In-House Fleet Services Vs Contracted 3PLs: An Empirical Analysis

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The purpose of this study is to compare and contrast the benefits of installing in-house fleet against contracted 3PL. In this empirical research, we first investigated the existing fleet management at a food processing industry to identify the company's logistic requirements and secondly categorize the possible advantages/disadvantages the organization may achieve by installing in-house fleet system vis-a-vis an outsourced fleet system. The methodology adopted establishes a research framework on in-house fleet management. Input variables depict the usage of logistics requirement, pros and cons of owning a fleet and the impact on service level of the company. The findings indicate the drawbacks in the existing system and scope for improvement in existing system in the company. Management can take a balanced decision of make/buy between in-house fleet and contracted 3PL. Company can save cost and possibly earn a good margin. They can also improve their service level and back-end policies. The result opens up a new approach for analyzing cost-benefit analysis for arriving at a solution for a balanced decision making.

Keywords: In-House Fleet, Contacted 3PL, Make/buy Decision, Outsourcing

1. Introduction

Nowadays companies are moving towards providing better quality products and higher service levels to its customers. As such firms are more focused towards customer satisfaction. They are probing for solutions (such as better ways to transport) for increasing service level without compromising on profits. Thus, they find themselves in a flux of whether to go for outsourcing or install their own fleets. This research focuses towards building a framework for managers to take a balanced decision of make/buy.

The methodology adopted tries to establish a research framework on in-house fleet management. This is used to establish the impact of owning a fleet on cost reduction and improvement of service level at the company. The survey results have inferred pertinent factors that indicate owning a fleet set-up not only can get a cost reduction but also make profit through 'return integration' in the organization. Return integrations here refers to contracts with brokers and other companies whose goods these trucks will fetch while returning from the cities to which company's goods are supplied.

This empirical investigation presents the need to adapt the condition of the logistics requirement, which in turn will improve the service level of the company and hence increase the role of company in fleet transportation. We establish a research framework in order to analyze benefits of installing in-house fleet vis-à-vis contracted 3PL.The results showcase: (1) The setting up company owned fleets as a driving policy for improving service level, (2) exhibit impacts of sustainable development policy in the sector, (3) Take 'Make or Buy' decision of installing own fleet or outsource.

Section 2 presents the earlier studies done in this area and identifies research gaps. In section 3 methods are defined comprehensively which are adopted in this research. Section 4 summarizes the data collected and shows analysis of company collected data. Section 5 shows the outcome of the data analysis. In Section 6 the challenges are described and a viable road map is recommended to follow. The paper concludes in Section 7 by stressing on prominent results and limitations and future scope.

2. Literature Review

Organizations find themselves in a flux of whether to outsource or perform transportation activity in-house. Earlier studies were examined in order to have an understanding of characteristics of these components. While outsourcing there are several costs involved in movement of goods like freight, vehicle hiring cost, paper work, tax, etc. If a firm performs this activity in-house, then it needs to keep a subsequent amount of money in cash and have to bear extra cost of hiring personnel for handling it. In order to keep themselves away from this extra work and to concentrate on core activities firms usually prefer outsourcing.

2.1 Outsourcing

"Outsourcing represents a strategic decision for manufacturing firms to achieve a competitive advantage", (Rodriguez and Robaina, 2006). "Outsourcing, third-party logistics and contract logistics generally mean the same thing", (Lieb, Minnel and Wassenhove, 1993). The firm needs to decide the benefits of outsourcing as indicated by a few criteria, for example, return on investment (Trunick, 1989) and it should collect the hazardous factors also in order to make a balanced decision (Bradley, 1994a). Razzaque and Sheng (1998) propose that small firms should consider outsourcing as competitive advantage and not merely as a cost-cutting decision. Although the services offered by logistics firms have also evolved overtime. Berglund, Laarhoven, Sharman and Wandel (1999) stated logistics suppliers of the 1980s were managing just with transportation and

warehousing. They were followed in mid 1990s by organizations which could offer more altered and tailor-made services and had the capacity to offer further developed administrations including stock management and fleet administration (Razzaque and Sheng, 1998).

"Outsourcing is a specifically defined contractual relationship that is dependent on the supplier meeting the buyer's defined performance goals", (Razzaque and Sheng, 1998). Oliver (1993) proposes that customer satisfaction is controlled by a gap between expectations and performance observations. Customer disappointment can emerge because of poor execution as well as the nature of administration gave by the 3PL which can negatively impact the overall business performance of the organization (Vlachos, Bourlakis and Melewar, 2009).

Vlachos, et al. (2009) states "To the degree that a 3PL provider can keep the logistics costs (transportation, handling, warehousing, inventory management, reverse logistics, and monitoring performance) low while avoiding behavioral pitfalls such as opportunism, lack of professionalism, then the 3PL is a necessary partner and a viable alternative to in-house logistics".

2.2 In-House Fleet

Teo and Marshall (2014) demonstrate "organizations that possess a good internal fleet management function are able to operate their fleet in a more cost-efficient manner". Firms fear of losing control over supplies, that's why sometimes they resist outsourcing (Bardi and Tracey, 1991). Other than losing control, distance from crucial data, their inability to oversee suppliers and customers, their powerlessness to react to emerging conditions, the absence of common objective have likewise been referred to as potential issues which can possibly influence firms to manage services in-house (Bradley, 1995b).

Sheffi (1990) articulates that large organizations, which can manage the cost of advanced in-house staff, may not like to utilize outsourcing. Different components can be put-forth in order to perfectly manage in-house fleet. Software packages can be helpful in minimizing the distribution cost and improve customer service. It increases the managerial control over distribution operations (Golden, Wasil (1987). They also pointed out that micro-based routing model with more assumptions requires more advanced algorithm. Access to data and the capacity to exchange and incorporate and the usage of data for the benefit and purpose of the firm give a competitive advantage (Ahonen, Reunanen and Ojanen (2010).

Minahan (1995) pointed out that in order to know working pattern of 3PLs, organization used to inspect the 3PL firms' physical resources and not the 3PL firms' skills and abilities which may help them carry out operations of fleet more effectively.

2.3 Make/Buy Decision

"The outsourcing decision is a variant of the classical make/buy decision", (Maltz and Ellram, 1997). On a basic level, firms could also perform operations of logistics firms by utilizing their own particular assets or they can also utilize the alternative to outsource part or the entire logistics capacity to specific firms which will handle all the logistics operations for the firm (Razzaque and Sheng, 1998).Heinritz, Farrell, Giunipero, and Kolchin, (1991), consider factors like quality, limit, work, planning and ability to be vital in a make or buy choice. According to Nesbitt and Sperling (2001) in context of decision making structure autocratic and democratic fleets are least. Autocratic fleets never analyze life cycle cost and make purchase decision based on purchase price and are easily influenced by rumors. While democratic fleets take their decisions as analyzed by its internal players who are on lower level but are well informed. Despite both these types of fleets are informal; the autocratic fleets are fully centralized while the democratic fleets are highly decentralized. Strategic decision making is highly affected because of lack of knowledge of critical elements of supply chain (Layangani, Styger and Kumarage, 2014). Distribution control, stock administration, warehousing and outbound transportation are recognized as the knowledge-rich, basic components in conveying while customer benefit is distinguished as the most Knowledge-rich, basic component in returning (Layangani, et al., 2014).

Rodriguez and Robaina (2006) stated that the resource based view (RBV) approach enables administration to recognize center capabilities and distinguish which exercises must be performed in-house or, on the other hand outsourced, and also characterize what measures a firm will take as far as accessible assets and capacities and what 3PLs can give. While administration, in essence, may not be a benefit of competitive advantage, inability to actualize the right administration in a circumstance can lead firms to not completely understand the advantages of the assets they control (Barney, 1991). However, according to Ray, Barney and Muhanna (2004) in view of the RBV system, the principal key choice process includes distinguishing which exercises are for outsourcing and should be performed by outer providers and which can be in control of the firm. The RBV of firms to a great extent highlight their inner qualities and shortcomings, as opposed finding qualities that are dangers to a firm (Grant, 1991; Foss and Eriksen, 1995). List system is considered best to know advantages and capacities of a firm as indicated by the RBV to deal with key investigation, (Grant, 1991).

2.4 Fleet Safety

"Fleet safety is a quality issue, and can't be isolated from planning, administration and supervision", (Murray et al., 2003).While operating the transportation in-house, firms often forget to consider fleet safety as an important factor. In an in-house fleet management system, the fleets are considered as physical assets of the company. Any harm to these can result in loss of money and poor service level. It is the duty of the designated official of the organization to look after the safety of the fleets. By concentrating on some factors firm can possibly be able to save fleets from harm to some extent. State level travel

data need to be recorded on police crash report structures to permit a full detail of the degree of the issue (Murray, et al. 2003). Insurers need to be urged to concentrate more on fleet safety in their techniques and projects.

Murray, et al. (2003) states vehicles operators are more focused on insurance and repair work and they often overlook other costs which are difficult to measure. However, the measurement of these can make the argument for putting resources into fleet safety considerably more prominent. Contribution of employees at all levels is a key issue in the accomplishment of any program. Executing a proactive and effective fleet security program can regularly increase significantly more media scope than any means of business improvement program. After due consideration of the literature review the following gaps were identified:

- Need of measuring potential cost of managing transportation in-house.
- A cost-benefit analysis considering outsourcing cost and the cost of managing transportation in-house.
- An analysis of vehicle selection considering driver and fleet safety.
- An efficient system for sustainable management of fleets

Thus, a three-fold opportunity has emerged: opportunity to optimize service level, opportunity to optimize back-end within an organization, and the opportunity to optimize cost. In this research same is being explored through empirical analysis.

3. Methodology

According to Kothari (2004) various types of research with their specific characteristics are at Figure 1. In this paper, the research on comparing and selecting which is more effective in-house fleet or contracted 3PL can be defined as a qualitative approach and is empirical, applied and analytical as it involves collecting facts and information and then critically analyzes and evaluates all information. It works towards finding a solution to a problem present in an organization and not just highlighting existing facts. It also involves in-depth interviews and working hypotheses.

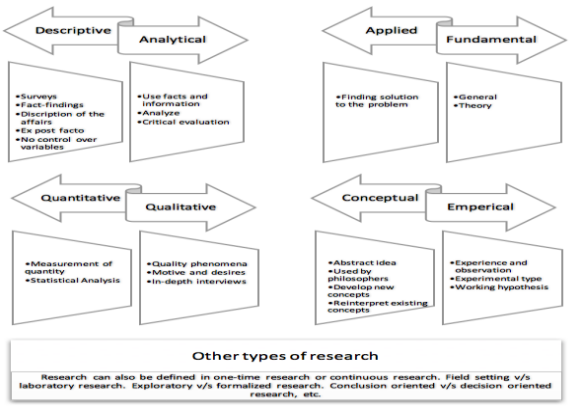


Figure 1 *Interpretations of Research Method by the Authors*

In this research following three questionnaires are developed. This is because there was need of collecting qualitative data for three different reasons and from three entirely different categories of people. Questionnaires included both open-ended as well as closed-ended questions. While open-ended questions made information available the closed-ended questions other hand restricted the answers to the requirement of the research.

The first questionnaire was a group interview. It was administered to company officials who were handling the logistics at the food processing company. This was essential to understand the current logistics requirements and the key problems faced in handling the logistics at the company and to what extent, if any, it can get solved by installing in-house fleet. Purposive sampling method was used for choosing employees for interview as there is requirement of data for analysis and it should be collected properly. Etikan et al., (2016) stated that when there is high importance of collecting data properly purposive sampling method should be used.

The second questionnaire was a one-on-one interview. It was administered to truck drivers in Haryana and Delhi-NCR who were employed on different routes. We successfully interviewed a total of 50 truck drivers. The inferences were helpful in determining best possible routes, miscellaneous in-transit expenses, best truck variant according to their perspective, etc. Being the important work-force of running these fleets the consideration to their comfort was also highly important. According to Dubey and Gunasekaran (2015) all the policy makers and other mangers at an organization needs to remember that truck drivers are equal and to be regarded as most important member in supply chain network. Convenient sampling method was used to conduct one-on-one interviews of truck drivers because of issue of availability and willingness to answer questions. Convenient sampling is best when there is issue of availability of respondents (Etikan, et al. 2016).

The third questionnaire, external to the company, was a one-on-one interview administered to the sales person employed with the top four major truck manufacturing companies in India. The four truck manufacturing companies were Tata, Ashok Leyland, Bharat Benz and Eicher. The assessment was used to gauge the best possible truck variant based on costs, technology, customer service, etc. Purposive sampling method was used in order to conduct one-on-one interviews of sales persons because there is need of specific details in this regard.

As empirical research usually works towards finding a solution to a problem present in an organization, here company's quantitative data was collected. According to Pasek (2012) "Empirical research papers are used to express the results of qualitative as well as quantitative scientific data on real world phenomena". Therefore, there was need of collection of quantitative data also. It was beneficial in giving exact and calculated results. Secondary sources of data as available in the Management Information System (MIS) for last one year, as generated from the company's MIS system were fetched from the company. As indicated by Vittal and Shivraj (2008) these reports provide up to date options that helps decision makers make effective choices.

4. Data Specification

This study concentrates on in-house fleet and contracted 3PL in an attempt to find useful facts and information and critical analysis of perceived value that can be derived which will assist companies in making balanced decision between in-house fleet and contracted 3PL.A total of three different questionnaires were made. Of this, first questionnaire was used for a group interview and remaining others for one-on-one interview. The majority of respondents (83 per cent) were truck drivers.

Table 1 *Primary Data Summary*

Questionnaire - 1		***Questionnaire - 2***		***Questionnaire - 3***	
Number of Respondents	*6*	*Number of Respondents*	*50*	*Number of Respondents*	*4*
Designation	*Supply Chain team*	*Designation*	*Truck Drivers*	*Designation*	*Sales persons*
Sampling technique	*Purposive sampling*	*Sampling technique*	*Convenient sampling*	*Sampling technique*	*Purposive Sampling*
Time interval	*50 Minutes*	*Time interval*	*20 minutes/person*	*Time interval*	*30 minutes/person*

At first cleaning of data was done and then these reports were thoroughly analyzed using MS excel. The outcome of secondary data (MIS reports) were helpful in figuring out actual requirement of logistics in company. Based on total freight value and total volume in metric ton (MT) cities on different surface routes were identified and a base town was set for different cities on different multimodal routes (sample based on 80 – 100 KM of radius as shown in Figure 6 and Figure 7).

The radii may increase or decrease based on the company identified routes. The identified routes, further helped in determining number of trucks required for efficiently handling the overall requirement of logistics of that company. Total trucks that company needs to purchase was calculated as (total number of rounds required for a particular route in a month / rounds a truck can make in a month on that particular route). All these calculations were done using MS excel.

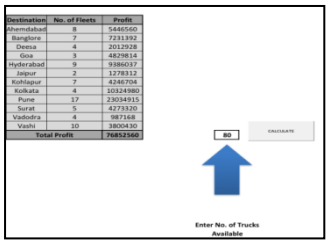


Figure 2 *Number of Vehicles required per Base Town*

A truck allocator calculator was made by using outcome of secondary data of a food processing company. In it by entering number of trucks available the calculator will allocate available trucks to different routes based on company's maximum requirement of a particular route and maximum profit they can possibly generate.

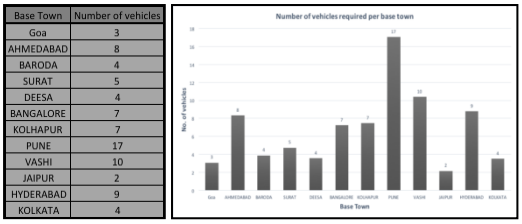


Figure 3 *Truck Allocator Calculator – MS Excel*

4.1 Cost-Benefit Analysis

The cost-benefit analysis was done using MS Excel (2013) where the following was considered:

- Freight which company was paying earlier for outsourcing
- Operating expenses (including in-transit and management)
- Return freight which company would get by fetching other company's goods.

In order to do cost-benefit analysis values of return freight were calculated from freight calculator of one of Indian website namely "truckbhada.com". This calculator was used as it calculates freight keeping in mind purview of Indian scenario. The

expenses and other data was determined with the help of company reports and also truck driver interviews. The yearly increase in number of fleets was assumed based on risk, yearly return on investment and total truck requirements of the company. The projection shows that company by installing in-house fleet can get EBITA of around 4.42 cr. after 1st year and it can reach up to 15.81 cr. In 5 years (as shown in table – 2). Due analysis of the investments, interest on loans and taxes shows that it will break-even in 3 years.

The revenue streams here were calculated as: revenue from 'return integration' minus freight the company was paying earlier for outsourcing. The cost of truck purchased assumed as 25 lakhs and financed at 85% of the value. The tenure of the loan was assumed as 4 years. The interest rate of loan was assumed as 8% per annum.

Table 2 *Projection after Installing in-House Fleet (Values Based on Assumptions & Company Calculated Data)*

(amount in cr.)

	FY 1						
	First 6 Months	Next 6 Months	FY 1	FY 2	FY 3	FY 4	FY 5
No. of Fleets	12	80	80	215	237	260	286
Annual Revenue	3.01	20.09	23.11	62.11	68.32	75.15	82.66
Annual Expense	2.44	16.25	18.69	50.22	55.25	60.77	66.85
EBITA (Annual)	0.58	3.84	4.42	11.88	13.07	14.38	15.81

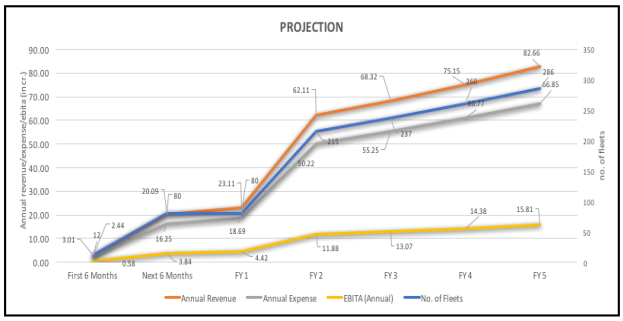


Figure 4 *Five-Year Visual Projections*

(amount in cr.)

	FY 1		FY 1	FY 2	FY 3	FY 4	FY 5
	First 6 Months	Next 6 Months					
No. of Fleets	12	80	80	215	236	260	286
Fleet cost	3.00	8.00	11.00	33.75	5.25	6.00	6.50
Investment	0.45	1.20	1.65	5.06	0.79	0.90	0.98
Annual Revenue	3.01	20.09	23.11	62.11	68.32	75.15	82.66
Annual Expense	2.44	16.25	18.69	50.22	55.25	60.77	66.85
EBITA (Annual)	0.58	3.84	4.42	11.88	13.07	14.38	15.81
Installment	0.42	1.54	1.96	5.28	5.79	6.38	1.82
EBT	0.16	2.30	2.46	6.61	7.28	8.00	13.99
Tax	0.03	0.67	0.72	1.96	2.17	2.38	4.18
PAT	0.13	1.63	1.74	4.64	5.11	5.61	9.81
	-0.32	0.43	0.09	-0.42	4.32	4.71	8.84

Break-even Point

Figure 5 *Break-even Analysis*

5. Results and Discussions

In an organization, there is high need of improving the service level of the company. The inferences from the result shows there is presence of communication gap between the company and 3PL service providers which results in poor control over supplies. After due analysis of the result, it is found that by installing in-house fleet company can increase its service level by efficiently managing its supplies accordingly. But installing an in-house fleet requires investment. After critical analysis of the cost-benefit analysis it is found that installing in-house fleet also brings opportunity to earn extra margin through return integration and have the potential to get higher returns on investments. It can be considered as a 3PL business whose primary and main client will be the company itself. It can be proved as a better alternative to Contracted 3PL if planned and implemented in an efficient manner. By installing in-house fleet company not only be able to increase its service level but also be able to reduce cost and optimize back-end of the company.

By analyzing the interview transcript of group interview of company officials who were handling the logistics at a food processing company following points were gathered; (1) Company for majority of its transport uses services provided by 3PL providers, (2) They have very less or no control over their supplies, (3) Lots of effort and cost is being incurred by them for arranging trucks for their deliveries, (4) They admit that 58 percent of the total delay in service level is due to logistics, (5) Different kind of discrepancies were there in the existing system of the company, (6) They spend annually around INR 36 crores on logistics yet they face delay in service level.

After critical analysis of interview transcripts of drivers working on different routes following points are gathered: (1) Details about the possible costs which incurred in transit on different routes were gathered, (2) Different commodities are recognized which trucks can bring while returning from their destination routes, (3) All this data was helpful in cost benefit analysis and can further be helpful for company in operating its fleets. Also, the analysis of interview transcripts of sales persons of major truck manufacturing companies following points were gathered: (1) Insights about which truck the company should purchase in order to ensure safety of driver and fleet at the same time, (2) Helpful in analysis of different factors like technology, driver safety, cost efficiency, durability, etc.

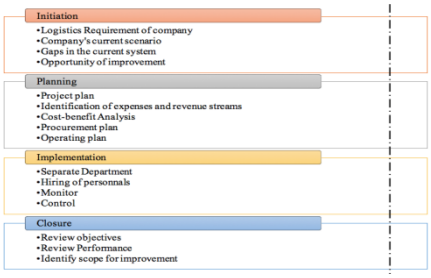
Result shows by successfully implementing this project the company was able to save around INR 36 crores per annum and above that there is possibility of earning a good profit over the years (as shown in figure – 3). According to analysis this company after 5 years shall be able to generate around INR 8.51 crores from this project. As beautifully said by Benjamin Franklin "A penny saved is a penny earned", we can say after 5 years company be able to earn around INR 44.51 crores per annum from this project.

6. Challenges and Suggestions

There are numerous challenges which emerged in installing in-house fleets: (1) There is requirement of sufficient amount of cash-in-hand for running these fleets, (2) There is high risk of accidents and theft, (3) In the practical scenario, there might be chances of driver ran away leaving the fleet behind, (4) Company's focus could be deviated from core business, (5) Need to invest on inventory for on-hands parts, (6) Need of specialized technicians for maintenance.

Based on the above, the following is recommended: (1) GPS can be installed in trucks for regularly monitoring the status and location of trucks, (2) Fast-tag service can be utilized for payment of toll charges. It is a service provided by banks by which payment of tolls automatically deducted from account and truck don't have to wait in queue to pass through tolls. On major tolls, there are separate lanes for these card holders to pass through, (3) Card system can be adopted for payment of miscellaneous expenses in-transit.

6.1 A Viable Road Map



7. Conclusion

We conclude that by comparing the benefits and drawbacks of in-house fleet and contracted 3PL companies can get themselves out of the dilemma of make/buy decision. Companies by analyzing their logistics requirements and cost-benefit analysis can make a balanced decision of whether to go for outsourcing or install its own fleet. By installing its own fleet company be able to manage its supplies more efficiently and likewise improve its service level. The finding shows the drawbacks in company's existing system and scope for improvement. Considering driver and fleet safety services of different truck manufacturing companies were analyzed thoroughly to get sustainable benefit for a long time. Little things need to be looked more closely so as to derive major benefits. To sum up we can say both outsourcing and in-house have benefits as well as drawbacks. Companies can choose between these two by comparing its own internal capabilities and external opportunities.

Major limitations identified include (1) Calculations based on road transportation only, (2) Driver and fleet safety is seen in terms of technology and services provided with fleet by truck manufacturing company only, (3) Driver's opinions were taken just for reference and not for calculations, (4) Confined to domestic territory only, (5) Calculated for outbound logistics only.

The same research experiment can be extended in future to (1) multimodal transportation and (2) to a global supply chain, (3) Inbound logistics and (4) Safety measures can be explored from multiple different factors.

8. Acknowledgement

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10. Appendix

Questionnaire – 1

This questionnaire is designed to conduct focused group interview. It is to be administered to company officials who are handling the logistics at the food processing company. This is essential to understand the current logistics requirements and the key problems faced in handling the logistics at the company.

1. What is the growth perceived in the coming two years? What is the logistics requirement of your Company?
2. How much is the total amount spent on logistics in terms of freight in the past one-years? How much is planned for this year? List factors leading to this increased spends?
3. What multimodal transport best suits your business? How many trucks the company own and on which routes they run? How you arrange trucks for transporting your goods?
4. What portion of the total requirement is arranged from open market and what from 3PL contracts?
5. In the open market what proportion accounts for brokers and what for fleet owners?

6. What percentage of service delay is due to logistics? When and how is the payment of freight made to 3PL service provider?
7. How much money is being spent on brokers for arranging trucks from open market?
8. Does arranging trucks consume a lot of time?
9. How you manage the deliveries which are urgent?
10. What other discrepancies arise in the current system of logistics?

Questionnaire – 2

This questionnaire is designed to conduct one-on-one interview of truck drivers (available through the brokers or 3PLs for transporting company's goods). The purpose of this questionnaire is to understand best possible routes, in-transit miscellaneous expenses, most comfortable truck variant from their perspective and other specific details.

1. Name, age, sex, highest education, license type?
2. Which type of truck you drive? {3 axles, 4 axles or 6 axles}
3. Which Brand you prefer? {Ashok Leyland, Bharat Benz, Eicher or Tata.}
4. What's the average mileage truck gives?
5. Which route is assigned for consignment delivery? {Pune, Bangalore, Surat, etc.}
   Linked questions...with question no. 5:
6. How many years you are driving truck on this route?
7. How much time it takes to reach your destination route?
8. List all expenses incurred in-transit? {List: Tolls, Food, Fuel, etc.}
9. How many tolls are there in between?
10. What are one-way toll charges on this route?
11. How much money you get for one round and what expenses are included in it?
12. What loading and unloading charges (Dala) are there in this area?
13. Who arranges the return order [broker or the fleet owner]?
14. From where you bring goods while returning?
15. Which products are accepted for return journey?

Questionnaire – 3

This questionnaire is designed to collect data from sales persons employed with top four major Truck Manufacturing Companies to gain insights about costs, technology, customer services, etc. of these brands.

1. Name of the authorized sales person, company name, branch office?
2. List the different types of transport carriers (trucks) being sold by your company?
3. Which type of carrier is preferred. List the factors in order of preference for the sales volume (cost, mileage, warranty, service and technology)?
4. What additional customer services your company can provide?
5. What is the Unique Selling Point (USP) of the carriers sold by your company?
6. Is your vehicle future compliance ready?
7. Is your carrier compliance with environment friendly technology? If yes please list
8. Are there any extra variable charges with these technologies?
9. How it is superior from variants of other companies?

Figure 6 *Map with Base Town (Ahmedabad) and Seven Cities within 100 KM Radius*

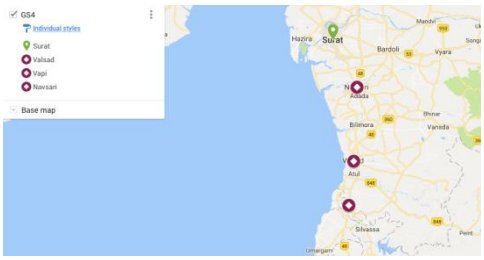

Figure 7 *Map with Base Town (Surat) and three cities within 100 KM radius*