Development of Management Information System to Enhance Performance of Transit Agencies

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Abstract

"Management Information System in Operational Performance" has a predominant role to play in the road transport sector since it is an important tool for the management used to assess the efficiencies, wastages, profitable or unprofitable activities. In recent years Information is a key input in transit (especially road transport) management throughout the world. Highest operational performance is one of the expectations / objectives of all Transit Agencies (TAs) but it need to be achieved through a quality management and managerial decisions. The management information system (MIS) extensively helps organizations to understand its functions and well considered to be the tool to enhance operational performance in road transport operations. This paper reviews the importance of MIS and components for the operations of TAs in India. It also provides a wide scope on the implementation strategies to enhance operations and services of transport sector.

Introduction

Information is the basic raw material for the decision-making activities that go on in any organization (Padam, 1996). The effectiveness of decision making is in fact largely dependent on the existence of an information system which monitors all activity, performance, results, and shortfalls taking place at various levels of the organization (Dilip Roy, 1999). A well-thought out and responsive management information system is thus an important component of management policy. The test of its effectiveness and responsiveness is that information

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reaches the decision-maker in the right form, at the right time. MIS thus prevents the use of guesswork and hunches in decision making planning and control. MIS at the transport management (at TAs organization level) provides operational control, which is one of the management functions to enhance operational performance.

Pre-Requisites for MIS in Transport

The output / support of MIS to the organization is hundred percent definite when it is systematically carried out by element owners (example: drivers and conductors of transport vehicle in a particular route) of the organization. MIS is highly helpful to the transit (transport) agencies in connection with providing comfort and timely service to the passengers (Bagade, 1979). Any transit agency, which provides passenger service, must concentrate on the following to enhance performance using MIS.

- The set of objectives of the transit management.
- Making the infrastructure to meet the exact demand / services.
- Identifying planning, execution and control decisions that are to be made by each transit/ transport officer / manager.
- Capability, knowledge and training of the transit managers to meet the challenges and to use information effectively.
- Commitment by the transport officers and proper utilization of MIS.

Following are the essentials for a particular State Transport Undertaking / State Transport Corporation / Transit agency to implement MIS in transport operations.

1 Objectives of the branch of STU related to the overall objectives of STUs.

2 Function wise divisions of management (example: Operations management and non-operation management like maintenance services etc.).

3 Duties and responsibilities of the individual in the top, middle and lower level staff of organization (example: Divisional managers, operational manager, general manager, office manager, drivers, conductors and mechanics of the Unit/ branch).

4 Business or services to be carried by TAs.

5 Identifying the critical success factors for the transport performance or the key result areas for

improvement (example: Service route, operating schedules, bus timings etc)

6 Identifying problems using the available information and devising solution through traditional or non-traditional methods (example: Cause-and-effect study is a traditional method to identify the root cause of the problem).

MIS for Quality of Service

Adequate service level as well as the quality of service is intimately connected with a healthy and well-maintained bus fleet and it is ensured by well trained and motivated staff. It is possible to increase the performance by effective utilization of fleet, vehicles and stores and thus bring economy of operations (Patankar, 1985).

Information system should include the following to improve the quality of service in transit operations.

1 Regularity of service (Suspending or canceling the services as minimum as possible or making arrangements to provide uninterrupted transport service).

2 Punctuality (Avoiding late departure and ensuring arrival of scheduled buses)

3 Cleanliness (Keeping the transport vehicles very neat and clean up to the satisfaction of the employees of the corporation and passengers who are all uses those vehicles).

4 Comfortable (Available service from vehicles must be comfort to the passengers).

5 Courteous [Crews (drivers and conductors) should be trained to meet the expectations of the passengers in connection with politeness and helpful approach during the service].

6 Reliability and safety [Transit agency should ensure the trouble-free vehicles (troubles due to breakdown or accident due to mechanical failure) during the service].

Branches should have clarity on the following to improve MIS

- Total investment on infrastructure and fleet
- Revenue earned by transport vehicles
- Profit earned through operations
- Loss if any
- Various Expenditure details
- Staff employed for operations and non-operations etc.

MIS for Organizational Structure of Transport

Jobs are always given to individuals to ensure target based function of organization. In transit management individuals are provided with functional responsibility to enhance the passenger service and operational performance of TAs. Contribution of the individuals in a team work is very important to make success. Table 1 details various functions of members of TAs to contribute to MIS and to enhance performance.

Table 1.0 : Functional Detail of Individuals of TAs to Enhance Performance using MIS

Staff to Contribute to MIS	Function
Depot / Branch Manager	Getting information through Operations (traffic) and non-operations (maintenance)
Traffic Manager	Getting information through daily planning (bus schedules) and operations carried out by the vehicles and staff (crew).
Workshop manager	Getting information through maintenance of transport vehicles and workshop activities.
Transport vehicle Operating in-charge	Getting information through ticket revenue (charges paid by the passengers) and crew (drivers and conductors).
Checkers	Getting information through checking assistants and data collection methods.
Administrative officer	Getting information through records (labour and office records).
Accountant officer	Getting information through salary, stores accounts and contingency.
Stores in-charge	Getting information through Consumables and other r equirements in stores (Diesel, engine oil, spare parts of the vehicle and related).

In order to improve MIS, a particular transit agency require one separate MIS in-charge to collect all necessary information from the above said category / group of members and to co-ordinate with the top-level and middle level managers to make analysis on the data collected. It is also necessary to carry out simple checks to ensure the consistency and reliability of the information. Review meeting helps to identify problems, solutions and to enhance performance.

MIS for Planning and Control Activities of TAs

In transit agencies, planning, organizing, motivating, coordinating and controlling are the regular activities that bring the management / organization to perform and to achieve target (Satyanarayana, 1996). Relevant and timely available information is more helpful to the management to achieve the target. MIS constantly improves the above said activities in transit management and table 2 provides the details of MIS for such type of activities.

Table 2.0 MIS for Planning and Control

Type of activity	Nature of MIS
Planning	Information regarding the management decisions / willingness in connection with resource development, investment, type of service, man power management etc. This information facilitates the management to answer - what to do? and how to do?
Organizing	Information regarding allocating people for different works to be performed in transit operations and channelizing all types of activities for a well defined transit management. Organizing plays a vital role in deciding- who shall do what.
Motivating	Information regarding facilities and encouragement provided to carryout the job / responsibility by the individual
Co-ordinating	Information regarding the responsibility of a team / group of people functioning to achieve target. Combining the

	efforts of all workers towards achievement of a common goal.
Controlling	Information regarding all proposed activities to enhance the performance of transit agencies. Analysis of data for the present and past performance status, this enable the TA to improve control on activities.

Generally, collecting and proceeding with Information is the primary function of a management. Each of activities described in table 2 demands decisions. Hence MIS involves managers to contribute more in providing information and making decisions. It is also important to note that to make decisions managers need information. Manager needs to know and understand the facts relating to the problem and information. It helps the managers to take effective decisions.

Indicators for Measurement of Performance

MIS is an integrated, man / machine system for providing information to support operations, management and decision making functions in an organization (Magesh Chand, 1996). The various useful elements to facilitate management information system are computer hardware and software, manual procedures, decision models and data base etc. Generally MIS in transit management may have to incorporate the following

- Measurement of operating performance
- Evaluation of operating performance
- Areas of improvement

Indicators are normally used to measure transit performance and they are used to measure performance in the following areas

- Quality of service
- Economy and profitability of operations
- Operating performance

Table 3 provides various performance indicators (Ref: Compendium of Transport Terms, 1982) to enhance operational performance of TAs.

Table 3.0 Performance Indicators

Indicator	Major	Minor	Supplementary
Quality of service	Breakdown overloading	Percentage of stations provided	Number of bus
	Accidents	Average passengers waiting time	Number of passen gers per bus station
	Buses provided for service	Condition of the vehicle	Number of bus stops provided
	Buses arrived in time	Number of buses on route per day	Crew behavior
		Fatal accident's per day	Subsidies given to the passengers
			Operations / extra trips provided
Economy and profitability	Total cost per kilometre	Turnover / capital ratio	Fuel performance
	Returns from capital	Major and minor expenses	Interest on capital paid
	Revenue	Earnings per bus	Average capital employed
	Net profit	Average earning of the fleet	Vehicle performance per kilometre
	Working expenses in operations	Passenger earningsfrom transport service provided by TA	Performance of the tyres used
		Earning per passenger	Performance of the batteries used
			Performance of the engine used

Operating performance	Fleet utilization	Scheduled kilometres	Total fleet strength
	Effective vehicle utilization	Operated kilometre	Capital invested for the fleet
	Kilometres operative	Ratio between the scheduled and operated kilometres	Average number of days operated
		Revenue kilometres	Number of fraud works
		Number of passengers carried per day	Number of routes operated
		Ratio between the Dead kilometre / kilometre operated	Route kilometres operated
		Average age of the bus	

Suggestions to Enhance Performance

Profitable operations of passenger transport require not only a proper selection of economic routes, fleet and bus utilization, but also control on the cost of operations (Padam, 1996). The only costs which are under the control of the branch manager are cost of fuel, lubricants, tyres, tubes, batteries and other necessary spare parts required for transport vehicle (Ganesan, 1996). The cost of operation per kilometre varies from branch to branch and from month to month.

TAs should insist on "clear accounting procedure and information" regarding the accounts on transport operations. The operations data should be collected and analyzed by the branches in the beginning of every month of a particular financial year. MIS also helps TAs in spare part management in connection with exact requirement of automobile spare part, purchase, actual consumption and control.

TAs should have a keen watch on the Kilometre per Litre (KMPL) provided by the transport vehicles since it reflects on the performance of the transport operations. Updating fuel consumption of the vehicles and improving the performance of vehicle through maintenance are the essential activities to be carried by every transit agency to enhance performance.

Maintenance of transport vehicles provides trouble free vehicles on road, saves money and these vehicles provide satisfaction to the passengers as well management authorities. TAs have to prepare a complete information report about the schedules of maintenance to be carried out in every day / month/ year. Branches should have all facilities to carryout repairs and breakdown maintenance etc.

Conclusion

In recent years, transit agencies have started implementing new management concepts to enhance performance in operations and service. A transport sector requires continuous effort to improve performance in operational and non-operational areas. Effective utilization of resources is considered to be one of the best ways to enhance performance. In this connection MIS helps transit management to improve the system and to take managerial decisions at right time. A good information system is essential for ensuring effectiveness and efficiency of the total transport management system. In simple terms management information system is the generating and making available of the right type of information to the right level of management at the right time. This paper highlighted some of the areas, where transit management can incorporate MIS to enhance transit operational performance.

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