CHAPTER 3

RESEARCH METHODOLOGY

This chapter discusses quantitative method, survey, population, answer frequencies, validity, reliability and non response bias. The chapter ends up with a discussion regarding the classification of respondents by annual revenue and data analysis tool.

3.1 QUANTITATIVE RESEARCH METHODS

According to Neuman (2006), all social researchers collect and analyze the empirical data systematically, and examine the patterns carefully to understand and explain social life.

As per Brannick and Roch (1997) concluded, quantitative methods focus on the links among a number of defined and measurable attributes involving many cases. The aim of the quantitative method is to classify features, count them, and construct statistical models in an attempt to explain what is observed.

Most quantitative researchers often rely on a positivist approach to social science. “Reconstructed logic” is applied and a linear research path is followed. Quantitative researchers emphasize measuring variables precisely and testing hypotheses that are linked to general causal explanations (Neuman 2006).
Collection of data in the quantitative approach includes a collection of close-ended information and this method relies on the instruments employed to gather and analyze data (Punch 2000).

Quantitative approaches stress on objectivity and more “mechanical” techniques. The principles of replication, standardized methodological procedures, measure with numbers, analyzing data with statistics or mathematics, are often utilized (Neuman 2006).

The key concept about quantitative data is quantity, and numbers are used to express quantity. Therefore quantitative data are numerical. They are the information about the world, in the form of numbers from either counting, or scaling, or both. Measurement turns the data into numbers, and its function is to help us make comparisons (Punch 2000).

This thesis aims to have an exploratory study about success of Indian 3PL service provider firms. A quantitative method would be more appropriate for this topic. This thesis point of view is that repeated quantitative study would guarantee greater generalization within the frame of research. It is believed that the generalization is needed for a broader understanding of the subject.

3.2 POPULATION

The firms are chosen strategically to investigate in this study. The mailing list was obtained from the logistics service providers directory 2008 published by CII Institute of logistics (Logistics Service Providers Directory 2008). List of 343 service providers was prepared from the directory and each of them is sent a questionnaire along with a covering letter, addressed to the CEO, and a self-addressed envelope. Two to three weeks after sending out the questionnaire, e-mail reminders are sent along with the covering letter and the questionnaire as
attachments. Some of the service providers informed that they would not participate in the survey and some of the letters dispatched could not be delivered and returned to the source citing change of address or unknown recipient, leaving the effective number of supposedly delivered mails to 283.

3.3 SURVEY

After deciding the research method of quantitative method, the next step is to choose the type of data collection method. Surveys can be performed in different ways. In order to obtain the effective data, this thesis would choose the mail questionnaire to collect quantitative data.

The mail questionnaire allows for greater flexibility towards the respondents. It allows them to think about and answer the questions in a certain period of time. The mail questionnaire will also be able to cover a greater geographical area. Other advantages include rapid and secured data collection along with the exclusion of the possibility for respondent coaching (Cooper and Schindler, 2003).

3.3.1 Survey instrument

In this chapter the main research issues will be transformed into specific questions for the purpose of conducting the survey. With reference to the previous literature studies, the overall research issue is to study the success of Indian 3PL service provider firms. This general issue will be broken down into small sets of more specific research issues that will generate specific questions.

By comparing other previous studies carried out in other countries as mentioned in the part of literature review, and thorough consideration, the thesis will build the research issues regarding the success of 3PL service provider firms as following:
• General information
• Diversification
• Market performance
• Operational resources
• Key success factors
• Performance metrics
• Growth strategies
• Information systems

3.3.2 Survey design

The first part of the survey is the general information about the respondents which includes ‘name of the company’. To make the survey questionnaire precisely simple and short, most questions are designed with selection from available choices, i.e., questions are excluded which require long time for respondents to think about and write down their own answers.

The questionnaire had eight sections. The questions that were asked in each section are given below.

3.3.2.1 General information

The respondent was asked to give the contact information. In addition, the respondent was asked to mention the year of starting 3PL service provider operations to see how old it was in the business of 3PL.
3.3.2.2 Diversification

The respondent was also asked to mention geographic coverage of the company around the world. This was to assess the extent of global reach of the respondent. Respondents belonging to the four regions of India such as North, South, East and West were asked to tick the regions that they covered. The number of states covered and the number of branches and offices that the respondent had were also asked for in order to ascertain the reach of the respondent. A whole range of services starting from inventory management, freight forwarding and customs clearance to order processing, distribution, reverse logistics carrier selection, contract manufacturing, rate negotiation, freight payment, fleet management, order fulfillment, vendor management, packing and labeling, after sales support, payment collection, assembly and installation, trade finance, cargo insurance, and consulting services, order management, customer support and freight consolidation were listed, and the respondent was asked to tick the services that it offered. The objective was to assess the breadth of service offerings of the respondent.

3.3.2.3 Market performance

The respondent was asked to list the 3PL turnovers and Sales growth for the last 5 financial years, from 2004-2005 to 2007-2008. The objective was to assess the 3PL turnover growth rate and the trend in the 3PL sales growth as a percentage of the total sales growth over the last 4 years.

3.3.2.4 Operational Resources

The respondent was asked to mention the number of employees in Indian 3PL service provider firms. The objective was to assess its size in terms of staff strength. The respondent was required to list the different types, numbers and total
capacities (in tons) of vehicles and material handling equipment that it owned. The number of warehouses/godowns and the total capacity (in square feet.) were also required to be listed. The respondent was also asked to mention the volumes of cargo handled (in tons) in the last 4 years to assess the growth of cargo volume.

3.3.2.5 Growth strategies

Four factors were identified as the possible growth strategies of Indian 3PL service provider firms, namely direct investment, acquisitions, mergers and alliance. These factors were listed and the respondent was asked to assign a score, on a scale of 1-5, to each of these factors where ‘1’ indicated very low importance and ‘5’ indicated very high importance. Also, space was provided for the respondent to mention any other factor(s), which, it felt, was (were) important.

3.3.2.6 Key success factors

Ten factors were found as the possible key success factors of Indian 3PL service provider firms, namely breadth of service, offering internationalization of operations, focus on key customer accounts, focus on specific industries, length and depth of 3PL relationships, experience as a 3PL service provider, investment in quality assets, investment in information systems, skilled logistics professionals, selling integrated supply chain solutions to clients, vendors and customers. These factors were listed and the respondent was asked to assign a score, on a scale of 1-5, to each of these factors where ‘1’ indicated very low importance and ‘5’ indicated very high importance. Also, space was provided for the respondent to mention any other factor(s), which, it felt, was (were) important.
3.3.2.7 Performance metrics

Nine factors were established as the possible performance metrics of Indian 3PL service provider firms, namely year-on-year growth in revenues, year-on-year growth in profits, year-on-year growth in cargo handled, return on investments, return on assets, reducing inventory levels, on time delivery performance, customer satisfaction level, acquiring new customers. These factors were listed and the respondent was asked to assign a score, on a scale of 1-5, to each of these factors where ‘1’ indicated very low importance and ‘5’ indicated very high importance. Also, space was provided for the respondent to mention any other factor(s), which, it felt, was (were) important.

3.3.2.8 Information systems

The respondent was asked to tick the Information Technologies that was used by them such as Bar coding, Electronic Data Interchange (EDI), Mobile Communications, Satellite-based tracking system, Geographic Information System (GIS) and Global Positioning System (GPS). The respondent was asked to mention the percentage of operations computerized. The respondent was also asked to mention the investments in information systems as percentage of total investments in the last 4 years.

3.4 ANSWERING FREQUENCIES

A sampling frame of 283 3PL service provider firms was selected from the directory. A questionnaire was mailed to the CEO of each firm. Over a period of two months after sending out the first batch of mails, 98 filled-out questionnaires were received. Of the 98 total questionnaires returned, three were eliminated because of missing data. The final analysis was performed with respect to the
remaining 95 surveys, resulting in an effective response rate of 33.6 percent. This response rate is consistent with prior studies conducted on 3PL services in North America, Europe, Australia and Singapore (Lieb and Randall 1996, 1999, Lieb and Kendrick, 2003; Bagchi and Mitra, 2008). The response rate was much better than what was already reported with respect to Asia Pacific countries - 12.6% in Australia, 16.8% in Singapore and 26% in India (Sahay and Mohan 2006).

3.5 VALIDITY AND RELIABILITY

Validity refers to the extent to which a test measures what is actually to be measured (Cooper and Schindler 2003), that is, more specifically, whether the measured data actually measures what it is intended to measure in order to answer the purpose of this thesis.

According to Thietart (2001), the main concerns with the validity are whether the measured data is relevant and precise, and the second is the extent to which this thesis can generalize from those results.

In this thesis, it generally leads to the question of whether the questionnaire has measured the right variables compared to the purpose and were these questions asked in a satisfactory manner.

Firstly, this research is purely a quantitative study which is based on specific designated questionnaire. All the questions are served to answer the main purpose in this thesis. Secondly, as described in this methodology, all the steps this thesis carried out for the data collection are proper and reasonable. The fulfilled response rate aligned with the other studies proves a satisfactory response rate.
According to Dyer and Wilkins (1991) validity are in general always debatable. Even certain precautions exist to reduce possible errors and biases, the question of validity remains. This thesis has a good understanding of this problem. Therefore this thesis is trying to minimize such errors and biases by appropriate conducting methods and achieve qualified data analysis. The research is an exploratory study rather than a deep qualitative analysis. This thesis makes sure that the observations based on the well designed questionnaire and proper steps of questionnaire design in terms of both design and pilot study, will be on the right direction and appropriate. This thesis has limited all the data collected from the survey and has used only the data that are pertained to the purpose of this thesis.

Reliability means ‘dependability or consistency’. It suggests that the same result can be achieved under the identical or very similar conditions (Neuman 2006). In a quantitative research, reliability normally refers to measurement reliability, which means that the numerical results produced by an indicator do not vary because of the characteristics of the measurement process or measurement instrument itself.

How to approach and perform the actual data collection is also a source of the reliability of the respondents. It is essential that the right individual at the responding organization is found. In this study, all the respondents are the logistics managers/CEOs, who were contacted by phone prior to sending the survey. This was a measure to ensure that the right type of individual in the companies was responsible for the response. The respondents were also promised confidentiality by the researcher. The collected data, in many cases containing sensitive company specific information, is not accessible to any person other than the research team. Further, the respondent companies are not named. The promised confidentiality made the respondents to give information in sensitive questions without fear of losing information. It is believed to have increased the response rate as well as the quality of
the answers. To summarize the short discussion on the validity and reliability of this thesis, several measures have been taken to make proper use of the method.

3.6 NON-RESPONSE BIAS

Non-response bias was assessed by examining the differences in mean scores of certain items between firms that responded to the survey and firms that did not. For lack of comparable statistics from non-responding firms, t-tests were used to test response bias between early and late wave returned surveys, late wave respondents being treated as a proxy for non-respondents (Armstrong and Overton 1977). In this study, 73 usable responses were received in the early mailing wave and 22 in the late wave. The mean differences between the two groups with respect to the annual revenue, cargo handled by the firms, age of the firms and number of employees were tested using an unpaired t-test. No significant differences were observed at the 0.05 level, indicating no systematic bias between the two groups. These analyses indicate that the study has no major non-response bias problems, and the final sample of 95 firms can be considered as the representative of the population.

3.7 CLASSIFICATION OF RESPONDENTS IN TERMS OF ANNUAL REVENUE

Surveys offer useful information about the overall trends in Indian 3PL service provider industry. They were unable to point out the differences in terms of industry dynamics among firms of different annual revenues. Two models of inter-firm analysis group 3PL service provider firms in two clusters were based on total revenue as shown in Figure 3.1. Cluster 1 consists of smaller 3PL service provider firms whose revenues are lesser than 200 million INR and cluster 2 has medium and large 3PL service provider firms whose revenues are more than 200 million INR.
Figure 3.1 Classification of respondents in terms of annual revenue

3.8 DATA ANALYSIS TOOLS

The statistics program SPSS (Statistical Package for the Social Sciences) is used for data analysis. It is one of the most widely used programs for statistical analysis in social sciences. In multiple linear regressions, one dependent variable is taken at a time, and its relationship with the independent variables is observed. Hence, different independent variables may turn out to be important for different dependent variables, and one independent variable may bear positive and negative relationships with two dependent variables. This analysis has been carried out in first model of inter-firm analysis and intra-firm analysis. Canonical correlation analysis has been employed to study the multiple dependent variables with respect to multiple independent variables. The main advantage of this analysis is to find out the simultaneous effect of all these variables. This analysis is carried out in second model of inter-firm analysis. Data envelopment analysis is used to classify the firms into efficient firms and inefficient firms based on input-output transformation. This analysis is carried out in intra-firm analysis.
The next chapter of this thesis maps key success factors with financial and operational performance metrics of Indian 3PL service provider firms under inter firm analysis. 3PL service provider firms are classified into small firms (51 firms) and medium and large firms (44 firms) in terms of total annual revenue. Multiple regression analysis is performed under two categories to map financial performance metrics with key success factors and operational performance metrics with key success factors.