THE IMPACT OF THE TRUCK BAN ON THE TRUCKING INDUSTRY IN METRO MANILA

Jennifer D. Punzalan
Engineer III
Development Planning Division
Department of Public Works and Highways
Port Area, Manila
Philippines

Dr. Primitivo C. Cal
Professor
School of Urban and Regional Planning
University of the Philippines
Diliman, Quezon City
Philippines

Abstract : The research looked into the effects of the truck ban on the socio-economic characteristics of truck operators and drivers, as well as into truck operations. The opinion of truck operators and drivers on the truck ban scheme was also ascertained. The study revealed that the truck ban has significant effects on trip-making routes and schedules, work schedules of truck operators and drivers and their time budget. While the incomes of truck operators and drivers are the lowest among the different types of transport services, the results are not conclusive that the truck ban is responsible for their economic standing. The majority of truck operators and drivers prefer the conversion of the "all-day" truck ban along EDSA to the peak-hour ban only.

1.   INTRODUCTION

Metro Manila, being the premier economic center of the Philippines, has experienced rapid growth. Along side this growth, it has become a center of a large concentration of people, which has produced far-reaching and complex problems. One of the more significant problems which is confronting all sectors of the society is traffic congestion. The road condition in Metro Manila's thoroughfare has greatly inconvenienced both daily commuters and motorists, and even the pedestrians. It is one of the major causes of the wastage of valuable resources and the degradation of the environment. It has an adverse effect of the economy.

While the government has put in place several methods or schemes to solve the problem of congestion, the problem still continues to grow. The increase in road infrastructure capacity has not been able to provide an answer to the continuing increase in congestion.

Traffic congestion problems cannot be solved, simply by expanding road infrastructures, but also require the proper management of existing transportation systems. Many countries have used a wide array of economic and administrative policies to successfully manage congestion and influence travel demand.   These policies are widely referred to as Travel Demand Management (TDM) measures. TDM measures are designed to improve the operating efficiency of the existing transportation system – its infrastructures, modes and services. These measures are implemented to improve mobility, safety, and traffic flows, and to reduce demand for vehicle use.

Premised on the above, the Metropolitan Manila Development Authority (MMDA) has implemented various TDM measures to alleviate or minimize congestion in the roads of the metropolis.   Some of these measures are the unified vehicle reduction program, truck ban, towing of illegally parked vehicles, exclusive bus lanes, and bus segregation scheme.

Among the schemes, the truck ban causes to control the activity of one sector to favor the movement of other road use.

At this period of its implementation, the efficiency of the truck ban is still in question, socially and economically. The sector directly affected by the TDM scheme may not only suffer from the restrictions imposed on them, but as well as the daily road congestion hazards encountered. This scenario, definitely, could have socio-economic impact on the actors directly affected by the TDM measure.

The basic concept of the truck ban is that by eliminating trucks, which are considered as slow moving and occupy large amount of road space, along Metro Manila's major thoroughfares during certain periods of the day, traffic congestion problem may be alleviated. The concept is true if mere vehicular volume is considered. However, the implementation of road use restrictions may have some social and economical implications to the sectors of the society, which are directly and indirectly involved. Furthermore, the adverse social and economical effects may outweigh the benefits that may be derived from the implementation of a TDM measure. In such a case, the TDM measure may be considered as ineffective or may require fine tuning or revisions.

On the other hand, freight transport, which is considered as one of the more efficient road users, is very important in the urbanization process such that any restriction imposed on its activities may disrupt the flow of goods. Further, implementation of road use restrictions on trucks will not only have an effect on the trucking industry but on the national economy as well.

A number of TDM measures have been proven to be a highly cost-effective way to alleviate road traffic congestion. TDM measures have been implemented in so many cities around the world to promote schemes, which allow efficient use of existing road infrastructure without large capital expenditures. But for any traffic scheme to be implemented successfully, it must have gone thorough study. Ill-studied TDM scheme will only provide limited relief in a minimal number of situations.

1.1.   The Truck Ban Scheme

In 1978, cognizant of the critical situation of traffic congestion on the roads of Metro Manila, the then Metropolitan Manila Authority (MMA), issued a directive, through Ordinance No. 78-04 which prohibits cargo trucks, with GVW of more than 4,000 kg., from traveling or passing along eleven major thoroughfares within the metropolis during peak traffic hours - from 6:00 A.M. to 9:00 A.M. and from 4:00 P.M. to 8:00 P.M., daily except on Saturdays, Sundays and holidays. In 1991, the MMA issued Ordinance No. 19, Series of 1991, amending the 1978 ordinance, providing Alternate Routes to the Truck Ban Routes and a 2 hour reduction of the truck ban hours.

The present truck ban is covered by Ordinance No. 5, Series of 1994. In 1994, the then MMA, issued Ordinance No. 5, Series of 1994, further amending Ordinance No. 78-04 as amended by Ordinance No. 19 Series 1991. The Ordinance restricts trucks to travel or pass along 10 major routes from 6:00 A.M. to 9:00 A.M. and from 5:00 P..M. to 9:00 P..M., everyday except Saturdays, Sundays and holidays. The Ordinance also provided for an "all-day" truck ban along Metro Manila's major arterial road, the Epifanio delos Santos Avenue (EDSA), everyday from 6:00 A.M. to 9:00 P.M. except Saturdays, Sundays and holidays.

Despite the implementation of several TDM measures involving other modes, the traffic situation in the roads of Metro Manila still worsen, that even on Saturdays traffic congestion is still experienced almost everywhere in the metropolis. The MMDA, in recognition of this predicament, further amended Ordinance No. 5, Series of 1994, by issuing Ordinance No. 96-008, which now includes Saturdays in the truck ban period. In 1999, MMDA Regulation No. 99-002, amended Ordinance No. 5, Series of 1994, wherein the "gross capacity weight" has been amended from 4,000 to 4,500 kilograms.

2. OBJECTIVES OF THE STUDY

The truck ban directly affects the activities of the trucking sector. In effect, the main actors affected by the TDM are the truck operators and drivers. In this research, the study aimed to address the questions of – What are the social and economic impacts of the truck ban on truck operators and drivers? What is its effect on the operations of the trucking industry? What is the attitude of truck operators and drivers toward the TDM scheme?

Recent studies on the truck ban dealt on its effectiveness as a TDM measure, solely taking into consideration its viability in economic terms. Thus, the research principally aims at identifying and investigating the socio-economic impact of the truck ban.

With the problems presented, the research aimed to achieve the following objectives :

- To determine the socio-economic characteristics of truck operators and drivers;
- To determine the effect of truck ban on the behavior, operations, trip characteristics and financial situation of the trucking industry; and
- To determine perception of truck operators and drivers towards the truck ban.

2.1 Limitations of the Research

The survey was mainly confined to truck operators and drivers since these two players are those directly affected by the truck ban. Their livelihood is dependent on the number of trips they are capable of making. Manufacturers and dealers were not included in the survey since transport represents a minor part in their over-all operations. The effects of the truck ban on their schedules will be minimal in comparison to their over-all operating costs.

3. DATA COLLECTION

3.1 Survey Methodology

The study area of the research is in Metro Manila, wherein the truck ban is being implemented. The survey area was limited to the Port of Manila – the trucks that cater to the North and South Harbors, and the Manila International Container Terminal (MICT). The area is considered enough to capture a representative picture of the truck movements affected by the truck ban. Most, if not all, of the trips generated to and from the Port of Manila are dependent mainly on the arrival and departure of ships carrying international and domestic cargoes. Since ship arrivals and departures fall in anytime of the day, and require immediate transport of cargoes, trips are generated even within the truck ban schedules.

The operator and driver survey was conducted by using a personal approach interview. Schedules of interviews for the two sets of respondents were done separately. The survey was

conducted during the drivers' off time, while waiting for the processing of documents for release of goods to be delivered, or simply just waiting for the window hours of the truck ban. The survey was conducted from 11:00 A.M. to 6:00 P.M. at the MICT truck holding area while 7:00 A.M. to 5:00 P.M. for the North and South Harbors.

To avoid the anticipated difficulty in retrieving and/or receipt of unfilled-up survey forms, as experienced in other studies, the personal or face-to-face approach was adopted in gathering the data for truck operators. These operators, who usually are not readily available because of the nature of their job, were given the privilege to set their own convenient date and time of interview.

The conduct of the O-D survey followed right after the questionnaire portion of the interview of truck drivers. The respondents were asked of the details of their latest trip data. All of the 184 drivers interviewed responded to the O-D survey, however there were about 12 samples discarded due to inconsistencies, lack of data supplied or in few cases, the driver was not able to make a trip during the previous week. As such, the number of samples was reduced to 172.

3.2   Survey Design

The survey questionnaires for both the truck operators and drivers were designed primarily to obtain the socio-economic activities of the respondents and the trucking operations with respect to the implementation of the truck ban.   Similarities on some items of the questionnaires on both sets of respondents were purposely done for cross checking of data. The survey questionnaire for the truck operators was structured comprising of four sections, namely, a) socio-economic profile, b) operations, c) work schedules, and d) perception survey. Similarly, the truck driver survey questionnaire incorporated the above mentioned sections with the inclusion of the questions on the influence of the TDM scheme to driving behavior.

The perception section of the questionnaire on both respondents dealt with the possibility of converting the existing truck ban time to two given scenarios, namely, a) the "all-day" (6:00 AM to 9:00 PM) truck ban along EDSA would be converted to the peak-hour (6:00 – 9:00 AM and 5:00 – 9:00 PM) truck ban, as in its previous schedule and b) the peak-hour truck ban along the main thoroughfares would be converted to an "all-day" truck ban, having the 6:00 AM to 9:00 PM truck ban applicable to all roads covered by the ban. This portion of the questionnaire was designed to get the perceptions of the respondents on the effects of the given scenarios in terms of their revenues, operational costs, work schedules, work force, number of trips, etc. and the delivery schedule they would prefer to apply for each scenario.

The conduct of the origin-destination (O-D) survey was intended to capture the driver's latest trip data. The survey was able to identify, the trip routes and the actual time of deliveries of goods.

4.   DATA PROFILE

4.1   Socio-economic Profile of Truck Drivers and Operators

The 179 respondents truck drivers interviewed had an average age of 36. Majority of the truck drivers (62%) falls under the ages of 26 to 40 years old. This indicates that most of the

drivers were still minors when the truck ban was implemented in 1978. A high percentage of the drivers (87%) have driving experience of less than 20 years, which means that most of the respondents were not yet driving trucks in 1978. The truck ban was already in place when most of the drivers started driving trucks and could be considered as already accustomed to the truck ban scheme.

Most of the drivers, representing 68% of the respondents, are high school graduates and a large number are only grade school graduate. This could be related to the portion of the survey covering the awareness of drivers of the truck ban schedules. In that portion, the data reveal that a significant number of drivers, 15% to 25%, are not familiar with truck ban schedules. The educational attainment of drivers may have a factor in this area.

The hard financial plight of truck drivers is shown in the survey results. The average monthly income of truck drivers, based from the survey respondents is P7,697.26. Most of the drivers, 72%, earn less than P9,000 per month. Majority of them, 78%, are lone working members of their households, which, on the average have 3 to 4 household dependents. With the continuous increase in the cost of living in Metro Manila, it is difficult for a truck driver to feed his family. Although, majority of the drivers, 85%, are classified as permanent employees, 63% are still paid on per-trip basis. This shows that truck drivers' income are solely dependent on the number of trips they can make. Another point to consider is that almost all drivers are not paid overtime pay even if their trips would exceed the normal working time.

Of the 61 truck operators interviewed, 25% have been in the trucking industry for 6-10 years already. The oldest 40-45 years are about 5% of the population while 16% comprise the operators who have been running the business for less than 5 years. Most of the operators, 78%, have been in business for less than 20 years, indicating that the truck ban scheme was already implemented when they entered the industry and may be considered as already accustomed with the TDM scheme.

The highest number of units owned by a one operator is 85. This is followed by the 21-30-units truck ownership, represented by only 7% of the operators. The survey also reveal that more than half or 52% of the respondents own less than 6 units of trucks. The highest percentage in terms of fleet size is 21% represented by operators who own only 2 trucks. This could be indicative that the business is capital intensive and the return is minimal, not enough to expand the business or increase the number of trucks.

In terms of gross revenue, 53% of the operators earn between P100,000-P399,000 per month on a 5- to 6-day-workweek. Operating cost ranges from 50% to 80% of the gross revenue. On a per truck basis, an operator realizes approximately P297,890.28 per year as gross income, certainly not enough to buy another truck. Mathematically, if a reconditioned truck costs P1.20M, an operator has to have at least 4 operating trucks to be able to acquire another truck in a year's operations.

4.2   Trip Information

The distance that each truck travels would range from 5 km. being the nearest and more than 350 km. as the farthest. The maximum travel distance varies with distribution except for the 200-km. mark which comprise 17% of the operators. Destinations of trucks could go as far as Aparri, in the northern part of Luzon and Bicol in the southern part.

The minimum length of travel of operation is within Metro Manila and its suburban areas. About 35% of the operators have deliveries of less than 5 km.   This would mean that the destinations are areas within the vicinity of the Port, i.e. Binondo, Tondo, and Intramuros. The farthest minimum travel length is 50 km. This would represent areas in the outskirts of the metropolis.

Majority of the truck drivers, 37%, make about 5 trips a week while 27% make 6 trips. It can be deduced that at least one trip per day is made by each truck driver. Deliveries within Metro Manila could make a return trip on the same day. About 2 of the respondents could only make 2 trips a week, since these are mostly provincial trip assignments. Significantly some could even make more than 7 trips a week, 8 (9 or 5%); 9 (1 or 1%); 10 (5 or 3%) and more than 10 trips (6 or 3%). Most of these trips are within the City of Manila or within a radius of 5 km.

The type of truck to be driven is assigned by the operator. Majority of drivers, 27%, drive trucks with 3 axles, better known as the 10-wheeler trucks. Twenty-two percent (22%), on the otherhand, drive semi-trailer trucks or the 18-wheelers.

Most of the truck operators charge freight services on a per trip basis. Trips are grouped according to the origin and destination of deliveries. Deliveries within Metro Manila are charged differently from provincial deliveries. Freight charges for Metro Manila ranges from P1,800 to P4,000, which is also based on the type of truck used. Deliveries outside Metro Manila are charged on a per kilometer basis. Although these rates are based on a per trip, it can somehow be considered distance-based.

4.3   Truck Operations

The clientele of a trucking firm is usually divided into two, the regular or contracted client and the walk-in client. The contracted client would represent an almost fixed revenue status. The data reveal that 20% of the operators have 80/20% ratio of contracted/walk-in clientele ratio. A high percentage of operators, 77%, have a clientele profile wherein more than half are contracted clients.

Normally, operators (75% of them) do not assign routes to be taken by their drivers since the drivers are considered as more knowledgeable of the more efficient routes to their destinations. Most trips emanating from the Port Area cover deliveries within Metro Manila, or some in areas just at the outskirts of the metropolis..

The truck operators' delivery performance was assessed through the percentage of the arrival of goods on time to their clients. The survey reveals that 75% of the respondents claim that 80-100% of their goods arrive on time. These operators painstakingly adjust their schedules with the truck ban schedule so as not to lose confidence from their clients which could eventually lead to losing their clients. However, there were cases when certain circumstances

occur, such as adjustment to the arrival/departure of the shipment of goods; loading/unloading; etc, causing the delayed delivery of goods. The remaining 24% of the operators reveal that either 60-79% or <60% of their goods arrive on time.

The survey results show that among the causes of delays in deliveries, the operators and drivers rank the truck ban scheme as the no. 1, followed by the loading/unloading time, then by traffic congestion.

The majority of the respondents, 71%, choose to follow their usual or normal schedules, on cases where rush deliveries are inevitable. Surprisingly 20% of the operators would use the banned routes during truck ban to arrive on time. As gathered from the interview, banned routes are used only when with police escort.

In case a trip would require travel along EDSA during the "all-day" truck ban, 80% of the respondents would prefer to make nighttime deliveries than to use alternate routes. Likewise, for trips requiring travels along banned routes during "peak-hours", 64% of the respondents would not use alternate routes but instead prefer to make nighttime deliveries. Operators and drivers prefer nighttime deliveries due to the following advantages – no traffic congestion, ranked first; cool weather, ranked second. As expected, majority of drivers, 22%, are assigned nighttime deliveries.

Although the TDM measure provides for "window routes", most of the respondents would not use said routes since most of the time these routes are congested and sometimes the drivers are apprehended while traveling along these routes. This is indicative of the lack of information on the truck ban scheme even among its enforcers.

4.4   Work Schedules

Most of the drivers or 58% of them report to work for 6 days a week, 24% work for 5 days, 15% of them for 7 days while a minority of 3% works for only 4 days a week. Normally, a driver can make only one trip per day if travel is within Metro Manila. This includes the return trip of the truck on the same day, which is mostly empty. If a trip covers deliveries outside the metropolis, particularly in the provinces, then the number of trips is reduced since the return trip would have to wait for the off-time of the truck ban.

Majority of the drivers, 88%, stay in their operators terminal or garage during the entire work-week, after reporting on the first working day up to the last working day of the week. Since trip schedules are mainly dependent on calls of clients, arrival of shipments and release of cargo documents, the drivers must be on-call or on stand-by anytime for deliveries. This type of work schedule has left a driver with little time to attend for his personal needs and family activities. On the average, a driver spends less than an hour a day for his personal activities. Likewise, on the average, a driver spends only 4.68 hours of sleep a day.

Similar to a regular work schedule of any profession, the operators' workdays ranges from 5, 6 and 7 days with 54%, 39% and 7% of the total respondents having these number of workdays, respectively. It can be noted that the regular or normal workdays could either 5 or 6 days. Only 4 operators are using a non-stop working week.

The survey shows that most of the operators or 38% would spend 6 hours of sleep, then followed by 29% to 8 hours of sleep. At this point, results are not surprising since the respondents do the monitoring of their drivers on the field at their homes by means of radios

and mobile phones. But there are also times when emergency calls for them to be present to their drivers' aid.

Due to the abnormal working schedules of the operators, 40% of them would utilize their weekends for their personal or family activities and 35% on Sundays. This is justified since the respondents' working days would run from 5 to 6 days and to some would even mean working for 7 days a week. Still, about 25% of the operators could manage to allot 2 to 5 hours a day on personal and family activities.

4.5   Influence of Truck Ban on Driver's Behavior

Data show that 22% of the drivers are assigned during nighttime deliveries for 5 days a week. About 21% follow with 3 days nighttime assignment. Since most of the drivers have 5 workdays a week, it can be stated that almost all of the trips of the week are during nighttime.

To the drivers, daytime delivery has its advantages over nighttime delivery and vice versa A high 61% declare that the main advantage of nighttime delivery is the ease in traffic congestion. This was followed by the cool weather condition as stated by 31% of the respondents.

For daytime delivery, 32% of the drivers account the readiness to unload cargoes during daytime or during regular working hours. During nighttime deliveries, drivers usually wait for the regular working hours of the client for them to unload the cargoes, unless for some where cargo depot are provided by the clients. On this type of condition by the time the drivers could unload cargoes in the morning another truck ban period would oblige them to wait for the window hours to take effect.

Majority of the respondents, 61% have not encountered any accidents for a year. About 17% and 8% of the drivers encountered 1 or 2 accidents, respectively. A total 50 drivers or 28% have encountered accidents of 1 (17%), 2 (8%), 3 (2%) or 8 (1%) times during daytime. Nighttime driving has lesser occurrence of accidents among drivers, which has 18%, 6%, 1% and another 1% for the frequency of 1, 2, 3 and 4 accidents respectively.   It can be noted that the operators are applying measures to prevent their drivers from road accidents.

The survey results show that the main cause of accidents during daytime delivery is mechanical breakdown, then followed by over speeding. During nighttime deliveries, the main cause is sleepiness followed by mechanical breakdown.

Most of the drivers are assigned during nighttime at almost all of their work days. Since there are no regular schedules of deliveries, there are instances wherein after a nighttime delivery another one would call for them to travel again within an hour's time. More so, there are times when another delivery would require them to travel immediately after the recent trip. This type of work schedule has left a driver with little time to attend for his personal needs and family activities. On the average, a driver spends less than an hour a day for his personal activities. Likewise, on the average, a driver spends only 4.68 hours of sleep a day.

4.6   Respondents' Perception on the Conversion of Truck Ban Schedules

Both of the respondents, the operators and drivers were asked to give their perception in response to the two scenarios given, converting the truck ban schedules of each type. This is aimed at determining the effects of the given scenario to each group of respondents. Both groups showed openness in sharing their ideas on the effects that the given scenario could have to their industry
.
Scenario I –   Converting the "All-day" along EDSA to Peak-hour truck ban. The survey reveals that 95% of the operators and 95.53% of the drivers are very much in favor of the lifting ban along EDSA. Increase in revenue and income of the operators and drivers, respectively, would be the most significant effect of the conversion. The scheme would cause improvement in their work schedules as stated by 54.10% of the operators and 44.69% of the drivers, while to some this would mean having the same schedules. There would be increases in the number of trips according to 73.77% operators and 77.09% drivers. Both groups agree that there would be no delays in the delivery of goods. These are indicated in **Table 1.**

Table 1 Effects of the Peak Hour Truck Ban on the Respondents

Factors	Operator (%)	Driver (%)
Revenue/Income		
Increased	73.77	75.98
Same / No Effect	26.33	24.02
Work Schedule		
Same	29.51	48.60
Improved	54.10	44.69
More work/ Very Productive	16.41	6.70
Number of Trips		
Same	24.59	22.91
Increased	73.77	77.09
Doubled	1.64	
Delivery to Arrive on Time		
Same	6.67	23.60
No Delays	91.67	73.60
Not Sure	1.67	2.25

Operators were asked on the preferred trip schedules they would take given the scenario while the drivers' perceptions were also solicited. As a result, the in-between truck ban time is the most likely preferred delivery schedules of operators (48.33%) and drivers (62.71%). Surprisingly, a number of operators   (36.67%) and drivers (23.16%) would still take nighttime deliveries.

Scenario II – Peak –hour to "All-day" truck ban.   As presented to the respondents, the scenario would suggest an "all-day" truck ban implementation on all roads covered by the ban but maintaining the window routes identified in the truck ban ordinance. The survey reveals that an almost 100% negative response was given by the operators and drivers interviewed. It is evident that the operators would be the worse hit in this scenario than the drivers since these drivers could shift to another job. The general effects on both groups are

summarized in the **table below**. The data shows that as the number of trips decreases and so as with the operators' revenue and the drivers' income.

Table 2 Effects of the All-Day Truck Ban on the Respondents

Factors	Operator (%)	Driver (%)
Revenue/Income		
Same / No Effect	5.00	7.82
Decreased	95.00	86.03
No Income at all		6.15
Work Schedule		
Same	11.67	26.26
Irregular	66.67	3.91
Bad	13.33	54.19
Hectic	-	13.41
Others	9.53	2.23
Number of Trips		
Same	10.00	6.70
Decreased	90.00	91.62
No Trips at all	-	1.68
Delivery to Arrive on Time		
Same	5.08	12.92
No Delays	93.22	20.22
With Delays	-	65.17

Even with the provision of the window routes, mainly to address the constraints of the restriction, the respondents find these routes insignificant at present to their sector. Only 15% of the operators would use alternate routes during ban time, in contrast to the drivers' preference of nighttime deliveries with a high percentage of 88%.

4.7. O-D Survey Results

The origin and destination for each trip made, were grouped by zones with reference to their locations, Zone 1 – Pier/Manila; Zone 2 – Valenzuela, Bulacan; Zone 3 – Quezon City, Rizal, Marikina; Zone 4 – Makati, Laguna, Cavite and Zone 5 – Malabon, Navotas. The central point is within the vicinity of the port, Zone 5 is within the City of Manila while the rest are directional traffic to the northern, southern and eastern parts of the metropolis.

The survey results indicate that 81% of the trips originate from the Zone 1 or the within the perimeter of the port. About 5% of the trips could have either Zone 2 and 3 as their starting point. Trips which pick up deliveries from clients for delivery to the port, fall under the percentages of these zones.   Significantly no trips originated from Zone 5 during the time of the survey.

Based from the results of the survey almost all trips leading to their destinations have return trips back to their origin. This is mainly because on their return trips, truck drivers usually wait at the port for another possible trip or the trucks' garage are usually located near the port.

The total no. of trips captured for this O-D survey is 279. These are trips made to and from the 5 zones identified. More than half of the trips, 53% were made during nighttime, while the rest were at daytime, 47%, as shown in **Table 3**.

Table 3 Percentage of Daytime and Nighttime Trips

BY ZONE	DAYTIME	NIGHTTIME
1	46	54
2	67	33
3	21	79
4	60	40
5	40	60
Over-all	47	53

The general routes taken by the drivers from zone to zone are indicated in **Tables 4** and **5**. The road sections reflected in italics are the routes covered by the truck ban. It can be noted that among the routes, only Zone 1- Zone 5 routes are not covered by the truck ban. Trips to this area, specifically the Malabon and Navotas areas, can be made at anytime of the day. Trips within Metro Manila (Zone 1 to Zone 1) usually occur during daytime with a high percentage of 85%. This could be due to the certainty of return trips during in-between truck ban time. An additional factor to this would be the fact that only 2 trips out of 20 or a low 10% of the total trips for this zones, would be traversing a road covered by the ban as the C. M. Recto Ave. Trips to other road sections of this zone could also be made during the ban time since almost all roads are not covered by the ban.

Statistics show that more than half of the trips, from Zone 1 to Zone 2 are done during nighttime. Surprisingly only 10 out of 52 trips passed 2 banned roads, EDSA and Abad Santos. Majority or 81 % of the trips do not ply the banned routes. Unlike the previously mentioned trips, most of the Zone 1 to Zone 3 trips, traverse the banned routes causing nighttime deliveries occurrence to be at 54%. Among the grouped trips, the Zone 1 to Zone 3 (Manila to East) have the highest number of trips made.

Having the highest percentage of nighttime trips among the surveyed routes (65%) is the Manila to South route or Zone 1 to Zone 4. Significantly, since all trips under this routes have a road or two covered by the ban.

Among the trips that converge towards the central point, it is the Zone 3 to Zone 1 routes that has a high percentage (79%) of nighttime deliveries. While both routes originating from Zones 2 and 4 have a high occurrence of daytime deliveries, of 67% and 60%, respectively.

The O-D survey results reveal that the highest number of trips made are to Zones 4 and 3. Significantly, both routes have the most roads covered by the truck ban. Of the total trips recorded, 65% traverses the banned routes of Metro Manila.

Table 4 GENERAL ROUTES FROM ZONE TO ZONE

To / From	Route Taken	No. of Trips	
		Daytime	**Nighttime**
Zone 1 to Zone 1 (Within Manila)			
Tondo	R-10, C-3, Honorio Lopez	9	1
South Harbor	R-10	1	
Divisoria	R-10, *CM Recto*	1	1
Dagatdagatan	R-10	1	
Binondo	Del Pan, Binondo	1	1
North Harbor	R-10	4	
	Total (Zone 1 to Zone 1)	17 (85%)	3 (15%)
Zone 1 to Zone 2 (Manila to North)			
EDSA	R-10, C-3, Bonifacio Ave., *EDSA*	2	4
Tondo	R-10, Capulong, Rabago, *Abad Santos*	1	3
Caloocan City	R-10, C-3, Dagatdagatan, Sangandaan, Samson Road	2	2
North Luzon	R-10, C-3, Dagatdagatan, Bonifacio, Balintawak, NLEX	16	14
North Luzon	R-10, C-3, Monumento, McArthur Highway	3	5
	Total (Zone 1 to Zone 2)	24 (46%)	28 (54%)
Zone 1 to Zone 3 (Manila to East)			
Antipolo	R-10, C-3, Sgt. Rivera, E. Rodriguez (C-5), Ortigas Ave.	4	4
Antipolo	Santolan, *EDSA*, Libis, Mangahan, Sumulong Highway	1	1
Antipolo Pasig, Rosario	R-10, *Legarda, Aurora*, Greenhills, Ortigas	7	8
Pasig, Rosario	*Bonifacio Dr*., P. Burgos, Shaw, Ortigas		2
Cubao	*Bonifacio Dr*., Lawton, *Espana, E. Rodriguez, Aurora*	1	3
Libis	R-10, *Legarda, Aurora*, Ortigas, E. Rodriguez (C-5)	4	1
Pasig, Ugong	*Bonifacio Dr*., San Marcelino, Kalentong, Shaw, Meralco Ave, C-5	2	2
Quezon City	R-10, Capulong, Tayabas, Ma. Clara, Laong Laan, *Quezon Ave*.	4	6
Marikina, Parang	C-3, Araneta Ave., *Quezon Ave.,* Commonwealth, Batasan, San Mateo Bridge	6	5
Pasig, Bagong Ilog	P. Burgos, San Marcelino, P. Gil, Kalentong, Shaw, Meralco Ave., C-5		1
Cubao	R-10, Ma. Clara, *Quezon Ave,* Kamuning	2	
Marikina	R-10, Del Pan, P. Burgos, *Espana, Quezon Ave*., Kamuning		2
C-5	Roxas Blvd., *EDSA*, Ortigas		2
Marcos Highway	C-3, Araneta Ave., *Quezon Ave.,* Comonwealth, Tandang Sora, Katipunan	2	2
	Total (Zone 1 to Zone 3)	33 (46%)	39 (54%)

Table 5 GENERAL ROUTES FROM ZONE TO ZONE

To / From	Route Taken	No. of Trips	
		Daytime	Nighttime
Zone 1 to Zone 4 (Manila to South)			
South Luzon	R-10, *Roxas Blvd,* Buendia, *SLEX*		5
South Luzon	R-10, *Bonifacio Dr*., P. Burgos, UN Avenue, *Quirino Ave. SLEX*	3	7
South Luzon	R-10, *Bonifacio Dr*., P. Burgos, Ayala Blvd., San Marcelino, *Quirino, SLEX*	9	15
South Luzon	Roxas Blvd., *EDSA*, SLEX		3
Cavite	*Roxas Blvd*, Coastal Road	8	9
Cavite	*Roxas Blvd.*, Buendia, SLEX		3
Cavite	*Roxas Blvd*, UN Ave., Taft Ave., Coastal Rd		2
Paranaque	R-10, *Bonifacio Dr*., P. Burgos, Ayala Blvd, San Marcelino, *Quirino, EDSA*, MIA Road, Sucat	2	2
Pandacan	Bonifacio Dr., UN Ave., Otis, Pandacan	2	
Airport	Pandacan, Malibay, *EDSA*	1	
	Total (Zone 1 to Zone 4)	25 (35%)	46 (65%)
Zone 1 to Zone 5 (Manila to Central North)			
Navotas	R-10	2	3
Tondo	R-10, C-3, S. De Jesus	1	
Fishport	R-10	1	
Malabon	R-10, Maysilo		3
	Total (Zone 1 to Zone 5)	4 (40%)	6 (60%)
Zone 2 to Zone 1 (North to Manila)			
Malabon	Gov. Pascual, Gen. Luna	1	1
North Luzon	McArthur, Monumento	8	
Caloocan City	*EDSA*		3
North Luzon	NLEX, Balintawak	1	1
	Total (Zone 2 to Zone 1)	10 (67%)	5 (33%)
Zone 3 to Zone 1 (East to Manila)			
Quezon City	*Quezon Ave., Araneta Ave*, C-3, R-10	2	
Marikina	Marcos Highway	1	
Antipolo	Marcos Highway, Anonas, Timog		1
Angono	Ortigas Ave, Meralco Ave, Shaw, Sta. Mesa, *Legarda*		5
Binangonan	Ortigas Ave, Meralco Ave, Shaw, Sta. Mesa, *Legarda*		5
	Total (Zone 3 to Zone 1)	3 (21%)	11 (79%)
Zone 4 to Zone 1 (South to Manila)			
Cavite	Coastal Rd*, Roxas Blvd*	1	3
Makati	*SSH*, Paco, Quirino	6	2
Taguig	Buendia, Pasong Tamo	3	
South Luzon	*SLEX, Quirino*, San Marcelino	5	5
	Total (Zone 4 to Zone 1)	15 (60%)	10 (40%)

5.   DISCUSSION OF RESULTS

Findings from the survey should be subjected to comparison to elicit the impact of the TDM scheme to the actors involved. One method is the "before and after" comparison wherein survey data are supposed to be compared to any secondary data which could have been gathered before the truck ban scheme was implemented. However, this approach of analyzing was not feasible since no data regarding the socio-economic profile of the actors had been collected during the time the ban was not in place.

Another method of analysis would entail comparison of profiles of the respondents who are affected by the TDM measure to those respondents who are not or least affected. Most likely each respondent is affected by the scheme in one way or the other. This is very much evident in the responses of the truck operators and drivers under the perception survey of the study. However, comparing survey data using another city in the country, where there is no truck ban, was not advisable as Metro Manila would be very much different from other cities in terms of its environment, standard of living, economic aspect, cultural dimensions, etc.

In order to achieve the ultimate goal of deducing the socio-economic impact of the truck ban to the sector involved, the data gathered from the survey was analyzed by comparing it with the economic data of other transport sectors, specifically, the operators and drivers of other service-oriented road users who are not covered by the TDM measure. On the other hand, the analysis of the social aspect of the study was done by comparing the survey data against the normal behavior of an individual, such as sleeping patterns, time with families, rest time, etc.

5.1   Impact on Income of Truck Drivers

The study indicates that truck drivers receive the lowest compensation among drivers in the service oriented sector of the trucking industry. In comparison to other drivers, truck drivers have the lowest average monthly income at P7,697.26. Based on MMUTIS data, bus drivers receive an average monthly compensation of P9,950.40, and taxi drivers earn an average of P11,928 monthly.   Jeepney drivers earn an average of P10,947.32 per month (Labastilla,1999). In terms of working hours, while truck drivers, jeepney drivers, and taxi drivers all follow 6-day-workweek schedules, the number of working hours varies considerably. Jeepney drivers spend an average of 10.73 work hours per day, taxi drivers about 10 hours. Bus drivers, on the other hand, have an average of 4.89-day-workweek at an average of 15.26 work hours per day.

The OD-Survey of this study reveal that truck drivers spend an average of 12.68 hours per day on the road, covering the time from the start of the trip, the time for loading/unloading cargoes, and the return trip. The duration may be considered as delivery time since it does not include the waiting time for shipments to arrive, processing of cargo release order and/or the off time of the truck ban. Based on the survey, a driver could be continuously on duty for 23 hours, as it is the longest delivery time carried within Metro Manila.

If the monthly income is further deduced, in terms of income per hour, the sad plight of truck drivers is clearly manifested. Taxi drivers earn P49.70 per hour, bus drivers at P27.17, and jeepney drivers at P42.51 per hour. The truck drivers earn a meager average of P13.36 per hour.

In the absence of historical data, preferably before or after the truck ban, it is difficult to establish that the truck ban is responsible for the low income of truck drivers. Other factors such as the demand for truck drivers, efficient service could also affect the present low income of truck drivers.

5.2   Impact on the Income of Truck Operators

In the analysis of the income of operators, the research tries to analyze the annual rate of return per truck as compared to the vehicles used by the other type of transport services, using the simple economics formula of I = P x R. To estimate the rate of return, the formula is reversed as follows :

$$R = I / P$$

Where : R = rate of return
I = revenue per vehicle type
P = investment or cost per vehicle type

The formula yielded the following results :

Comparison of Income Generated from Service Oriented Vehicles

Type of Vehicle	Yearly Income per Vehicle (I)	Average Cost Of Vehicle (P)	Rate of Return (R)
Truck	P 297,890.28	P 1,200,000	24.82%
Taxi	P 166,694.40	P 450,000	37.04%
Jeepney	P 110,511.36	P 270,000	40.93%
Bus	P 485,759.23	P 1,500,000	32.38%

The foregoing figures clearly illustrate that the average rate of return realized by truck operators is the lowest among the service oriented sector of the truck industry. Further, it requires a huge capital investment second only to buses. Digesting the figures further, the recovery period for the investment on trucks would be more than 4 years, while that of buses, taxis and jeepneys, is less than 3 years. This is ideal, since the wear and tear on the vehicles would start to manifest after 3 years, hence increasing its operating cost. For bus, taxi and jeepney operators, the revenue realized on the fourth year would take care of the repair and maintenance, and income for the operator. In the case of trucks, the recovery of investment would most likely be realized in more than 4 years, since the revenue from the third year onward would be divided into cost of repair and maintenance, recovery of investment (capital outlay), and income on investment. As the truck gets older its operating cost increases and therefore, the income decreases.

The truck ban is ranked as the second major problem affecting the movement of goods in Metro Manila as assessed by both the government and private sectors (Garsuta,1995). A similar finding has been obtained by the present study as discussed in Section 7.5 of this thesis. Nevertheless, it is not possible to conclude that the truck ban has affected the income of operators inasmuch as income is a function of supply and demand, and other factors. In the absence of historical and other data, one cannot make a conclusive finding on the impact of the truck ban on the income of truck operators.

5.3   Social Impact

The study reveal that drivers have only 4.68 hours of sleep per day. This is just a little over the minimum required by a normal human being. Adults sleep, on the average 7 to 8 hours each night, with individual averages ranging from 4 to 10 hours. Studies reveal, that without sleep, mental and physical processes steadily and progressively deteriorate. The longer the period of sleep deprivation, the more likely it is that effects such as headaches, irritability, attention lapses, extreme emotionality, and even psychotic reactions will be experienced.

Most operators and drivers prefer to use the routes covered by the truck ban than travel along the alternate routes. The research indicate that 64% would rather make nighttime deliveries, and another 59% would use the routes covered by the ban during the off-time.   This preference is confirmed by the OD-Survey of this study. The survey reveal that more than more than half of the trips of trucks, 53%, are made during the night, after the truck ban time. Of the two alternatives, nighttime deliveries are more preferred since the drivers have longer time of travel. Using the in-between truck ban time poses a problem since deliveries may be caught by truck ban time and drivers have to stop travel and wait for the off-time of the ban.   During nighttime, drivers do not feel pressure of deliveries since they have longer period to travel within Metro Manila.

However, the number one cause of accidents during nighttime deliveries is sleepiness followed by fatigue. The lack of sleeping hours of the driver per day may have something to do with this.

The operation of a trucking firm does not follow any scheduling plan. The schedules are not fixed or planned before a few days' time. It is a day to day operations. As such, most of the operators and drivers have only very few hours to spend for their personal and family activities. The research shows, that drivers have less than 30 minutes a day to spend for their personal and or family activities. This is significant since most of the drivers are family men.

A study conducted by E. Pacio, F. Lynch and M. Hollnsteimer, (1975) highlighted the importance of shared family activities. It states that the gage of a healthy family life is the companionship with one's spouse and children.   The research indicate that in 70% of Filipino families, the spouses share their social, recreational and religious activities with one another and with their children.

5.3   Attitude toward the Truck Ban

Most of the operators interviewed have been in business for less than 20 years and most drivers have been driving trucks for less than 20 years. This indicate that most of the actors were not yet in the trucking industry when the truck ban was not yet implemented. The data may establish that most operator and drivers now are already accustomed to the TDM scheme. Yet, they still foresee better conditions if the truck ban is to be lifted or if the scheme is modified such as reduction of the ban period. They perceive increase in income due to increase in number of trips, and better scheduling process hence decrease in delays of deliveries. In the study, the number one cause of delays in delivery is the truck ban scheme.

6.   CONCLUSION AND RECOMMENDATION

6.1   Conclusion

The study reveal the present socio-economic profile of truck operators and drivers. The research indicate that most of the truck operators earn between P100,000 to P400,000 per month. On a per truck basis, a truck earns a revenue of P297,890.28 annually. Most operators interviewed have less than 6 trucks to operate. Data indicate that most drivers earn less than P9,000 per month. Majority of them are lone working members of their households, which on the average, have 3 to 4 dependents. Drivers are mostly employed on a permanent basis but are compensated based on the number of trips they makes.

Truck drivers receive the lowest compensation among the drivers of the other service-oriented sector of the truck industry. Operators, on the other hand, realize the least rate of return on investment on vehicles among the transport industry.   With a low return on investment, operators may not be able to expand their operations or purchase new and modern trucks for more efficient and reliable services. New and modern trucks will not only be beneficial   to the trucking industry but also to other sectors in terms of lesser noise and air pollution. The existing data, however, is not sufficient to conclude that the truck ban has anything to do with the situations the drivers and operators are now experiencing. Other factors such as supply and demand, liquidity, the local economic atmosphere, or increasing operating costs may have influenced the present situation.

The OD-Survey confirms the interview results that, in order to avoid the constraint imposed by the truck ban, operators and drivers prefer to make nighttime deliveries or use the in-between truck ban time. As the survey reveal, most of the nighttime deliveries make use of the routes covered by the truck ban.

The practice of making nighttime deliveries, especially for numerous times in a working week, has an impact on the behavior of operators and drivers. Data show that drivers have an average of only 4.68 hours of sleep per day. This is just a little above the minimum required by a normal human being. This may eventually lead to the deterioration of the mental and physical prowess of the drivers, which may result in road accidents.   The time of the respondents for personal and family activities is considerably reduced because of nighttime operations. The study indicate that most of the respondents have less than 30 minutes a day to spend for personal and/or family activities.

On the possibility of converting the truck ban time, most of operators and drivers prefer the conversion of the "all-day" truck ban along EDSA to the peak-hour ban.   The sector perceives that the conversion would result to increase in the number of trips, increase in income and better working schedule. Majority of the respondents recognize the necessity of the truck ban, for the time being. However, with the completion of the road and transport infrastructure in Metro Manila, such as the MRT along EDSA and the C-5, the sector believes that there is a need for a review of the ordinance.

In summary, the study concludes that :

a.   The income of truck drivers is the least among other drivers of service-oriented transport sector. However, existing data is not sufficient to conclude that this is due to the truck ban;

b. Truck operators and drivers choose to use the routes covered by the ban, as indicated by their preference to make nighttime deliveries and/or use the in-between truck ban time, and as confirmed by the OD-Survey conducted;

c. The practice of making nighttime deliveries has undesirable social impacts on the operators and drivers, such as reduced sleeping hours and very little time for personal and family activities;

d. The operators and drivers prefer the conversion of the "all-day" truck ban along EDSA to the peak-hour ban.

6.2   Recommendation

In the policy formulation of TDM, a thorough study must be undertaken before its implementation. The effect of the scheme on the social and economical status of those directly and indirectly affected must also be considered. The political and environmental impact of the scheme on situations on hand need to be thoroughly analyzed. All these must be balanced in policy formulation in order to arrive at a scheme that would be equitably beneficial to all the transport sectors involved.

Premised on the foregoing, the study recommends the review of the policy governing the truck ban scheme that shall take a closer look at its socio-economic impact on truck operators and drivers. The review must also focus on the factors that are affecting the social well being of drivers and operators.

The research recommends further study that would investigate the low income of truck drivers and operators in relation to their counterparts in other modes of public transport.

REFERENCES

Allport, Roger J. **Transport Management Private Demands and Public Needs.** The Theme Paper Transportation Management, Regional Seminar on Megacities   Management in Asia and the Pacific, 26 Sept. 1995.

Bowersox, Donald J.; Calabro, Pat J.; and Wagenheim, George D. **Introduction to Transportation.** New York: MacMillan Publishing Co. Inc., 1981.

Button, R.J. **Economics of Urban Transport**. Saxon, Hence, England: 1977.

Cracknell, John A. Traffic Management for Urban Areas, **Developing World Transport**, Grosvenor Press Int'l , 1989.

Evaluation Report of Truck Ban Regulations in Metro Manila, Road Transport Planning Division, Department of Transportation and Communications, Manila, 1994.

Gadiraju, Rovi, and Garber, Nicholas J. **Effects of Truck Strategies on Traffic Flow and Safety on Multilane Highways**, Transportation Research Record 1256, Transportation Research Board, Washington DC, 1990.

Hochmuth, Jeffrey J., and Reilly, John P., **Effects of Truck Restrictions on RegionalTransportation Demand Estimates**, Transportation Research Record Journal 1256.Transportation Research board, Washington DC, 1990

Metro Manila Urban Expressway Study, Final Report, Department of Public Works And Highways: Port Area, Manila, 1993.

Metro Manila Urban Transportation Strategy Planning Project, Part BI, Volume 12, Truck Operations, Ministry Of Transportation and Communication, 1984.

Metro Manila Transportation Integration Study, MMUTIS, Progress Report 1, Jan. 1997.

Mohring, Herbert. **The Economics of Transport: Trucking Industry,** University of Minnesota, USA, 1994

Ogden, Ken W., **Urban Goods Movement: A Guide To Policy and Planning,** England:Ashgate Publishing Ltd., 1992.

Pacio, E., Lynch, F., Hollnsteiner, M., **The Filipino Family, Community and Nation, The Same Yesterday, Today and Tomorrow,** Ateneo de Manila University Institute of Philippine Culture, 1975.

Strickland, Sheldon G., and Berman, Wayne. **Congestion Control and Demand Management,** Public Roads On-line, 1995, available: http:// www.tfhre.gov/pubrds/winter95/p95 wil.htm

The Truck Ban in Metro Manila Major Thorougfares: A Policy Analysis, Report prepared By National Economic and Development Authority, 1984.

Transportation Demand Management-Description and Review of Alternative Policies for The WDOT, Wisconsin Translinks 21, 1994, available: http:// www.hts.gov/ntl/DOCS//tdm.html

Transport Policy Formulation Study. Transport Operations Policy Study, Manila 1977