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**POLICIES FOR IMPROVING OPERATIONAL PROFITABILITY
IN INTERCITY BUS COMPANIES IN EGYPT**

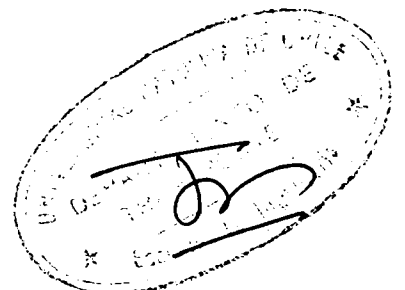
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ABSTRACT

Transport industries across the world are undergoing substantial changes. Powerful political and economic forces are affecting the size and the structure of transport sectors, as well as the objectives and organisation of transport companies. There is a tangible move towards deregulation and privatisation.

The paper starts by laying down the current organisational scene within which transport companies in Egypt operate. The main objective of transport companies is to maximise profit. Intercity bus companies are accountable for the financial profitability they produce. This paper presents two important financial indicators, namely the operating ratio and operational profitability. The paper considers some of the elements leading to the generation of these financial ratios. In doing so, it disintegrates operating cost into its different components establishing their relative weights. Costs and productivity of staff as well as of bus kilometre are examined. Problems related to age and mark composition of intercity bus fleets are explored. An analysis of the sensitivity of operational profitability to reductions in operational cost components is presented.

In light of the current deregulation of the transport industry in Egypt and based on the potential issues raised in the paper, the core of the paper suggests a set of policies aimed at reducing operational costs and increasing operational revenue in the intercity bus companies in Egypt, thus improving the operational profitability in these companies.



1. INTRODUCTION

Intercity road passenger transport in Egypt is mainly provided by four bus companies. These are the East, Middle and West Delta companies covering the Delta region and the Upper Egypt company which mainly serves the north-south Nile corridor.

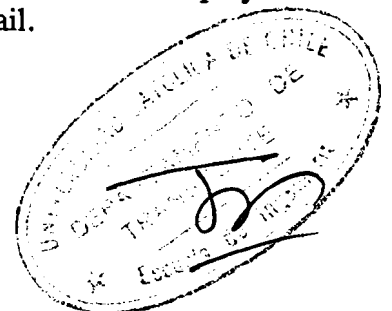
According to Abbas et al., 1992 the main factors that have resulted in the poor performance of intercity bus companies in Egypt include: the orientation of the companies towards achieving social objectives rather than economic ones, the lack of strong competition within mode as each of the four bus companies is responsible for providing services for a certain geographical area; the strict regulations and control imposed by the government inhibiting the power for making decisions specially decisions concerning investment and pricing; the lack of external accountability and incentives to management; the lack of research and innovative ideas; and the lack of good planning techniques and helpful management approaches. These factors are in line with the general framework developed by Kranton, 1990 for identifying causes of inefficiency in public transport. The framework involves studying five interrelated causes of inefficiency which are:

1. The goals of the enterprise
2. The structure of the output market
3. The control mechanism between government and the enterprise
4. The managerial incentive structure
5. The conditions of employment for labour.

The Egyptian transport industry is currently undergoing substantial changes within the framework of the national economic reform programme. There is a tangible move towards deregulation and privatisation. The main organisational changes are displayed in figure 1. As shown in the figure, a Holding Company for Transport, Service and Trade has been formed. The four intercity bus companies, among other companies, now follow the formed holding company as affiliate companies. The Holding Company for Transport, Service and Trade is currently under the auspices of the Ministry of Public Business Sector. The affiliate companies have complete freedom in setting their own internal rules and regulations which suit their nature, condition, needs, requirements and objectives and are free to choose their policies and to make decisions to implement these policies. This means no more government restrictions but at the same time no more government concessions. The final responsibility lays on the shoulders of the managers of the newly formed companies. The level of control or intervention from the government will be reduced to a minimum though still existing.

2. FINANCIAL PERFORMANCE OF INTERCITY BUS COMPANIES

The main objective of affiliate companies is to make and maximise profit. Intercity bus companies are accountable for the financial profitability they produce i.e. the financial return on invested capital. A causal representation of the various elements leading to the generation of operational profitability and hence financial return is displayed in figure 2. The paper will discuss some of these elements in detail.



Operational profitability and financial return in the four bus companies are presented in figure 3. Financial performance can be also represented by another two indicators, namely the operating and the final financial ratios, see figure 4. These measures are based on data available in the 91/92 yearly reports of achievements of the four intercity bus companies in Egypt. The figures include the cross-sectional mean computed as the average 91/92 performance of the four bus companies. This cross-sectional mean can be used as a bench-mark for comparison among the four bus companies. The insignificant profitability of intercity bus companies, demonstrated by the figures, can be mainly attributed to: minimum management awareness of cost reduction and attention to revenue increase.

The patterns of operational costs and operational revenue in the intercity bus companies are presented in figure 5. The trends show an average yearly increase of 14% in operational costs and 15% in operational revenue over the years 82/83 until 91/92. The development and the percentage contribution of the different operational cost components over the two years 90/91 and 91/92 are presented in table 1. Operating costs can be mainly divided into four categories, namely staff costs, production costs, service costs and other costs. Staff costs mainly include: basic and additional salaries, fringe benefits and social insurance, and incentive bonuses. Production costs mainly include: fuel costs (fuel, oil, lubricants), spare parts costs, tyres costs, and other production requirements costs such as uniforms, stationery, water, electricity, etc. Service costs mainly include the costs involved in the maintenance of the bus fleet, other equipment and buildings. Lastly other costs involve insurance, licensing, taxation, rent, debt servicing and depreciation costs. It is obvious from the table that staff costs constitute the most significant cost component. This is probably due to the overstaffing of the companies.

3. COSTS AND PRODUCTIVITY OF STAFF

As shown in figure 2, the problem of high staff costs can be either attributed to a high number of employees, or to high wages and other financial benefits, or to both. The average numbers of staff per bus and per operated bus for the four bus companies are shown in figure 6. The bus industry is known to be labour intensive, however the figure demonstrates the seriousness of the problem of overstaffing signified by excessive numbers of work force. An average of about 6.3 employees is required for each bus which is considered a high proportion. In fact, it is more logical to consider the number of staff per operated bus which shows an average of 8 employees per operated bus and further demonstrates the severity of the problem. The figure shows that the average proportion of administrative staff is about 21% while the operational and technical staff is around 79%.

"The high staffing ratios often arise because redundant staff cannot be laid off or retired, due either to government regulations or union influence. This can be a cause of very considerable losses, particularly when bus services are reduced and staffing ratios thus increase. Also, companies often have excessive layers of management and use elaborate administrative procedures employing large clerical and accounting staffs. Such arrangements add considerably to overhead and may impair rather than enhance productivity", (Armstrong and Thiriez, 1987).

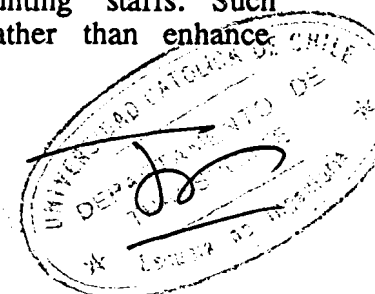


Figure 6 shows the relative success of West Delta compared to the other companies which is mainly achieved in reductions of administrative staff constituting about 12% of total staff.

On the other hand, figure 7 shows the average yearly earnings per employee in the bus companies. This comes to about 4000 Egyptian Pounds L.E. (1 U.S.\$ = 3.33 L.E.) including basic salary and fringe benefits, and incentive bonuses. This amount of earnings is considered low compared to world wide earnings. However, it is slightly above the average earnings level in Egypt.

The productivity of an employee can be represented as a service productivity i.e. number of bus-kilometres per employee or as a financial productivity i.e. operational revenue per employee. Both indicators are displayed in figure 8. It is to be noted that the two companies West Delta and Upper Egypt have the highest values, in relative terms, of staff productivity. Looking back at figures 6 and 7 we notice that these two companies have, in relative terms, the lowest numbers of staff per bus as well as the highest average yearly earnings per employee. Also, it is to be noted that in both companies the incentive bonuses are the highest, in relative terms, constituting almost 33% of the total earnings of an employee. This gives the management flexibility to encourage its staff to increase their productivity. In general, we can conclude from these previous figures that there is an enormous potential to reduce the existing number of staff and to significantly increase the productivity of the remaining staff through well designed incentive schemes.

4. COSTS AND PRODUCTIVITY OF BUS KILOMETRE

The consumption of the operational cost elements by unit bus-kilometre for the four intercity bus companies is given in figure 9. The figure demonstrates the relative magnitude of each of the variable cost components, showing the significance of spare parts costs followed by fuel costs and then tyres costs. The important distinction between operating (variable) costs and fixed costs is that the former is directly related to the number of vehicle kilometres whereas the latter will be incurred whatever the level of vehicle use.

As shown in figure 2, the consumption rates of these elements by a unit bus-kilometre depend on various factors. These include: mark of bus (vehicle characteristics), age of bus (usage), maintenance level, driver performance, operating conditions (including road geometry, surface conditions, traffic flows) and average bus running speed. Some of these factors are external to the company and hence difficult to manage or control, namely the operating conditions and partly the running speed. On the other hand the rest of the factors lay within the control of the management of a bus company, namely the age and mark composition of the bus fleet, the maintenance level, the performance of drivers and partly the operational speed. Several local and international studies have been undertaken to estimate vehicle operating costs, see Nedco, 1981 and ECOGIM, 1991 for local studies and Abaynayaka et al., 1976 and Chesher & Harrison, 1987 for international studies.



The productivity of a unit bus-kilometre can be represented as a service productivity i.e. number of passenger-kilometres per bus-kilometre or as a financial productivity i.e. operational revenue per bus-kilometre. Both indicators are displayed in figure 10. Middle Delta has the highest value, in relative terms, of passengers.kilometres per unit bus-kilometre, while East Delta has the highest value, in relative terms, of operating revenue per bus-km. In fact by dividing the operational revenue per bus-km by the pass.km per bus-km we can obtain an approximation of the fare collected per pass.km. It is noted that East Delta has the highest value for the fare collected per pass.km (1.64 piasters). This is followed by Upper Egypt (1.41) followed by West Delta (1.05) and lastly Middle Delta (0.79). It can be concluded from the figure that the Middle Delta buses are heavily over-loaded and that the fare collected per pass.km is very low. Over-loading causes several problems such as reduction of level of service, increase in the rate of deterioration of the buses, and problems in the collection of fares.

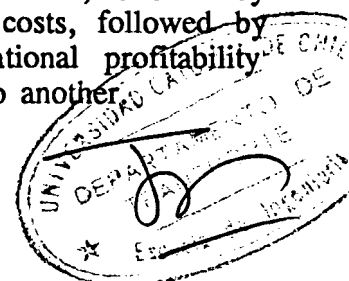
5. AGE AND MARK COMPOSITION OF INTERCITY BUS FLEET

The 91/92 fleet inventory of the four bus companies is detailed in figures 11 and 12. Figure 11 displays the age composition of the bus fleets. The lifetime of bus serviceability has been 8 years. However, as a result of considerable lack/deferment of investment towards renewing/replacing intercity bus fleets the current lifetime of buses has been extended to 10 years and even more and still being operated. A significant number of buses are more than 10 years in age. These buses when operated lead to a significant increase in the consumption of the different non-labour elements outweighing the revenue achieved by their operation. Additionally the rate and severity of breakdowns is high which consequently leads to high maintenance costs.

The mark composition of the bus fleets is displayed in figure 12. The figure demonstrates the potential problem of buses being at least from 7 different marks which are mainly imported. The variability of marks of buses causes problems such as spare parts availability, obsolescence of spare parts in the warehouses, inventory control problems, maintenance problems. This can lead to a considerable waste and increase in operational costs.

6. SENSITIVITY OF OPERATIONAL PROFITABILITY TO REDUCTIONS IN OPERATIONAL COST COMPONENTS

This section explores through a process of simulation the sensitivity of operational profitability towards decrease in operational cost components. For each of the four bus companies, figures 13 to 16 display the operational profitability resulting from percentage reductions in the five main components of operational costs, namely staff costs, fuel costs, spare parts costs, tyres costs and other costs (including service costs). The 91/92 operational profitability for each of the four bus companies are used as bench marks for comparison in this sensitivity analysis. It is obvious from the figures that the four companies share the same trends in terms of operational profitability being more sensitive to reductions in staff costs, followed by reductions in other costs, followed by reductions in spare parts costs, followed by reductions in fuel costs, followed by reductions in tyres costs. However the degree of sensitivity of operational profitability towards each of these cost components varies from one company to another.



Upper Egypt is the most sensitive in terms of reductions in staff, spare parts, and tyres costs. On the other hand, West Delta is the most sensitive in terms of reduction in other costs. In terms of reduction in fuel costs, East Delta is the most sensitive.

In light of the current deregulation of the intercity bus companies in Egypt, the following sections will present a set of policies that are meant to reduce operational costs and increase operating revenue. It is to be noted that the list of presented policies is by no means exhaustive. This list is suggested mainly in view of the potential issues already raised in the paper.

7. COST REDUCTION POLICIES

Policies should be targeted towards reducing the operating costs of running the companies' buses. The main policies for reducing costs should be directed towards optimising staff productivity, slimming down waste, and increasing the efficiency of utilisation of production requirements.

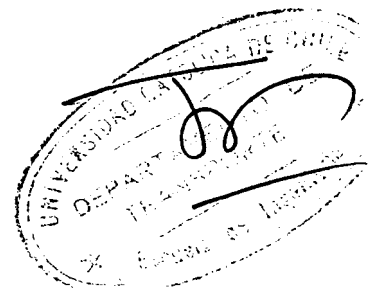
7.1 Staff Related Policies

1. Policies should be directed towards reducing the staff number by seizing all forms of new recruitment, providing attractive redundancy agreements for early retirement with no new replacements to retired employees, and encouraging holiday entitlements. If new employment is required apply the policy of short renewable contracts and part-time employment.

2. Change the policy of incentives awarded for overtime work in accordance with basic salary and develop a new penalty/incentive scheme that links bonuses with the level of performed work. Incentives to be given in return for dedicated workers and should be fairly awarded while stringent sanctions to be firmly applied for poor performance. "Payments need to be clearly linked to readily identifiable and quantifiable achievement, for example revenue gains and savings that result from higher bus utilisation and revenue collection, reduced fuel consumption, fewer breakdowns and accidents, etc", (Armstrong and Thiriez, 1987). The penalty/incentive scheme should be combined with the institution of an effective system for monitoring and measuring performance.

3. Towards this end rules governing functions and standard rates of achievable performance (man hours/task, employee/vehicle) should be devised. Not only must the company know what its overall objective is, but each individual in the company must know what tasks he/she has to perform.

4. Apply alternative forms of transitional training to provide the under-employed with new required skills and transfer them to places where they are needed. "The importance of training increases at times when there are significant strategic and organisational changes. If transport companies are to succeed they should invest in training their staff" (Abbas, 1993a). Training should be also aimed to provide each employee with the skills and abilities to perform different tasks within the various company activities.



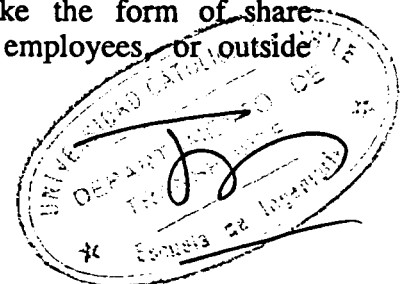
7.2 Operation Related Policies

1. Reduce operation to the level of expected demand.
2. Minimise operating uneconomic routes and services, even if socially desirable unless government provide subsidy.
3. Stop the operation of short distance routes that mainly runs through densely urbanised areas.
4. Renting of service either by contractual agreement and/or franchisements and selling/leasing of spare vehicles to reduce capital investments. "Service contracting can reduce costs without adversely affecting performance... Contracting can allow the creation of new routes, a decrease in fares, changes in schedules and routes, and lower operating costs", (ITE, 1992).
5. Prohibition of excessive overloading i.e. loading beyond design capacity.
6. Facilitate boarding and alighting of passengers and hence minimise idle stopping time.
7. Garages and main terminals to be at the same location to remove/reduce waste resulting from dead travelling distance.
8. Flexibility in manning arrangements i.e. moving crew staff between company buses, routes, branches and regions.

7.3 Maintenance Related Policies

In general all maintenance related policies should be aiming to achieve a high level of fleet utilisation, and prolonging the economic life time of the bus fleet with the least possible cost.

1. Scrap vehicles whose lifetime has reached an end and invest to renew and replace old bus fleet. Acquisition of buses should have the objective of reducing the different marks to two or three marks. These should be selected on the basis of proven: durability to road conditions, cost effectiveness and appropriateness to meet the quality and quantity of different levels of demand. In addition it is hoped that these are offered with a relatively competitive prices. This policy of standardisation is meant to provide economies of scale in: the acquisition of buses and spare parts, the skills required by the maintenance staff, and the tasks involved in operation. In addition this policy will gradually minimize the problem of idle spare parts. It is also hoped that these marks are the ones that are locally produced so as to minimise the frequently encountered difficulty of obtaining the required spare parts on time.
2. Improve working environment and working practices, (analyse road failures, customise maintenance schedules, standardise maintenance activities, keep track of performance, provide mobile workshops), in workshops so as to increase maintenance productivity and fleet utilisation rate i.e. reduce down-time costs.
3. Allocate maintenance staff based on man hours required to perform certain tasks and work gradually towards reducing the man hours required to perform these tasks.
4. Reduce company size through a process of buy-outs of some/all surplus warehouses and maintenance workshops specially in cases where it is more financially sound to commercially maintain fleet with outside workshops. In Britain "many companies have been able to close and sell off depot facilities, which often realise substantial sums of money for the operator, and to replace them with less sophisticated out-of-town sites. Sometimes this has made it possible to subcontract maintenance to the commercial vehicle trade", (Gwilliam, 1989). Buy-outs can take the form of share ownership by: the management, or the management and the employees, or outside entrepreneurs.



5. Applying the practice of choosing to employ outside contractors for certain tasks i.e. maintenance tasks that cause high costs can be performed outside the company.

6. Obsolete spare parts of old bus models can be adapted and used in existing fleet or being sold in public auctions. In addition scrap and used spare parts can be further utilised through a process of recycling.

7. Systemise the process of inventory management and control, (determining optimum order quantities and reorder points for each item in the inventory), with the objective of reducing idle inventory and reaching economic inventory levels.

8. Standardise warehouses in terms of workshops served, vehicle marks, types of spare parts and reduce the amount of paper work and facilitate (speed) the process of issuance and reconciliation of stock in warehouses.

9. Internal organisation of warehouses.

7.4 General Policies

1. Choice of high quality of leadership. Placing competent managers who are convinced of the necessity of the change in the company and who have the knowledge and capability to accomplish this mission.

2. Divide the company into several small manageable units and provide for greater diversification of working practices at all levels within company. This can be attained by "giving managers greater autonomy and freedom to negotiate their own agreements" (Heseltine and Silcock, 1990) and to be accountable for them i.e. more delegation of responsibilities and decision making power.

3. "Accountability for performance at all levels of management. This can be achieved by clearly defining the responsibilities of each manager, including the managing director, set down and monitor the achievements expected of each manager and publish the performance results and call upon management to answer for any shortfalls", (Armstrong and Thiriez, 1987).

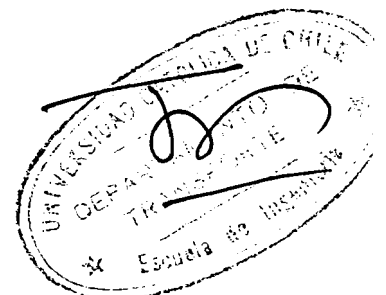
4. Management to instigate a feeling of ownership and a spirit of belonging among employees through humanitarian and social relations, staff welfare, fairness, consultation, motivation and incentives and in general improvement of working conditions (employee health and safety).

5. Concentrate on building groups of people in team structures capable of vertical and horizontal communication and coordination.

6. High quality management depends on the existence of reliable, accurate, pertinent and timely information. It is imperative that companies have to set a system of collection of data and use of computers to store this data and develop management information systems and decision support systems. Information should be disaggregated to cover all aspects related to every bus in the fleet considered by mark, age, operating route, level of service provided as well as the branch and the region that it follows.

7. Conducting research studies to tackle practical issues. Research should be mainly directed towards determining the costs of the various functions and units of the organisation so that adverse trends can be detected and corrected, identifying profitable and unprofitable routes and services and hopefully recommending implementable solutions that are meant to increase operational profitability.

8. Gradually introduce the concept of total quality into all activities of bus companies.



8. REVENUE INCREASE POLICIES

In general all revenue increase policies should be aiming to achieve a high rate of fleet operation at the right levels of service and the right fares and the right system for fare collection with the least possible cost.

1. Terminate the policy of free and concessionary fares. To cater for this problem the government could still repay operators for providing concessionary fares to a limited number of users eligible for such free/low fares e.g. handicapped, pensioners, students, military and police personnel.

2. Policies should be directed towards satisfying and retaining the current level of demand as well as to attract more demand. "Ability to compete is vital to retain a company's own passengers as well as to gain more share of the market, thus achieving more profitability and better resource utilisation", (Abbas, 1993b). A key to this is to conduct demand prediction and market analysis studies to understand the current market environment (customers' needs) and the possible future market potentials.

3. Better operational planning i.e. routing, and scheduling based on demand prediction and market analysis studies. It is imperative for a company to repeatedly conduct such studies as the level and quality of demand can significantly vary from place to place and from time to time and a company should be always looking for the identification of a Viable Network System i.e. emphasis on high earning routes and operations of new potential routes.

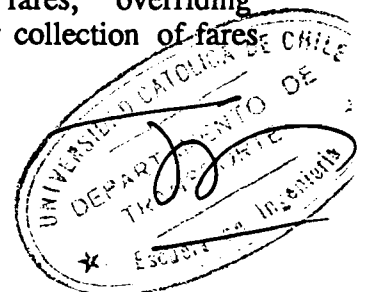
4. Attract more riders by providing a wide range of tailored innovative services. These can range from offering basic rideable conditions at low fares to high quality of services at premium fares "provide good value for money". Innovative service levels can include variations in aspects related to:

- * frequencies (headways), waiting times, boarding and alighting times (i.e. regularity, punctuality and reliability of service);
- * average vehicle speeds (i.e. passenger in vehicle times);
- * choice of locations for pick up and set down points and number of transfers (i.e. connectivity);
- * terminal and interchange facilities;
- * crew appearance and conduct (safety, friendliness, politeness, courtesy and hospitality)
- * seating style and arrangement, cleanliness, air conditioning, catering, lavatories, video display (in vehicle aspects of comfort and convenience);
- * driver training, vehicle condition and route choice (riding quality and safety record).

5. Well designed marketing policies including good publicity, attractive travelling incentives such as discounted fares, travel cards, season tickets, etc. Provision of adequate travel information displayed on bus shelters, through computerised travel information offices, help points, telephone, etc. This can take the form of comprehensive timetables, maps, guide pamphlets, leaflets, posters, etc.

6. Develop a flexible fare structure that reflects the cost of the different levels of service offered, the degree of competition, and the ability and readiness of passengers to pay i.e. market segmentation and selective pricing. Fares should be constantly revised and modified.

7. Develop a tight system for fare collection to minimise waste resulting from "fare evasion" high number of passengers avoiding paying the fares, "overriding" passengers travelling further than entitled by the fare paid and tardy collection of fares and pilfering of fare revenues by conductors.



9. CONCLUSION AND FURTHER RESEARCH

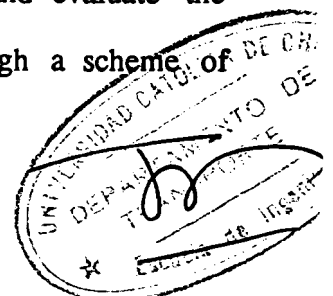
In concluding this paper it would seem appropriate to quote from the strategy paper approved by the African ministers of transport in their seventh conference organised by the United Nations Economic Commission for Africa (UNECA) and held in Addis Ababa in 1989. It stated that: "the principal areas of focus in public transport management and operations should be on increasing the efficiency and productivity of the public sector operations and adopting private sector management principles. Efforts should be made to increase fleet utilisation and productivity through better maintenance practices, to reduce revenue leakage through better operating procedures and elimination of subsidised fares, to reduce cost overheads by eliminating redundant resources and provide output related incentives for management and staff. As far as services are concerned better planning of routes and schedules and management information systems should be targeted. Routes that are blatantly non-profitable should be eliminated. Social services which are marginally viable should be identified. Separate fees for running services on these routes should be paid by the local or central government authority", (UNECA, 1990).

Management of transport companies is becoming an increasingly complex and sophisticated task. Managers of transport companies are faced with the task of managing their fleet of vehicles in an efficient and effective manner. The various elements involved in managing a fleet of vehicles call for coordinated approaches for examining and solving problems. Policy oriented management techniques that can generate and test a variety of alternatives are strongly required.

Further research aims at developing a Vehicle Management System that can act as a tool for aiding in the management of a transport company. The main functions and activities of a transport company are presented in a framework where the interactions between the various activities would be explored. These include: market analysis, demand prediction, planning for operation, planning of maintenance and repair, inventory control, manpower development and training, marketing, costing and finance and finally evaluation of performance, see figure 17. Each of these activities would be examined and the dynamic feedback relations that link these activities would be explored.

The problem of financing the different activities of companies and specially renewing/replacing the old bus fleet can be partly solved through buy-outs of some fixed idle company assets such as pieces of land, surplus garages, warehouses and workshops. Within the main company objective of maximising profits i.e. reducing costs and increasing revenue, all activities in the company should be carefully planned. This involve:

- * studying the requirements, potentials, constraints and available resources;
- * setting achievable objectives (daily, weekly, monthly, quarterly, half a year and yearly);
- * standardising working practices;
- * developing a system to monitor, inspect and control and evaluate the achievements of these objectives;
- * make people accountable for their achievements through a scheme of penalties/incentives;
- * provide feedback to the management.



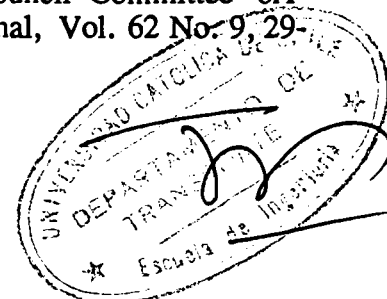
Companies should be getting rid of all the inflexible bureaucratic working practices. Managers and employees should be encouraged to make decisions and to pursue innovative ideas and working practices.

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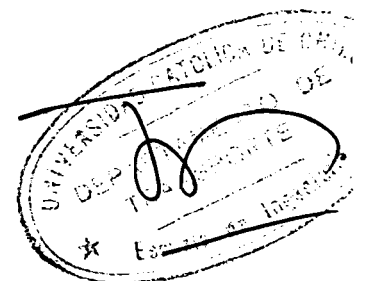
The views expressed in this paper do not necessarily reflect the views of the Egyptian Government or any of its agencies.

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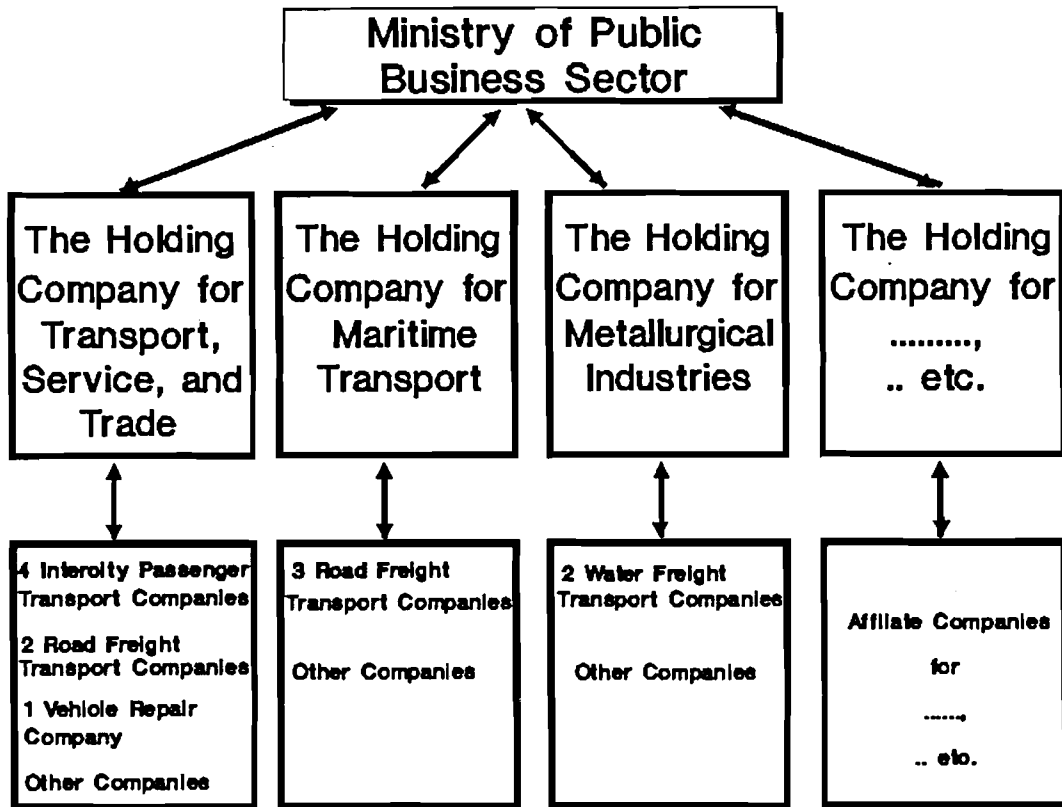


Figure 1: Current organisational scene within which main transport companies in Egypt operate

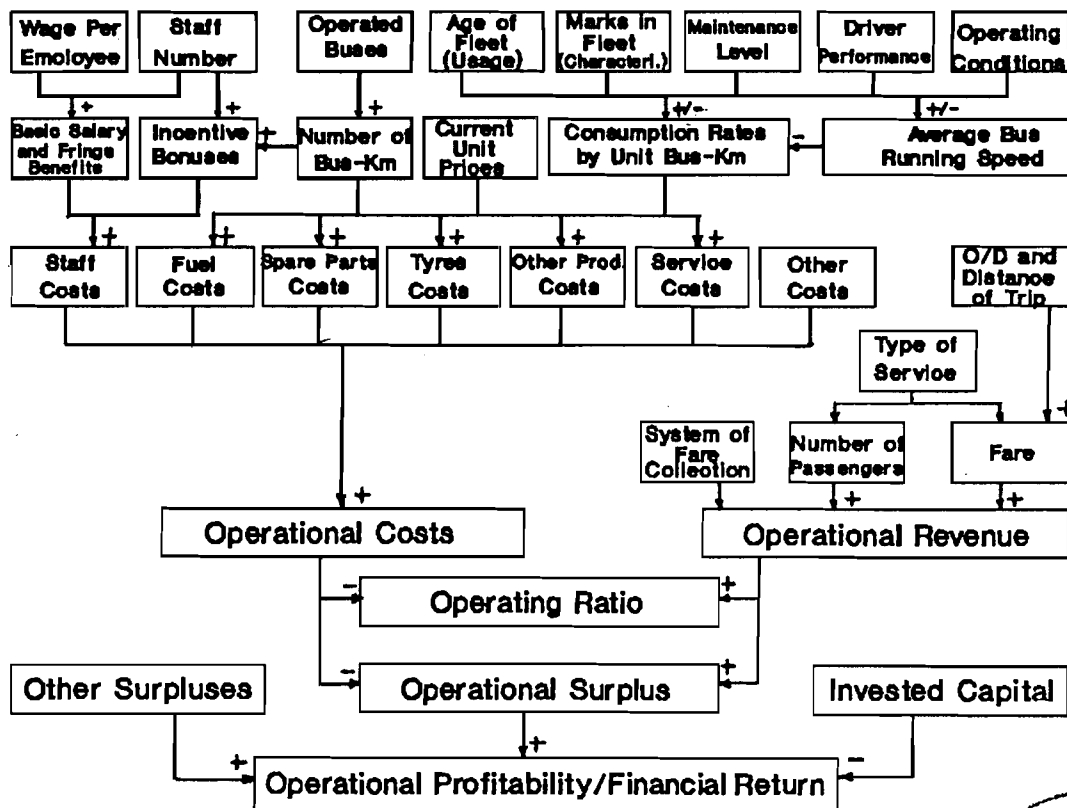
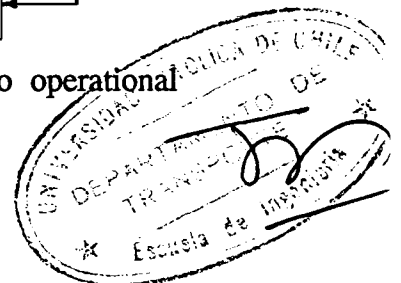


Figure 2: Causal representation of elements leading to operational profitability



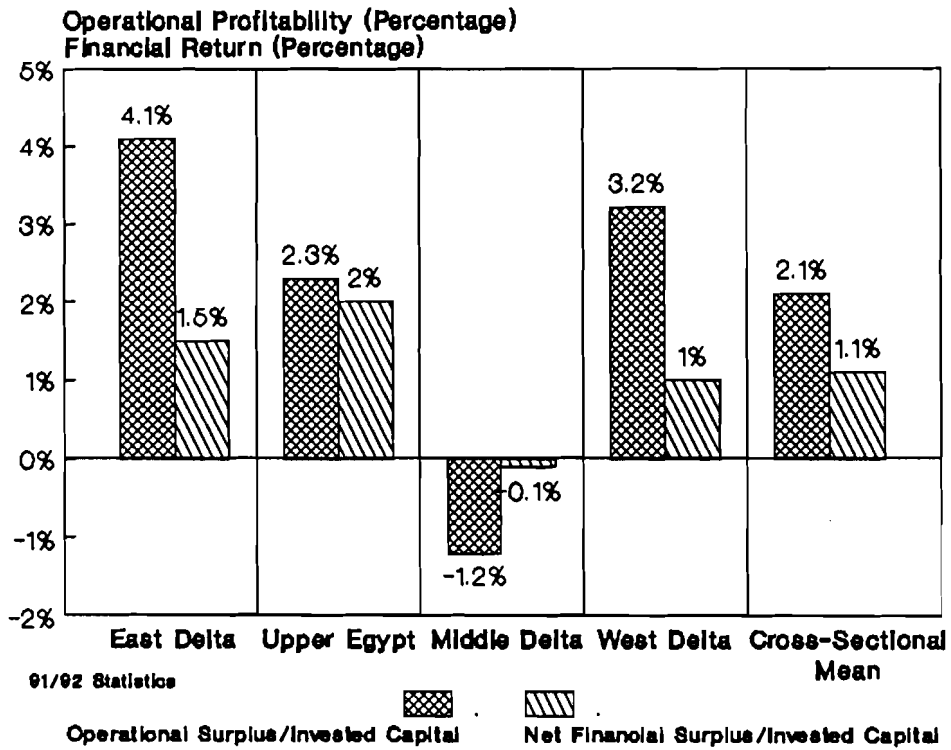


Figure 3: Operational profitability and financial return in intercity bus companies in Egypt

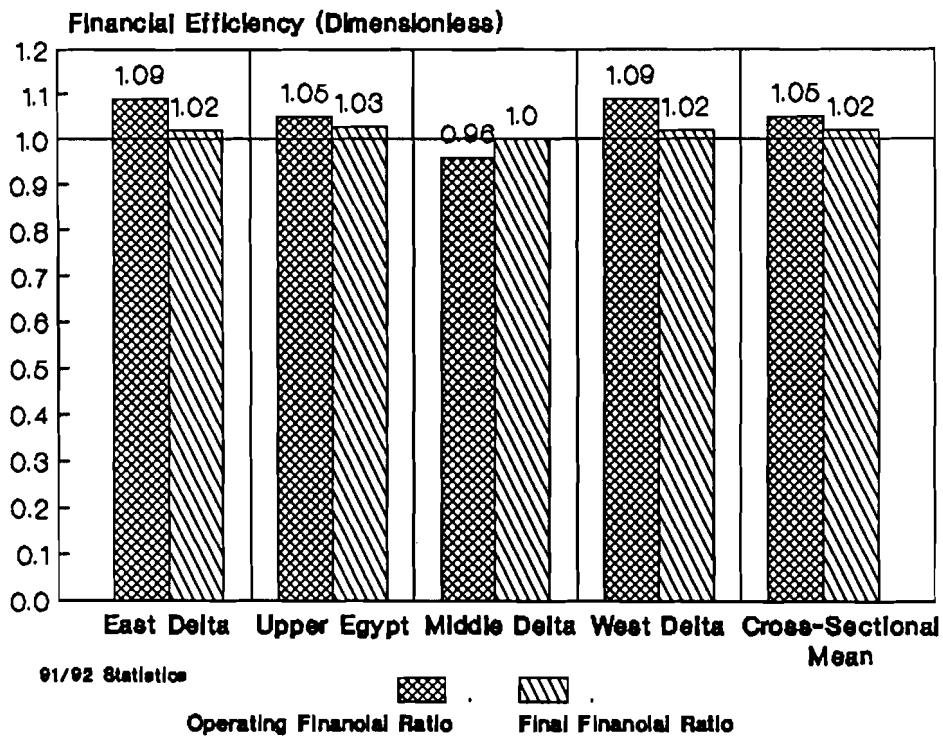


Figure 4: Financial efficiency in intercity bus companies in Egypt

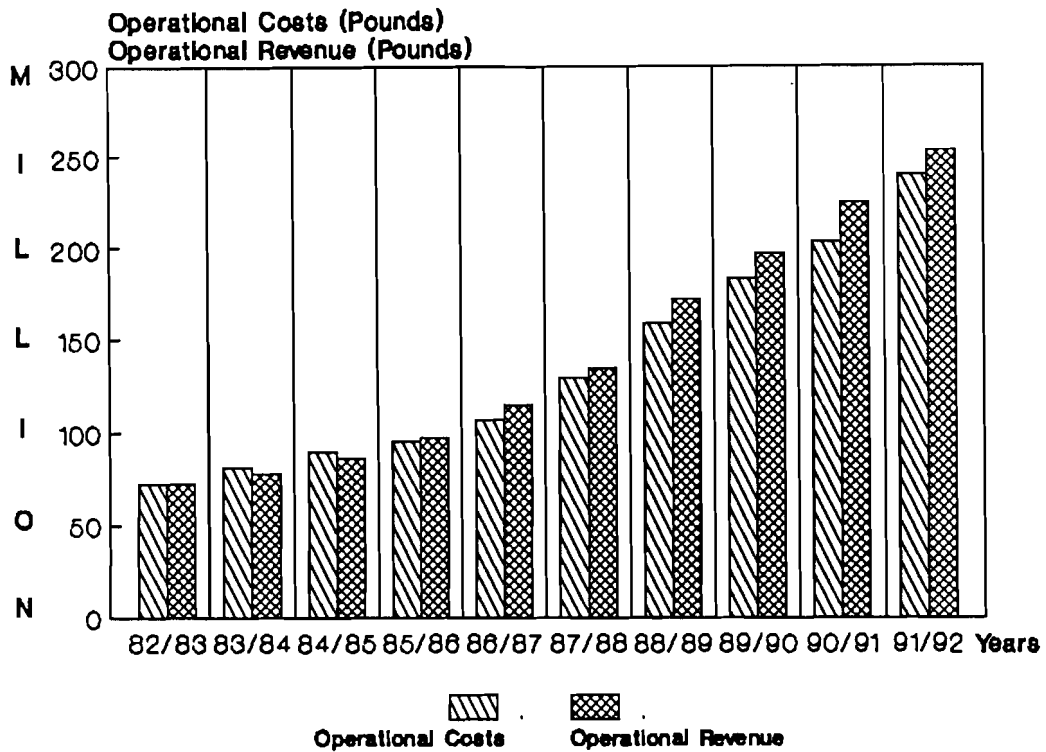


Figure 5: Trends of operational costs and operational revenue in intercity bus companies in Egypt

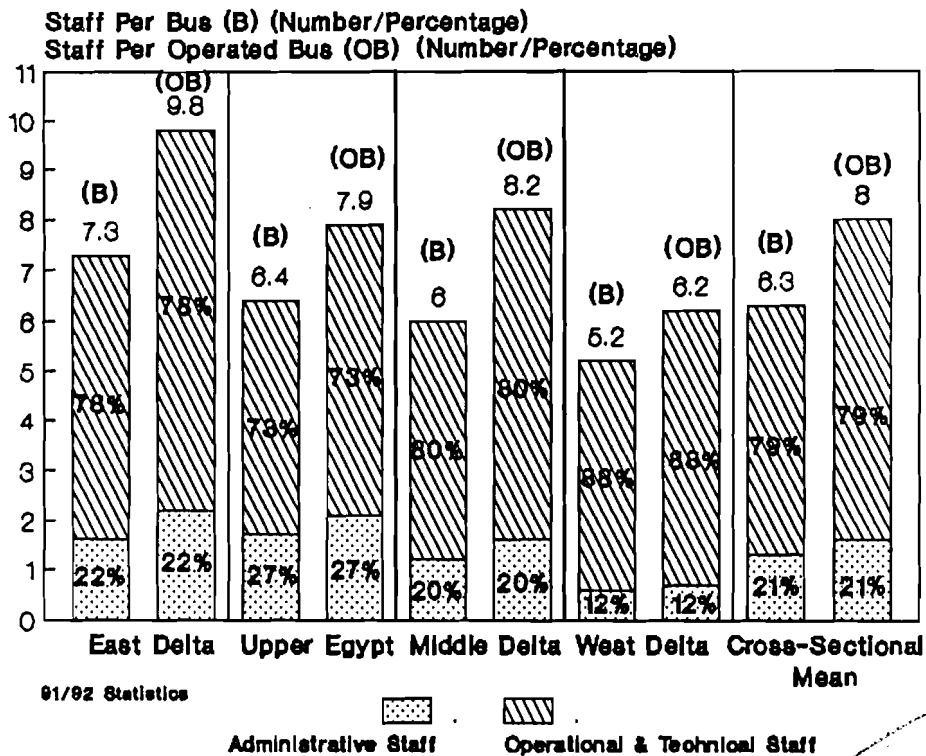


Figure 6: Staff per bus ratio in intercity bus companies in Egypt

Table 1: Main operational cost components in intercity bus companies in Egypt

| Company Cost Components | East Delta | | | | | Upper Egypt | | | | | Middle Delta | | | | | West Delta | | | | | 4 Bus Companies | | | | |
|----------------------------|------------|------|-----------|------|------------------|-------------|------|-----------|------|------------------|--------------|------|-----------|------|------------------|------------|------|-----------|------|------------------|-----------------|------|-----------|------|------------------|
| | 90/ 91 | % | 91/ 92 | % | 90 to 92 % | 90/ 91 | % | 91/ 92 | % | 90 to 92 % | 90/ 91 | % | 91/ 92 | % | 90 to 92 % | 90/ 91 | % | 91/ 92 | % | 90 to 92 % | 90/ 91 | % | 91/ 92 | % | 90 to 92 % |
| Staff Costs | 26917 | 37.7 | 29498 | 37.4 | 9.6 | 29568 | 41.4 | 33004 | 39.2 | 11.6 | 15747 | 45.0 | 17370 | 38.8 | 10.3 | 9837 | 39.1 | 10576 | 32.9 | 7.5 | 82069 | 40.4 | 90448 | 37.7 | 10.2 |
| Fuel Costs | 3779 | 5.3 | 7978 | 10.1 | 111 | 3991 | 5.6 | 8436 | 10 | 111 | 2246 | 6.4 | 4602 | 10.3 | 105 | 1346 | 6.3 | 3060 | 9.5 | 127 | 11362 | 5.6 | 24076 | 10 | 112 |
| Spare Parts Costs | 13460 | 18.8 | 12419 | 15.7 | -7.7 | 13841 | 19.4 | 14887 | 17.7 | 7.6 | 3932 | 11.2 | 6960 | 15.6 | 77 | 3626 | 14.4 | 4461 | 13.9 | 23 | 34859 | 17.2 | 38727 | 16.1 | 11.1 |
| Tyres Costs | 3803 | 5.3 | 4600 | 6.8 | 21 | 3240 | 4.5 | 6390 | 6.4 | 66 | 2251 | 6.4 | 2932 | 6.6 | 30.3 | 1241 | 4.9 | 1858 | 5.8 | 60 | 10535 | 5.2 | 14780 | 6.2 | 40.3 |
| Other Production Costs | 1884 | 2.6 | 2334 | 3 | 23.9 | 1493 | 2.1 | 2112 | 2.5 | 41.5 | 1095 | 3.2 | 1306 | 2.9 | 19.2 | 563 | 2.3 | 766 | 2.4 | 36 | 6035 | 2.5 | 6517 | 2.7 | 29.4 |
| Service Costs | 2232 | 3.1 | 2199 | 2.8 | -1.5 | 2398 | 3.4 | 2256 | 2.7 | -5.9 | 1087 | 3.2 | 1184 | 2.6 | 8.9 | 1061 | 4.2 | 1231 | 3.8 | 16 | 6778 | 3.3 | 6870 | 2.9 | 1.4 |
| Other Costs | 19414 | 27.2 | 19886 | 25.2 | 2.4 | 16809 | 23.6 | 18126 | 21.5 | 7.8 | 8603 | 24.6 | 10365 | 23.2 | 20.5 | 7501 | 29.8 | 10203 | 31.7 | 36 | 52327 | 25.8 | 58580 | 24.4 | 12 |
| Operational Costs | 71490 | 100 | 78914 | 100 | 10.4 | 71340 | 100 | 84211 | 100 | 18 | 34961 | 100 | 44718 | 100 | 28 | 25176 | 100 | 32155 | 100 | 27.7 | 202966 | 100 | 239998 | 100 | 18.2 |

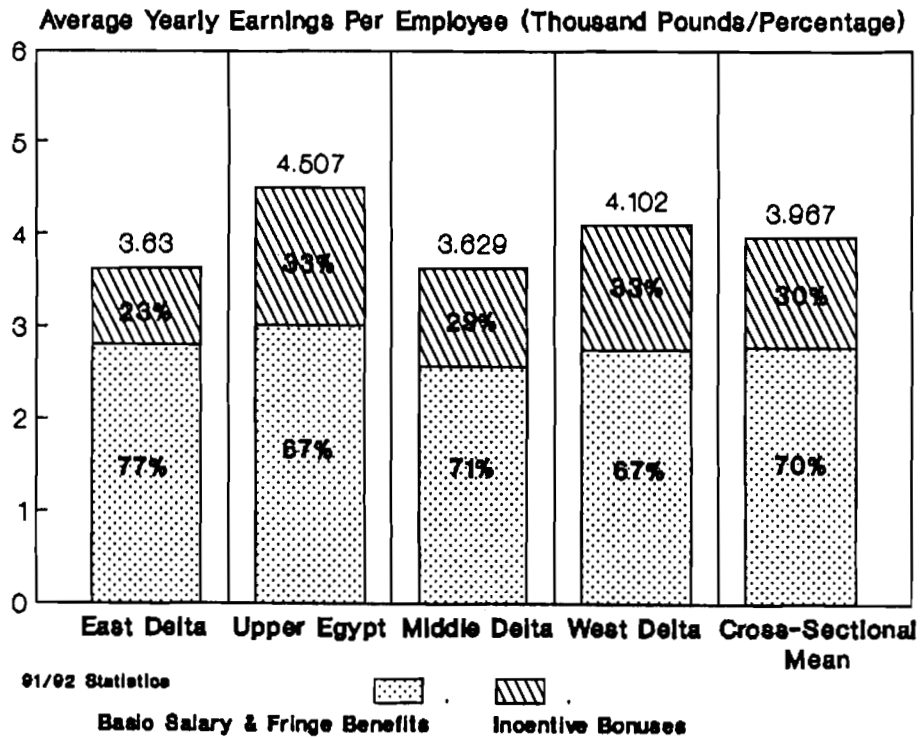


Figure 7: Average yearly earnings per employee in intercity bus companies in Egypt

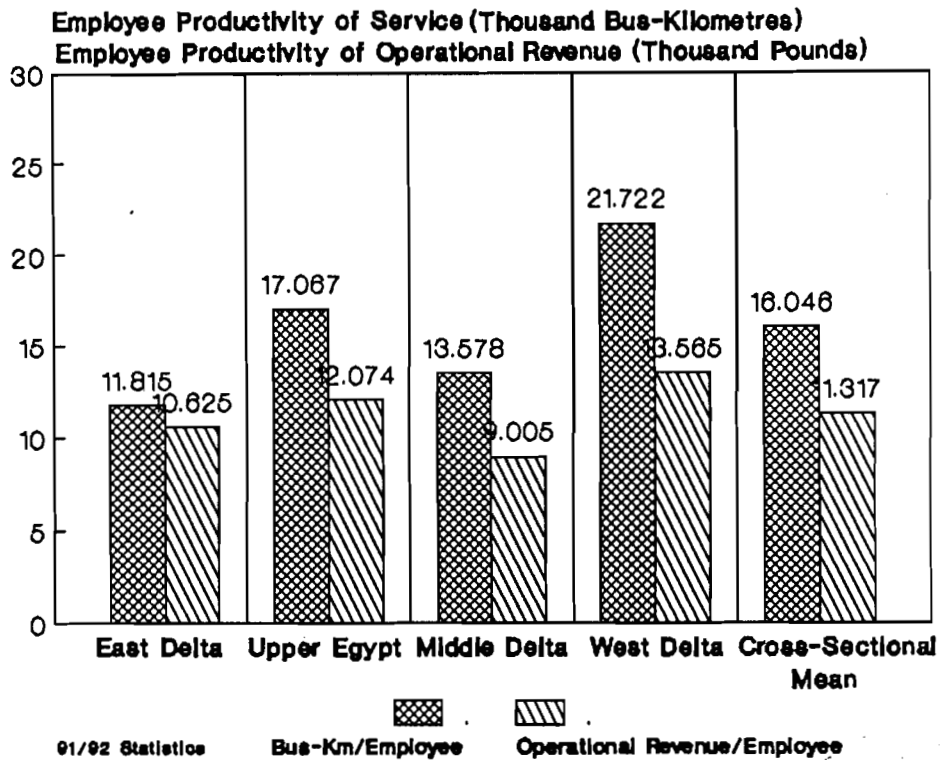


Figure 8: Employee productivity in intercity bus companies in Egypt

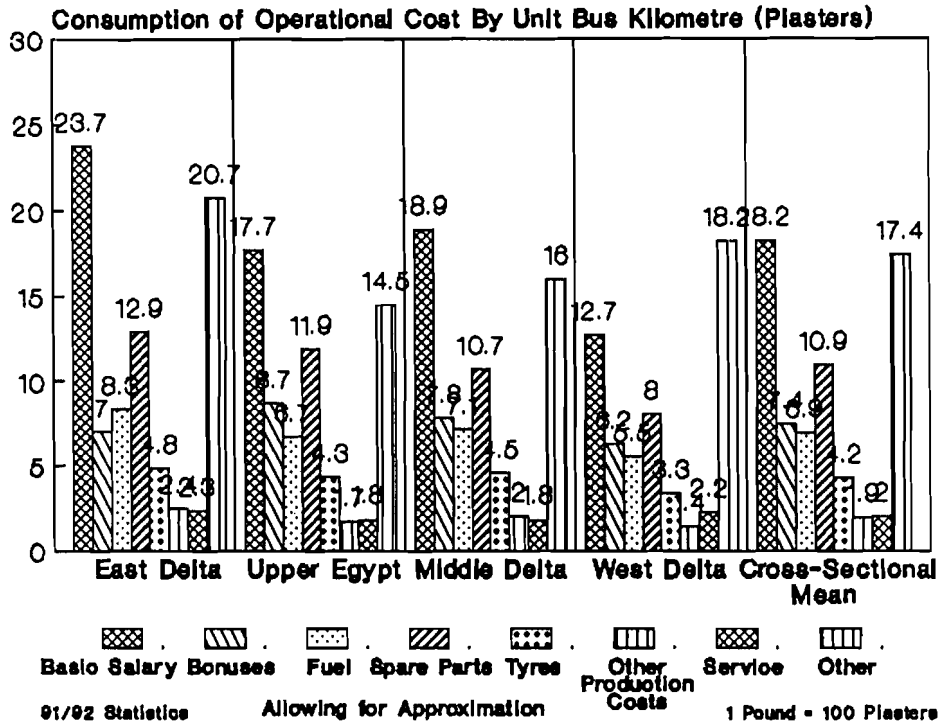


Figure 9: Consumption of operational cost components by bus-kilometre in intercity bus companies in Egypt

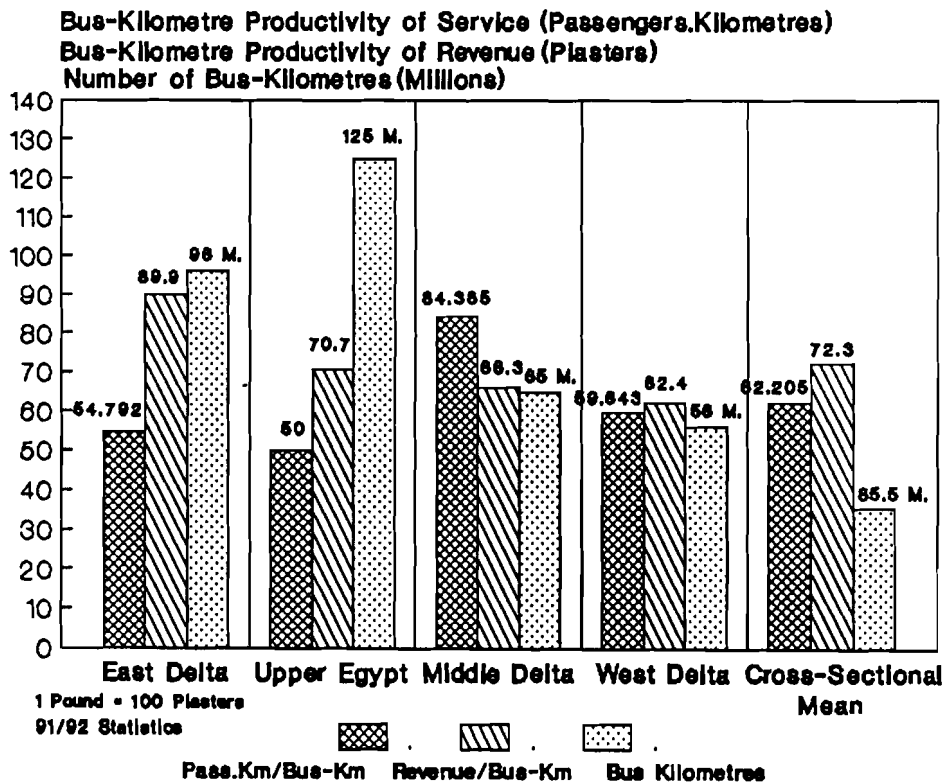


Figure 10: Productivity of bus-kilometre in intercity bus companies in Egypt

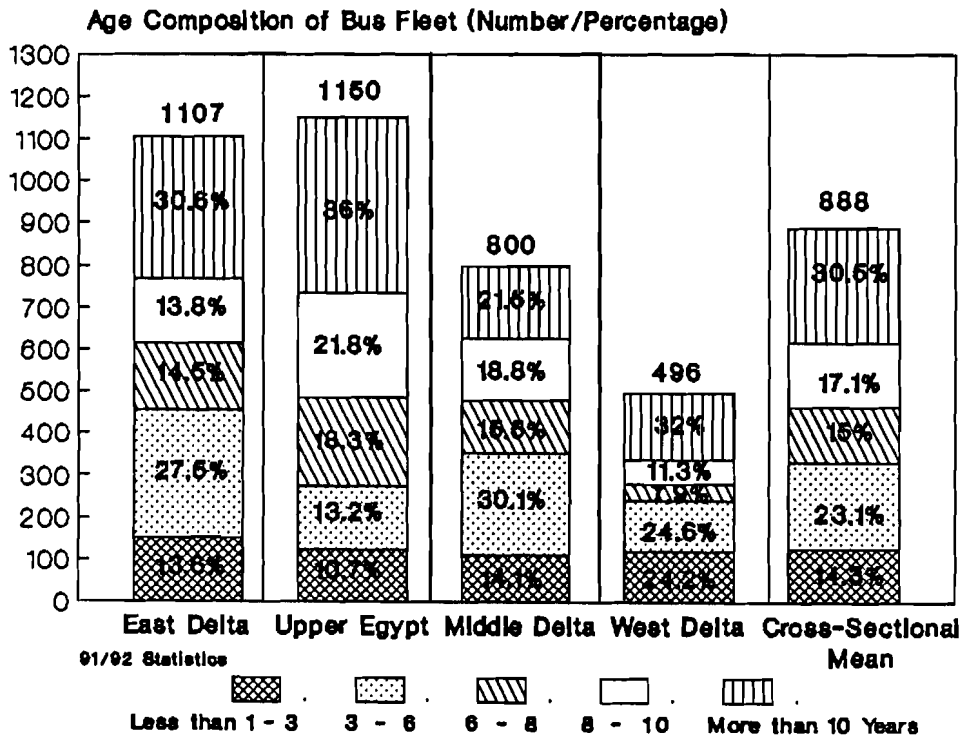


Figure 11: Age composition of bus fleets in intercity bus companies in Egypt

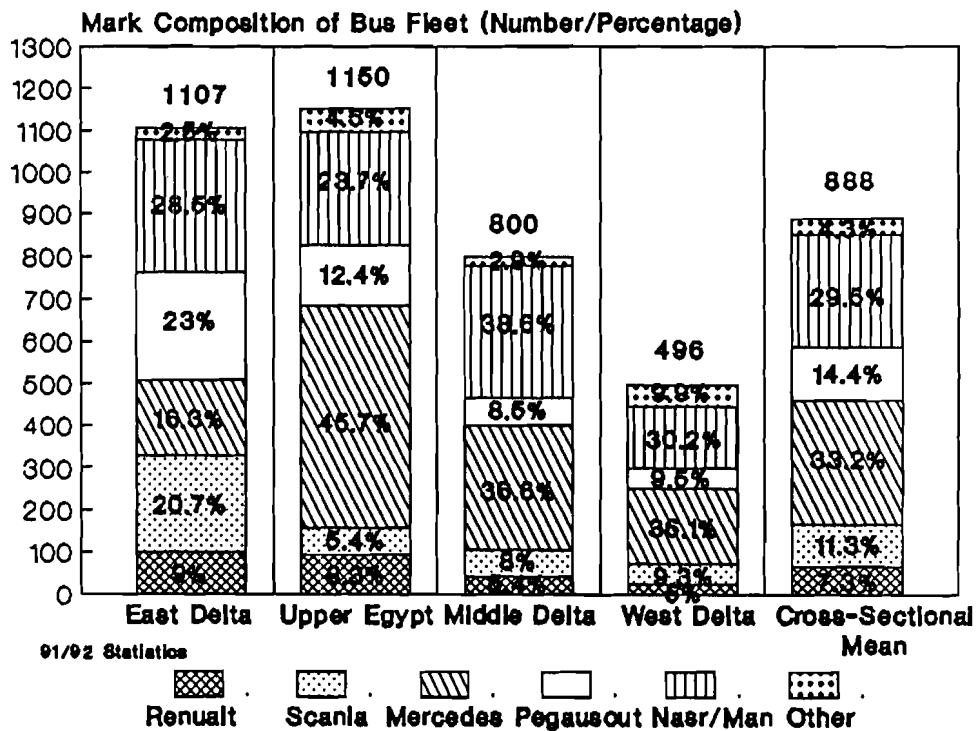


Figure 12: Mark composition of bus fleets in intercity bus companies in Egypt

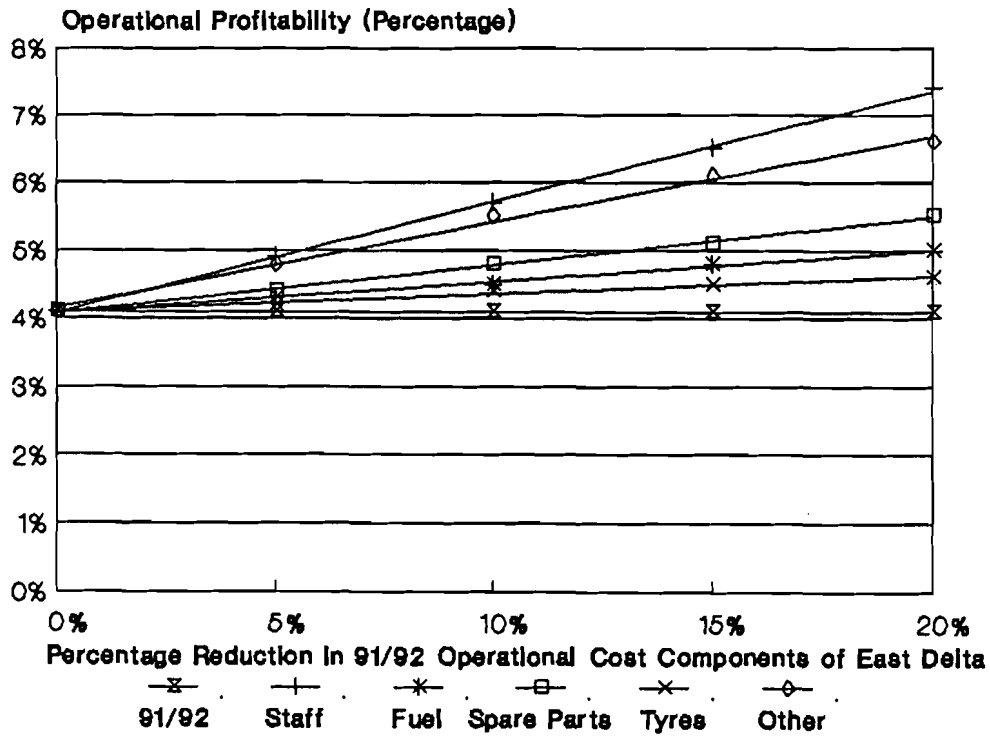


Figure 13: Sensitivity of operational profitability to reductions in operational cost components in East Delta Bus Company

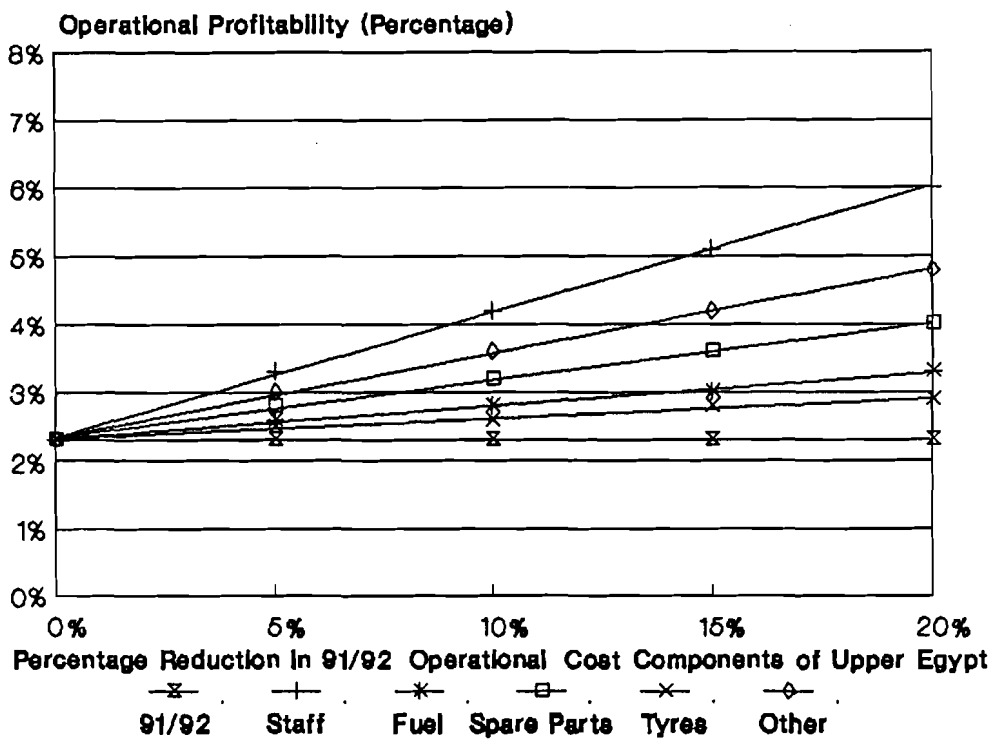


Figure 14: Sensitivity of operational profitability to reductions in operational cost components in Upper Egypt Bus Company

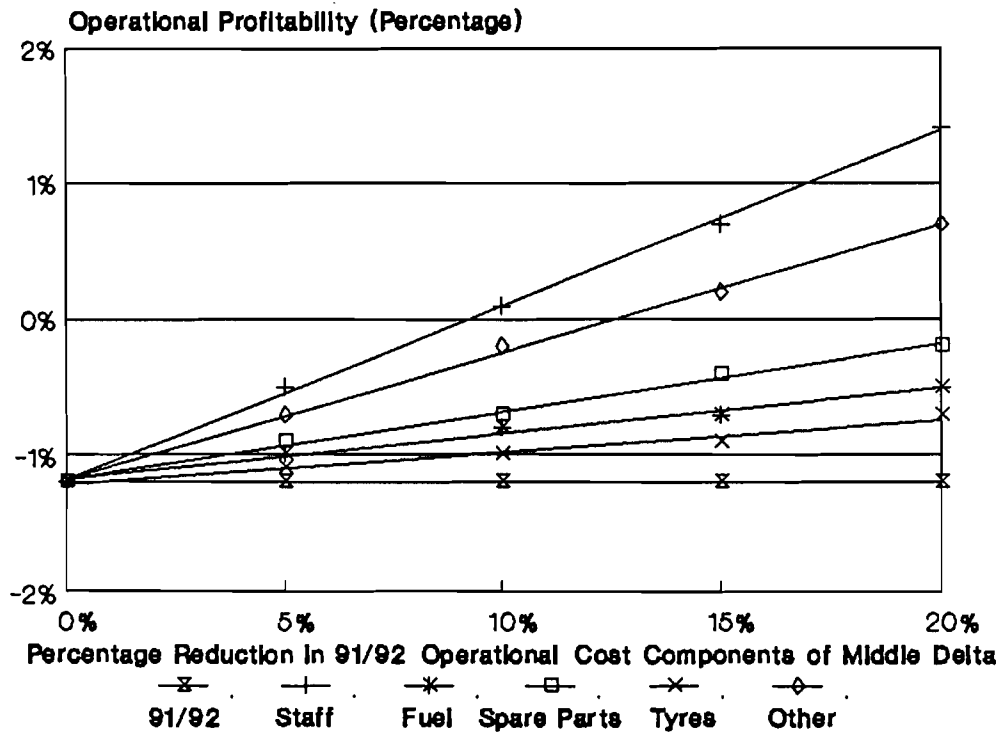


Figure 15: Sensitivity of operational profitability to reductions in operational cost components in Middle Delta Bus Company

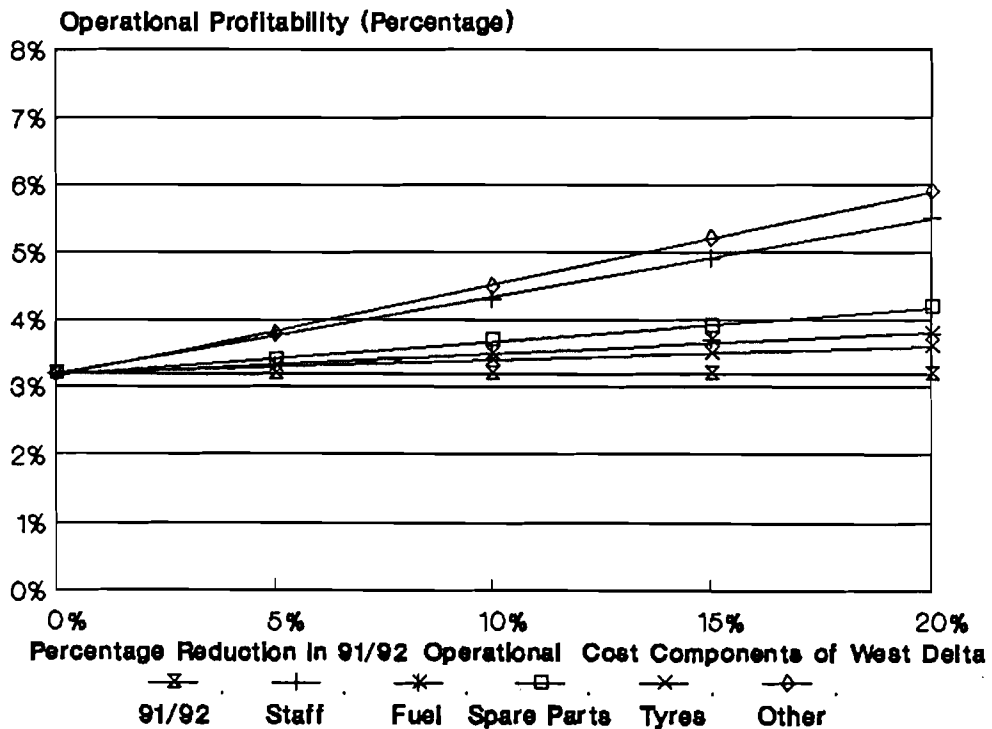


Figure 16: Sensitivity of operational profitability to reductions in operational cost components in West Delta Bus Company

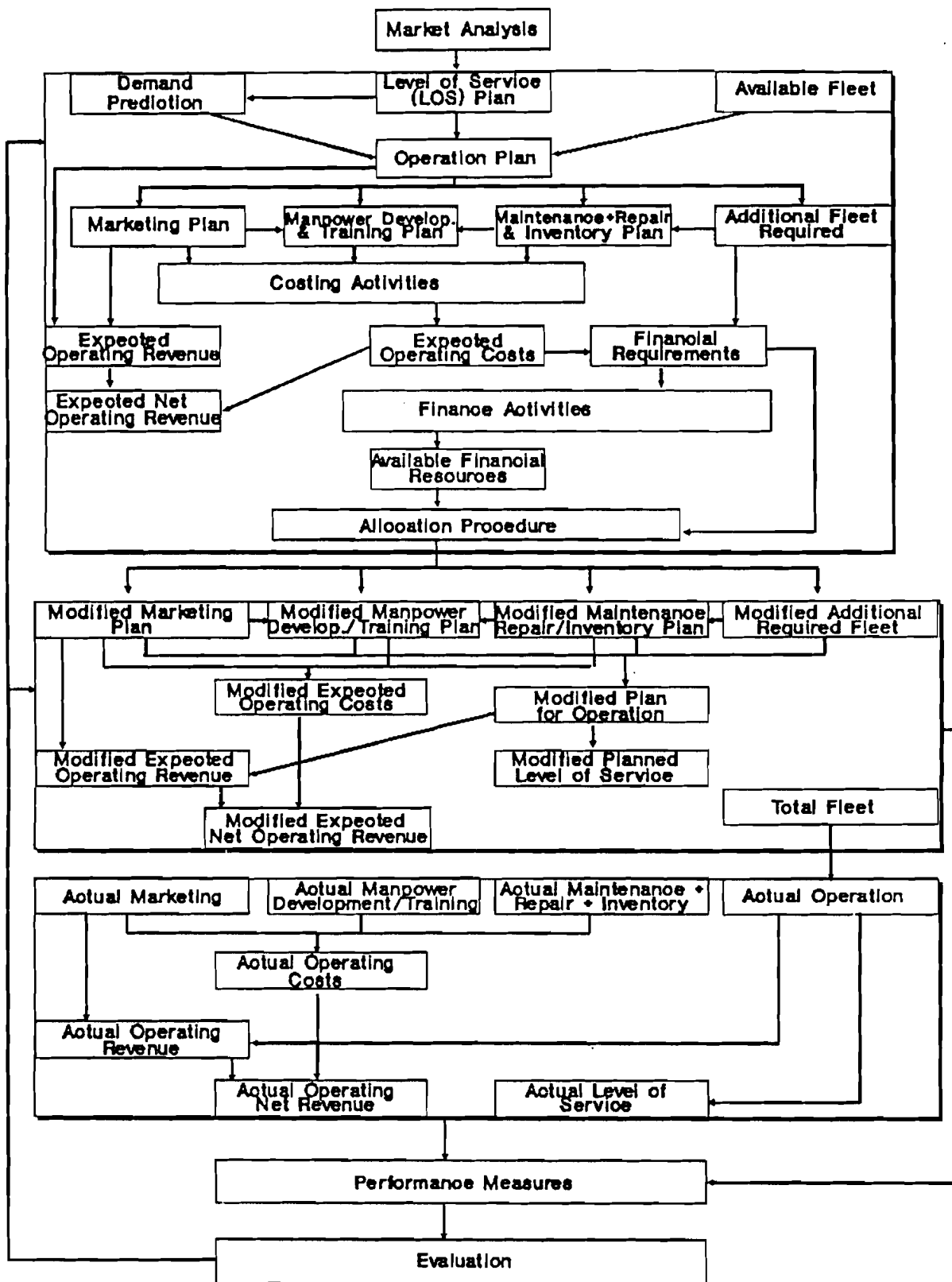


Figure 17: Framework of a proposed Vehicle Management System

