airport limousines.

CONCLUSIONS

All the systems looked at in greater or lesser detail in this survey are vigorous in their operations and in great demand among their customers. Thus, they can only be characterized as successful. The key concepts appear to be flexibility and responsiveness.

1. They have grown out of the local transportation needs. They are not deliberately planned or particularly controlled by official bodies.
2. They rely on hardware that the local community can afford and manage, but changes are made rapidly as the fundamental economic state improves.
3. They provide a personal service that fosters direct human relationships. The drivers, owners, and mechanics are members of the local community themselves.
4. They are labor-intensive systems at the semi-skilled level—fitting exactly the employment needs in developing countries (perhaps also in industrialized countries today).
5. They exploit quickly all demand situations. The operators are immediately aware of new patterns, and they can step in at a moment’s notice.
6. They tend to use small vehicles, which can maintain high frequency of service and can penetrate residential districts.
7. They act in the broadest sense as the incubators of skills toward national industrialization, both in technical and entrepreneurial areas.
8. They do not require large investments in general and practically none from the public sector: No rebuilding of channels is necessary. No research or development of equipment is needed: Hardware is bought off the shelf or is modified through well-established local practices.

All this is possible because private individuals work very hard to gain the largest possible income to support their families and to move ahead. The industry tends to attract the most aggressive persons from the local communities, and it is very frequently the easiest entry into modern business, requiring rather modest initial means. This powerful motivation results in exceptional service response.

Lest this examination become a one-sided paean in praise of unbridled private enterprise in public transportation, the negative elements of these systems must not be ignored. While there are many variations in this from place to place, the following concerns appear to be somewhat universal.

1. Service will be provided within a corridor or even at any given time only if it is profitable to do so in the short run or perhaps in the long run. Low-density or poor neighborhoods remain unserviced.
2. The high competitiveness of the activity can keep the net income of drivers at the bottom level, but it also keeps the fares down.
3. There are frequently opportunities and temptations for unscrupulous individuals to build self-serving enterprises beyond the pale of legality. This can reach the level of outright gangsterism.
4. The scramble for fares almost always necessitates a hostile attitude and behavior toward traffic regulations and driving etiquette.
5. The public agencies tend to ignore this industry at best (keeping hands off and providing no assistance or encouragement) or at worst try to eliminate it, since it does not present the proper civic image.
6. Maintenance of equipment and rider comfort and safety can be seriously deficient under tight economic conditions.
7. The regularity and reliability of service can be seriously affected by the personal whims of drivers or the monetary inducements of riders.

It is quite obvious that most of the bad features of rampant and rapacious capitalism and incipient criminality can be at least minimized by a positive assumption of responsibility by the government. It is not so clear what can be done to assure that the public objectives of a public service are achieved—the provision of reasonable service to all who need it. No matter how good the service may be in any given instance, there will be people, certainly at the lower end of the economic scale, who are shut out from it. Here only direct or indirect public assistance may help, and this is exactly the step that most official agencies will shy away from.

The efforts of some national or local governments to actively work toward the elimination of these services have been a more serious problem than nonassistance. The overwhelming reason for this attitude is a perception of status symbols: Jitneys appear to be primitive and improvisational compared to the taxis of London, the monorails of Tokyo, the buses of Copenhagen, or the subways of San Francisco. This, unfortunately, misses the point completely and, ironical as it may sound, the emergence of interest in paratransit modes in the industrialized countries has placed those that flourish in the cities of the third world in a much better local per-
Regulatory Considerations for Alternatives to Conventional Transit Systems

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The case of the Reston Commuter Bus presents an interesting example of intergovernmental confusion and conflict that culminated in a public regulatory commission overruling the policies of a public transit authority. It is an example of a technically and financially sound transportation system being threatened by institutional policies that were, ironically, designed to preserve public transportation.

STARTING THE SERVICE

The Reston Commuter Bus System was started in 1968 by a group of commuters for the simple purpose of getting to work without driving. This was prior to the public acquisition of transit in Washington, D.C., and the privately owned common carrier that had operating rights between Reston and Washington declined to provide regular bus service because it did not appear to be financially justified. The commuters therefore chartered a daily bus and routed it to serve most parts of Reston, run nonstop on the 32-km (20-mile) trip to Washington, and drop off riders at downtown employment centers.

The carrier was pleased with this arrangement since there was no financial risk, and the commuters did their own scheduling and revenue processing. Unlike most public transit in suburban Washington, the system was designed to serve commuters effectively and provide a realistic alternative to driving. The service was successful, more buses were added, and the group of commuters became a corporation. By 1972 the Reston Commuter Bus had attracted more than 1000 people (2000 daily trips).

But while Reston Commuter Bus was a success, transit ridership in the Washington area was declining and public acquisition was imminent. In January 1973 the private carrier that served Reston was condemned and its assets were taken over by the Washington Metropolitan Area Transit Authority (WMATA).

The WMATA inherited the contract between the private carrier and Reston Commuter Bus. Reston generally supported the public takeover and expected a lower price per bus run because WMATA’s price would not include a profit factor or depreciation, since the capital costs would be absorbed by WMATA and Fairfax County. Economies of scale were anticipated because WMATA would merge the four Washington area bus companies. Reston simply expected that a public agency would be more responsive to public needs, especially in the case...