CHAPTER 3

RESEARCH METHODOLOGY

Every organization wants to be competitive and sustainable. Being a part of the supply chain, there is a need to enhance the efficiency and responsiveness of all the partners of supply chain to achieve the goal. Relationship with suppliers, providing strategic or critical component, is relevant as it aids in making the supply chain faster, flexible and reliable. But building relationships is one of the most difficult aspects of supply chain management (Johnson et al., 2004) and there is a need for clear understanding of BSR dynamics to the organization (Chenoweth et al., 2012). Therefore, this study aims at examining the aspects of relationship existing between the buyer and the key-input supplier. It was recognized while reviewing the available literature that there is a need to penetrate below the surface of large surveys to identify the specific aspects of BSR and at the same time generalizing the concept with maximum possible involvement of organizations from different sectors. In this chapter, the need for the study and the specific objectives have been presented. A thorough description of the sources of data and the methodology adopted to analyze the data have also been made.

3.1 NEED FOR THE STUDY

BSR is the ‘corporate advantage’ (Gattorna and Walters, 1996) as it becomes an asset to the organization. Supply chain executives are coping with a wide range of challenges like profitability, cost reduction, supply chain flexibility and meeting customer needs (Global Supply Chain Survey, 2013). Integrating with key suppliers is one of the initiatives which many organizations are taking to cope with these
challenges. For integration, there is a need to have relationship orientation with these key suppliers. In case of Indian organizations, the main focus is on reducing the logistics cost (Sahay and Mohan, 2006) which results from a lack of trust and sincerity (Thakkar et al., 2009). For resolving the issues of logistics, many Indian organizations have started deploying supply chain strategies for logistics improvements (Sahay and Mohan, 2003). Coordinating business functions horizontally across the supply chain (Aqua MCG, 2009) to reduce the costs have been identified as a significant stride. Although the issue of buyer-supplier relationships is considered important, only a few studies have been reported on this issue in developing countries as compared to developed nations. Also there is a lack of empirical research addressing the comprehensive archetypal representation of BSR.

Therefore, this study is an attempt to provide a link to this research gap (identifying the type of relationship specifically and providing comprehensive model) which may contribute to the current knowledge of relationship orientation practiced by the organizations.

3.2 OBJECTIVES OF THE STUDY

With this backdrop in mind, the present study has been undertaken to add to the existing literature and to explore the relationship between the buyer and the key input supplier with the following objectives:

i. To find the type of relationship existing between the buyer and the key input supplier.

ii. To explore the factors of relationship between the buyer and the key input supplier.

iii. To study the criteria used in supplier selection and evaluation.
iv. To propose a model for BSR.

3.3 SAMPLING

The convenience sampling technique has been used to collect the data from targeted one hundred fifty organizations. More specifically, a form of non-probability sampling, namely reliance on approachable organizations, was used. This technique to collect the data has been chosen because of the paucity of resources, in terms of time and money, and also the rigidity of organizations in providing the required data. The questionnaire constructed is more like a schedule of enquiry which required face to face interaction with the data unit. Also for collecting the critical incidents for identifying the type of relationship, interviews have been conducted for which the data have been collected from the available ready to respond organizations.

The data were collected from one hundred fifty organizations as recommended by Hutcheson and Sofroniou (1999) for rule of 150, i.e. at least 150 cases for the study to be taken and rule of 10 recommended by Velicer and Fava (1998) and Nunnally (1978) in which 10 cases per variable need to be taken.

Out of one fifty organizations, twenty seven belonged to chemical and pharmaceutical industry, twenty two to food processing industry, twenty belonged to metal industry, thirty one to textile, thirty four to service industry and sixteen from diverse industries (miscellaneous category). These organizations are located in Jammu and Ludhiana regions of India.

The level of analysis of this study is BSR. According to the research objectives and feasibility, it was chosen to seek data from the buyer’s view-point. The head of the purchasing department of each sample unit was the target respondent because of his
knowledge of the practices actually being used. As purchasing managers are responsible for procuring from suppliers so they should be conversant about the materials they buy and the relationships they have with suppliers (Hutt and Speh, 2000). Accordingly, the study employed a survey data to be collected from purchasing managers responsible for managing relationship with supplier. The survey asked respondents to focus on a key-input supplier of a critical component or material used in the production of its main product/service line. Although the unit of analysis in each case was the buyer, the data focused on the buyer’s relationship with a supplier of the critical component. Here, critical (Handfield and Bechtel, 2002) refers to components that contribute the greatest value-added to the product or to components that have the largest delivery cycle time if inventory falls to zero. The survey also specified that the components should be frequently ordered items as opposed to infrequently ordered items. In all cases, respondents were able to identify such a component or input and thus could provide information from the perspective of key-input supplier.

3.4 MEASUREMENT

A primary study was performed with manufacturing and service firms in the context of BSR. In order to address the key issues identified, a three stage methodology was developed:

i. Pilot interviews

ii. Questionnaire

iii. Semi-structured interviews.

The pilot interviews were conducted with ten buyers and sought to provide a workable framework for the research and to provide feedback on the draft
questionnaire. Improvements and feedback about the pilot questionnaire were incorporated into the instructions and final version of the questionnaire. The final questionnaire was prepared containing eighty nine items.

A total of one fifty questionnaires were issued to buyer respondents who were requested to provide feedback on their relationship with key input supplier. Semi-structured interviews were held to collect the list of positive and negative incidents recalled by the buyer in relation to the act or behavior of key input supplier.

The aspects of BSR enquired in the questionnaire are as follows:

i. **Trust**: This scale comprises of five items to probe the buyer’s trust on the key input supplier. The items have been measured on five point Likert scale ranging from not at all to a great extent.

ii. **Long Term Orientation**: Twelve items are included in this scale to scrutinize the level of importance as perceived by the buyer for creating the foundation for long term relationship with key input supplier. The items have been measured on five point Likert scale ranging from most important to most unimportant.

iii. **Supplier Development**: This scale comprises of ten items to seek the extent of using the practices by the buyer for developing the key input supplier. The items have been measured on five point Likert scale ranging from high degree to low degree.

iv. **Cooperation and Coordination**: Ten items have been included in this scale to measure the perception of buyer towards the key input supplier’s cooperating and coordinating acts. The items have been measured on five point Likert scale ranging from strongly agree to strongly disagree.
v. **Information Sharing**: Eight items are included in this scale to ascertain the involvement of buyer in sharing the information with key input supplier. The items have been measured on five point Likert scale ranging from never to always.

vi. **Governance Mechanisms**: Eight items are included in this scale to seek the extent of mechanisms used by the buyer for governing the relationship with key input supplier. The items have been measured on five point Likert scale ranging from high degree to low degree.

vii. **Benefits Reaped**: Investing in relationship with the key input supplier has led to certain benefits to the buyer organization. This has been probed by encompassing fourteen items on five point Likert scale ranging from strongly agree to strongly disagree.

viii. **Supplier Selection Criteria**: Thirteen supplier selection criteria have been asked to be ranked by the respondents. Along with ranking, these criteria have also been measured on five point percentage scale to ascertain the actual involvement of these criteria while selecting or evaluating the suppliers. Along with these scales, a question was asked to find the years of association between the buyer and the key input supplier. The brief demographic details of the respondent were also asked to ascertain the level of suitability for providing the information asked.

### 3.5 DATA ANALYSIS TOOLS

The study has used various econometric and statistics tools to attain the results with the provision of SPSS version 15.0 and AMOS version 21. The methods used for the analysis of the data are discussed below.
3.5.1 CRITICAL INCIDENT TECHNIQUE

The Critical Incident Technique (CIT) has been used to find out the type of relationship existing between the buyer and key-input supplier. CIT was first devised and used by Flanagan (1954). The validity and reliability of this technique has been shown by Ronan and Latham (1974).

CIT is an encounter based measurement method which has the advantage of both qualitative and quantitative features. Those specific events (which have actually happened) are identified with the use of this technique, which make an encounter either positive or negative. These events or encounters are the critical incidents which are brief descriptions reported by the respondents. This technique allows a holistic approach to collecting data that are very context dependent.

As advocated by Flanagan, the following steps have been followed while using this technique:

a. Determining the general aim of identifying the type of BSR.

b. Developing specifications for collecting the incidents by considering the procurement executive as the respondent.

c. Collecting the data by interviewing the targeted respondent.

d. Analyzing objectively by classifying the reported incidents.

e. Interpreting the classified incidents into positive or negative for further interpretation.

CIT is a well-established methodology (Sweeney and Lapp, 2004) used by many researchers (Lockshin and Mcdougall, 1998; Backhaus and Bauer, 2000; Friman and Edvardsson, 2003; Zhang et al. 2010). Gremler (2004) analysed one hundred forty
one research papers which have used this technique and judged it as popular research method which provides a rich source of data by allowing respondents to determine which incidents are the most relevant to them for the relationship being probed.

This technique has been used because of its inductive nature and flexibility. The information obtained directly has also helped, in recording and understanding clearly and holistically the set of cognitive and emotional perceptions of the buyer for the supplier. To measure the buyers’ perspective of relationship quality with their meaningful transaction partners, the approach used in the work of Fynes et al. (2005) was adopted, where respondents were asked to reply to questions with respect to the relationship they were having with the key-input supplier.

3.5.2 RELIABILITY TEST

Cronbach Alpha, the coefficient of reliability (or consistency) was considered to check the reliability of the questionnaire. It is a measure of internal consistency, that is, how closely related a set of items are as a group. A high value of alpha is often used as evidence that the items measure an underlying (or latent) construct.

Cronbach Alpha can be written as a function of the number of test items and the average inter-correlation among the items. The formula used to calculate the reliability coefficient is as follows:

\[
\alpha = \frac{N}{N-1} \times \frac{(Total\ Variance - \sum Individual\ Variance)}{Total\ Variance}
\]

Individual Variance for an Individual question and candidate is calculated:

\[
\text{Variance} = \text{Square} (\text{Score} - \text{Average})
\]

Total Variance for all questions and candidate is calculated:
Total Variance = Square (Score – Average) for the total group values

Alpha = \( \frac{N}{N-1} \times \frac{(\text{Total Variance} - \text{Sum of Variance for Each Question})}{\text{Total Variance}} \)

If the average inter-item correlation is low, Alpha will be low. As the average inter-item correlation increases, Cronbach Alpha increases as well (holding the number of items constant).

Cronbach Alpha values of all the scales used for the study were above 0.6, showing their significance in defining the theoretical construct.

3.5.3 KAISER-MEYER-OLKIN (KMO) TEST

The Kaiser-Meyer-Olkin measure of sampling adequacy tests whether the partial correlations among variables are small. This measure of sampling adequacy is an index for comparing the magnitudes of the observed correlation coefficients to the magnitudes of the partial correlation coefficients.

3.5.4 BARTLETT’S TEST

Bartlett’s test of sphericity checks whether the correlation matrix is an identity matrix, which would indicate that the factor model is inappropriate. Bartlett’s test of sphericity is used to test the null hypothesis that the variables in the population correlation matrix are uncorrelated. It is a test statistic used to examine the hypothesis that the variables are uncorrelated in the population. In other words, the population correlation matrix is an identity matrix; each variable correlates perfectly with itself \( r = 1 \) but has no correlation with the other variables \( r = 0 \).
3.5.5 KRUSKAL-WALLIS TEST

The Kruskal-Wallis test is a nonparametric test used to compare three or more samples. It is used to test the null hypothesis that all populations have identical distribution functions against the alternative hypothesis that at least two of the samples differ only with respect to location (median), if at all. The test statistic is given by:

\[ K = 12 \frac{\sum R_i^2 / n_i}{N(N+1) - 3(N+1)} \]

It follows the chi-square distribution with \( S-1 \) degrees of freedom, where

- \( S = \) total number of samples
- \( N = \) total number of observations across all samples
- \( R_i = \) sum of ranks for \( i \)th sample
- \( n_i = \) size of the \( i \)th sample

3.5.6 FACTOR ANALYSIS

Factor analysis is a means by which the regularity and order in phenomena can be distinguished. It is a method for investigating whether a number of variables of interest are linearly related to a smaller number of unobservable factors. Mathematically, each factor extracted can be represented as:

\[ Y_i = b_1 X_1 + b_2 X_2 + \ldots + b_n X_n + \epsilon_i \]

i.e.

Factor \( i = b_1 \) \text{Variable}_1 + b_2 \text{Variable}_2 + \ldots + b_n \text{Variable}_n + \epsilon_i

where \( bs \) represent factor loadings.
3.5.7 REGRESSION

The general purpose of multiple regression is to learn more about the relationship between several independent or predictor variables and a dependent or criterion variable. Regression analysis helps to understand how the typical value of the dependent variable changes when any one of the independent variables is varied, while the other independent variables are held fixed. It is presented as follows:

\[ Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \ldots + u \]

Where,

- \( Y \) = value of the Dependent variable (Y), what is being predicted or explained
- \( a \) (Alpha) = the Constant or intercept
- \( b \) = Slope (Beta coefficient) for X
- \( X \) = independent variable that is explaining the variance in Y
- \( U \) = unobserved error term

3.5.8 PATH ANALYSIS

Structural equation models decompose the empirical correlation or covariance among the variables to estimate the path coefficients. It allows examining simultaneous linkages. Specifically, path analysis, which is Structural Equation Modeling (SEM) with a structural model, has been used to describe the directed dependencies among a set of variables. Path analysis was developed as a method of decomposing correlations into different pieces for interpretation of effects
Path analysis is theoretically useful because it specifies relationships among all of the independent variables. This results in a model showing causal mechanisms through which independent variables produce both direct and indirect effects on a dependent variable. A causal relationship is directional in character, and occurs when one variable causes changes in another variable.