

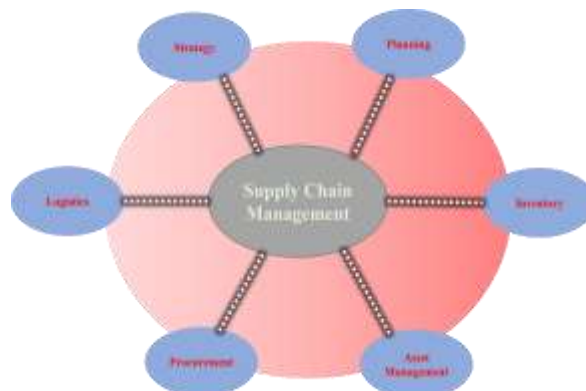
**OPTIMIZATION OF TRANSPORTATION COST IN SUPPLY CHAIN MANAGEMENT (SCM)**Rajesh A S^{1*}, Subbaiah K M², Mohammed Ismail³, Basavaraju. G⁴^{1*} M. Tech Scholar, Department of Industrial & Production Engineering, The National Institute of Engineering, Mysore^{2,3} Associate Professor, Department of Industrial & Production Engineering, The National Institute of Engineering, Mysore⁴ Manager, Materials Management Department, Rane (Madras) Limited, Mysore Plant, MysoreCorrespondence Author: as.rajesh.jce@gmail.com**Keywords:** Supply chain management (SCM), Transportation & Logistics, Transportation Management.**Abstract**

Transportation is movement of materials from origin to destination. In industrial means, expenses involved in moving materials/products from Supplier to Customer. Transport system is the most important economic activity among the components of business logistics systems. The data shows transportation is the highest cost, which occupies (one-third) of logistics costs, which includes order by inventory, warehousing cost, packing cost, management cost, movement cost and ordering cost. This paper deals with the reduction of transportation cost by adopting new technique. The analysis worked out in reduction of transportation cost to greater extent.

Introduction**Supply chain management (SCM)**

It is the management of the flow of goods, flow of cash, and flow of information internally and externally of a company or a group of companies that share the same value chain. It includes the movement and storage of raw material, work-in-process inventory, and finished goods from point of origin to point of consumption; cash or credit in purchasing or selling of products or services; as well as the information that conducts those activities, such as orders, demand forecast, or even picking lists. Interconnected or interlinked networks, channels and node businesses are involved in the provision of products and services required by end customers in a supply chain. Supply chain management has been defined as the "design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and measuring performance globally."

SCM draws heavily from the areas of operations management, logistics, procurement, and information technology, and strives for an integrated approach.

**Fig1: Division in supply chain management****Logistics**

Logistics is the management of the flow of goods between the point of origin and the point of consumption in order to meet some requirements, of customers or corporations. The resources managed in logistics can include physical items, such as food, materials, animals, equipment and liquids, as well as abstract items, such as time, information, particles, and energy. The logistics of physical items usually involves the integration of information flow, material handling, production, packaging, inventory, transportation, warehousing, and often security.

Logistics cost includes Transportation and handling costs, Packaging costs, Inventory carrying costs, Administrative costs, Ordering costs, Warehousing cost.

Types Of Logistics:

1. **Primary or Domestic Logistics** is the movement of materials from supplier end to customer end which connects between major cities.



2. **Secondary or Local Logistics** is the movement of materials within the city, and the materials are transported between parent company and its sub-contracting company that adds value to components.
3. **Tertiary or Local Logistics at supplier end** is the movement of materials from suppliers site to transporters place at suppliers city, when the same city has more than one supplier.

Considering Toyota (as customer) and its supplier as example: If Toyota is customer at Bangalore and having its series of suppliers at Chennai, then primary logistic is transportation from Chennai transporter point to Toyota, secondary logistic is the transportation of material within the Bangalore city for adding value to the components and the tertiary logistics at supplier end is transportation of materials from suppliers place at Chennai to the transporters point in Chennai itself, before primary logistics to start and is explained in figure 2 and SC is the indication of Sub Contractor, S is the indication of Supplier.

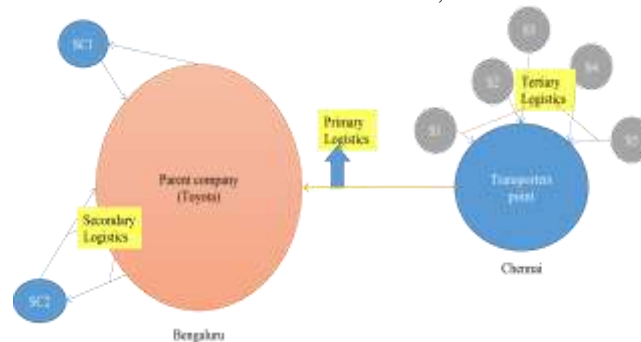


Fig 2: Schematic of Logistic types.

Methodology

Contract management

Contract management gives the ability to accurately record all transportation service provider contracts in a single, central repository and easily access and incorporate updated rates. This is a foundational element that should not be overlooked as a required step in achieving transportation savings. It is also an administrative function where accuracy shows positive downstream results. Maintaining accurate rates prevents many costly errors in subsequent processes from carrier selection to freight payment.

Optimal load & route

In today's market where capacity is at a premium, reducing transportation cost requires finding greater efficiencies rather than simply working to extract deeper discounts from transportation providers. The creation of an optimal transportation plan is a sure way to generate savings without causing disruption in your carrier base. As optimization technology has advanced, it has become accessible to a much broader market than ever before.

Least-cost Mode/carrier selection

The selection of a least-cost carrier can yield savings without adversely affecting customer service. Selection of a least-cost carrier does not mean lowering service standards. It often means being more aware of service requirements as well as historical carrier performance. The development of a carrier price/performance ranking is key in implementing an effective least-cost carrier selection process. The carrier base should be reviewed by each major traffic lane and a ranking developed that clearly expresses the order of preference for the carriers in each traffic lane.

Performance improvements

The ability to manage performance has always been dependent on the ability to measure performance. In the fast-paced, resource-constrained environment of today's businesses, too often performance measurement has fallen by the wayside as an activity too time-consuming to formalize as a process.

The structured method in achieving the objective of case study (Secondary Logistics or Local Transportation) is as follows:

1. Total number of components transported between Company and Sub-contractor is noted for past month along with the necessary details such as number of trips, cost spent and tabulated the same.
2. Local transportation cost is calculated based on the Number of trips planned for each vehicle per day.
3. Master weight analysis is done for individual component for each transporter.
4. Revisited and Updated the weight master.
5. Based on Bill of Materials (BOM) calculate the component wise freight using weight master.
6. Fix up the rate master for individual components in transportation process with the previous data.



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Results & discussion

Calculation:

Cost analysis for present scenario (Trip-wise cost analysis)

Transporter name: Devaraju S

Total number of components in warded/month=38400

Total transportation cost=21000

∴ Transportation cost/component= 21000/38400
= Rs. 0.55/component

Modified analysis to reduce freight (Component-wise cost analysis)

Total number of trips=140

For efficient utilization, Maximum load of the vehicle=450kg

Average component weight=1.45kg

∴ Transportation cost/component= (140*450)/1.45= 43448 component
cost/component= 21000/43448= Rs 0.48/component.

In practical analysis, total cost= Rs. 21000

In suggested analysis, total cost= Rs. 19200

∴ Total cost saved/month= 21000-19200= Rs. 1800

% of cost saved/month=(21000-19200)/21000*100
= 8.57%

Total cost of transportation in practical analysis=Rs.137670

Total cost of transportation in suggested analysis
=Rs. 125866

∴ Total cost saved/month=137670-125866= Rs. 11803

This analysis has been worked out for eleven transporters and collected data for the month Jan'2015 and these are tabulated in Table 1 and graphical representation is as shown in Fig 3.

Table 1: Shows the details of trip wise total cost and component wise total cost for Local transporter

Sl No	Transporter Name	Data Analysed				Per Component Analysis		Savings	Savings in %	
		No of Component	Avg Component wtj(in kgs)	No trips	Cost per Trip	Total cost	Cost/comp			Total cost
1	C.M RAMESH(SRI MARUDESWARA SWAMY ENTERPRISES)	40500	1.7	125	150	18750	0.45	18225	525	2.80
2	DEVARAJU S	38400	1.45	140	150	21000	0.5	19200	1800	8.57
3	Girisha C.R	115000	0.3	50	80	4000	0.08	3450	550	13.75
4	GOPAL KRISHNA G	25000	1.5	95	180	17100	0.6	15000	2100	12.28
5	MANJULA TRANSPORT (MANJULA)	29050	1.35	90	150	13500	0.46	13363	137	1.01
6	RAJALAKSHMI ENTERPRISES	30000	2	160	80	12800	0.37	11100	1700	13.28
7	S S & S ENTERPRISES	20000	1.6	60	180	10800	0.5	10000	800	7.41
8	SAVITHA TRANSPORTS	20000	0.3	10	80	800	0.08	600	200	25.00
9	SRINIVASA M.R (MADHESWARA TRANSPORT)	35000	1.5	116	150	17400	0.45	15750	1650	9.48
10	VASANTHA KUMAR	22000	3.1	131	80	10480	0.4	8800	1680	16.03
11	VINAYAKA ENTERPRISES	28050	3	138	80	11040	0.37	10378.5	661.5	5.99
Total cost savings per month								11803.5		

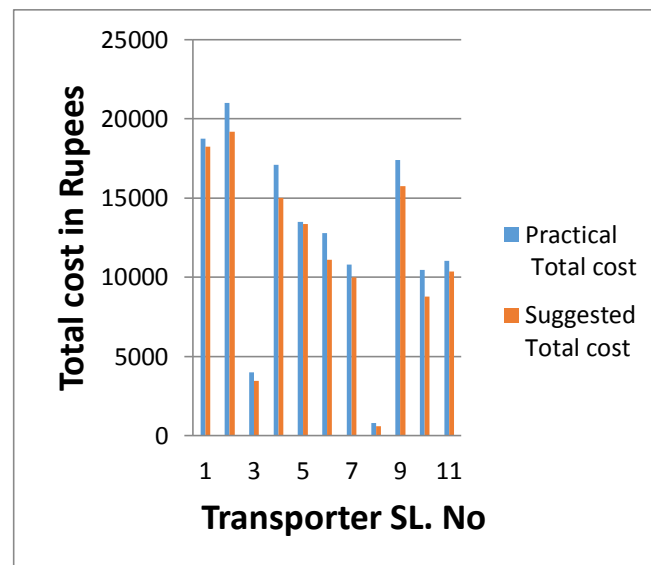


Fig 3: Indicates the practical total cost and suggested total cost under graphical representation.

By this analysis company is going to save about 8.57% of its total cost spent for secondary logistic for local transportation and cost-wise, amount saved would be 11803.5 INR.

Conclusion

This paper deals with the minimization of transportation cost by replacing existing trip-wise payment method with the component-wise payment method. The result of the analysis has minimized the transportation cost of about 8.57% of its total cost spent/month. The value saved is around 11803.5 INR for Jan'2015. for same data.

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