CHAPTER 3

RESEARCH METHODOLOGY

3.1. Introduction

Three research gaps were identified through extensive review of relevant areas of research study. The present research sought to address these three research gaps. The first research gap: Research studies covered did not have focus on micro level logistics issues and challenges related to apparel exports. Besides, the studies did not discuss micro level issues and challenges that affect delivery lead time of apparel exports. The second research gap: Research studies (both apparel and non-apparel sector) did not focus on research related to logistics issues and challenges and its effect on lead time of export business. Research studies had not focus on identification of severity level of logistics issues and challenges and their effect on delivery lead time of export business. The third research gap: Research studies did not measure delay lag and cost implications arising due to logistics related issues and challenges in apparel exports.

The research gap identification was followed by framing the research objectives, approach, scope, development of broad research framework and hypotheses. Therefore the objectives of this chapter is to specify research questions, discuss the adopted research approach, research objectives and form a conceptual model for the study and state hypotheses. The purpose of this chapter is to also explain the research structure and flow. Section 3.2 explains the research questions and Section 3.3 discusses the research objectives. Sections 3.4 outlines the research approach adopted in this study. Section 3.5 highlights the scope of the study. Section 3.6 explains the conceptual model and research hypotheses. Research structure and flow is explained in section 3.7.

3.2. Research questions

In the view of found research gaps as explained in Section 3.1, absence of studies focussing on micro level issues and challenges of outbound logistics activities of apparel exports and quantification of their severity along with the study of delay lag
and cost implications due to delay resulting from challenges gave the below research questions,

Research Question 1: Which are the key issues and challenges that significantly affect outbound logistics activities having effect on delivery lead time of apparel exports?

Research Question 2: What is the impact of key issues and challenges of outbound logistics activities on delay in delivery of apparel shipments and its cost implications to apparel exporters?

3.3. Research objectives

The objective of the research was to study the outbound logistics activities of apparel export process and focus on the following contextual issues;

Research Objective I: Identification of key issues and challenges in context of international outbound logistics of apparel exports that affect delivery lead time.

Research Objective II: Measurement of severity level of key issues and challenges in outbound logistics activities that affect delivery lead time of apparel exports.

Research Objective III: Measurement of delay lag in apparel shipments and cost implications to apparel exporters due to issues and challenges involved in outbound logistics activities that affect delivery lead time of apparel exports.

3.4. Research approach

Research approaches are plans and the procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation (Creswell, 2013). Creswell has suggested three research approaches: qualitative, quantitative and mixed method. Quantitative research is an approach for testing objective theories by examining the relationship among variables. These variables can be measure through various instruments/scales and numbered data can
be analysed by suitable statistical tools. The stated research objectives clearly indicated towards identification and measurement of variables and hence the quantitative research approach was adopted.

The selection of the research approach is dependent on the research problem and is linked with
- Philosophical assumptions under the study
- Research design (procedures of inquiry)
- Research methods (data collection, analysis, and interpretation)

The following subsections of this chapter explains the above three:

3.4.1. Philosophical assumptions under the study

There are five factors which influence conduct of business research (Bryman and Bell, 2007) as illustrated in Figure 3.1 below:

**Figure 3.1: Factors having influence on business research**

Source: Business Research Methods, Bryman and Bell, 2014
The present research was based on deductive theory and the principle of deductivism under epistemological consideration of positivism. The present study sought to deduce hypotheses basis theoretical considerations in domain of logistics activities of apparel exports and to empirically test the same. The ontological position of the present research was objectivism as it sought to bring out the specific logistics hindrances affecting lead time of apparel exports. Influence of values signifies the bias due to personal beliefs of the researcher which was avoided in the present research. Practical considerations covers the selection of research design and methods which are explained in the below subsections for the present research.

3.4.2. Research design

The chosen research designs for the study were both exploratory and conclusive. The exploratory research design was chosen at pilot study stage to gain additional insights and to identify relevant courses of action (Malhotra and Dash, 2011). The research approach adopted for the pilot study was mixed approach as both qualitative and quantitative type of information were required (Creswell, 2014).

The conclusive design was adopted to test formulated hypotheses under the study. Information needed was clearly defined and the research process was formal and structured. Survey method has been used to collect the data through large and representative sample. Quantitative data analysis was used for the data collected. The findings were conclusive and they were used as input for recommendations. Under conclusive research design the research followed descriptive type of design as the research findings aimed to describe the characteristics of the selected variables and also study association amongst different variables. Under descriptive design cross sectional study design has been adopted as the collection of information from any given sample of population elements only happened once. The research followed multiple cross sectional design as there multiple sample frames and profiles were used (Malhotra and Dash, 2011).

Figure 3.2 summarizes the research design adopted for the study.
3.5 Scope of research

Scope represents the breadth and depth of research topic coverage (Cooper and Schindler, 2006). The scope of research work is the area selected where the work is undertaken. Following subsections explains the various considerations under the scope of present study.

3.5.1. Coverage of international outbound logistics activities

The research scope of the study covered all international outbound logistics activities of apparel exports from ex-factory till ex-country node i.e. from the departure of cargo from factory premises till the cargo leaves the gateway seaport of country of origin.
The present research study covered the apparel export shipments negotiated on FOB incoterm. The free on board (FOB) is an international commercial term (Incoterm)\(^1\). "Free on Board" means that the seller requires to clear the goods for export. The seller fulfils his obligation to deliver when the goods pass over the ship's rail at the named port of shipment. Post the shipment is on board, the buyer bears all costs and risks of loss of or damage to the goods. The FOB term is used only for sea mode or inland waterway mode.

The main obligations of seller are - providing goods in conformity with the contract, obtaining export licence or other official authorisation, carrying out all customs formalities necessary for the exportation of the goods, delivering the goods on board the vessel named by the buyer at the named port of shipment on the date or within the period stipulated and in the manner customary at the port, bearing all risks of loss of or damage to the goods until such time as they have passed the ship's rail at the named port of shipment, paying all costs relating to the goods until such time as they have passed the ship's rail at the named port of shipment; giving sufficient notice to the buyer that the goods have been delivered on board along with necessary export documentation, paying the charges of checking, packaging and marking, etc.\(^2\)

Besides free on board, there are other incoterm\(s\) available basis which export pricing is negotiated. Incoterm\(s\) are used for all kinds of products on which international trade takes place. Appendix VI provides information of all incoterm\(s\).

Figure 3.2 depicts the scope of research in terms of ex-factory till gateway port and selection of FOB sea mode.

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\(^1\) The Incoterms® rules are an internationally recognized standard and are used worldwide in international and domestic contracts for the sale of goods. [http://www.iccwb.org/products-and-services/trade-facilitation/incoterms-2010/](http://www.iccwb.org/products-and-services/trade-facilitation/incoterms-2010/), accessed on 06/08/2014, 10.10 am.

\(^2\) [http://www.worldclassshipping.com/incoterm_fob.html](http://www.worldclassshipping.com/incoterm_fob.html), accessed on 06/08/2014, 10.30 am.
3.5.2. Geographical research area coverage

The study aimed to focus the research on Indian apparel exports and therefore Indian apparel clusters were considered for the study. AEPC (Apparel Export Promotion Council), India published AEPC cluster study on apparel cluster in 2010. As per the study there are 19 apparel clusters in the country and they account of 95 percent of apparel production. Out of these 19 clusters, 12 clusters account for 89 percent of the turnover (both domestic and exports). Rest 7 clusters were termed as smaller apparel clusters. The turnover figures were calculated in Indian National Rupees (INR) value in crores. Table 3.1 showcases the exports turnover data of 12 apparel clusters.

The study only covered the landlocked apparel clusters of India as the logistical challenges of landlocked regions are different from that of coastal regions due to their distance difference from the sea port and differences in transport modes (Arvis et al, 2007; Horst & Langen, 2010; Arvis et al, 2010).
Kolkata, Chennai and Mumbai clusters are situated at coastal regions and also have seaports in the area. Therefore these three clusters were not considered for the study. Indore and Bellary clusters are the small doing only 0.299 percent of the turnover of mentioned for total 12 clusters. Therefore Indore and Bellary clusters were not considered.

Table 3.1: Annual Exports Turnover of Indian Apparel Clusters

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>India’s Major Apparel Cluster</th>
<th>Annual Exports Turnover (in INR Crores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tirupur</td>
<td>9950</td>
</tr>
<tr>
<td>2</td>
<td>Kolkata</td>
<td>1000</td>
</tr>
<tr>
<td>3</td>
<td>Ludhiana</td>
<td>1400</td>
</tr>
<tr>
<td>4</td>
<td>Gurgaon</td>
<td>4250</td>
</tr>
<tr>
<td>5</td>
<td>Bangalore</td>
<td>4000</td>
</tr>
<tr>
<td>6</td>
<td>Noida</td>
<td>3500</td>
</tr>
<tr>
<td>7</td>
<td>Chennai</td>
<td>2000</td>
</tr>
<tr>
<td>8</td>
<td>Mumbai</td>
<td>840</td>
</tr>
<tr>
<td>9</td>
<td>Indore</td>
<td>60</td>
</tr>
<tr>
<td>10</td>
<td>Okhla</td>
<td>680</td>
</tr>
<tr>
<td>11</td>
<td>Jaipur</td>
<td>650</td>
</tr>
<tr>
<td>12</td>
<td>Bellary</td>
<td>25</td>
</tr>
</tbody>
</table>

Source: AEPC cluster study, 2010

The seven clusters, Tirupur, Ludhiana, Gurgaon, Bangalore, Noida, Okhla and Jaipur were selected for the study. Gurgaon, Noida and Okhla areas come under National Capital Region (NCR) and hence were taken under Delhi NCR cluster. Ludhiana, Jaipur and Delhi NCR clusters are situated in the northern part of the country and hence taken under North India Cluster. Tirupur and Bangalore clusters
were considered under South India Cluster. The geographical locations of the selected apparel clusters are depicted in Figure 3.3.

Figure 3.3: Selected apparel clusters under study

Source: Background figure source: mapsofindia.com
3.6. Conceptual framework and Research hypotheses

A conceptual framework is the underlying structure of a study (Merriam, 2009). One of the sources basis which conceptual framework may be drawn is literature covered for the study (Maxwell, 2005). The framework can be either in graphical or narrative form and "rudimentary or elaborate, theory driven or commonsensical, descriptive or causal", and will evolve or emerge during the field research (Miles and Huberman, 1994). Hypothesis is a formulated statement about observable phenomena (concepts) that many be judged empirical testing (Cooper and Schindler, 2006).

From the literature review, it was observed that lead time is one of the most critical success factors in sourcing fashion apparel products (Froza and Vinelli, 2000; Christopher and Towill, 2002; Mattila et al., 2002; Jacobs, 2006; Caro, 2008; Kam et al, 2011; Yi et al, 2011). The delivery date of apparel export shipments are often not met due to issues and challenges involved in logistics activities (Chandra and Kumar, 2000; Subramaniam and Arnold, 2001; Zubaidi and Tyler 2004; Kumar and Arbi, 2008; Moon and Ngai, 2008; Pfohl and Shen, 2008; Azevedo and Ferreira, 2009; Nuruzzaman and Haque, 2009; Ahsan and Azeem, 2010; Hasan and Alim, 2010; Silkey et al, 2010). The delay in delivery lead time in export business has cost implications (Djankov et al, 2006; Zhang and Figliozzi, 2010). The different types of cost implications are also explained in previous chapter. Literature review also gave seven international outbound logistics activities and their issues and challenges in detail.

3.6.1. Preliminary conceptual framework

The research design of this study started with constructing a preliminary conceptual framework. A preliminary conceptual framework of this study was presented in a graphic form. The preliminary conceptual framework is depicted in Figure 3.4. It showcases that effect of issues and challenges of outbound logistics activities affect delivery lead time of apparel exports. For example, effect of complicated documentation process of export documentation affects delivery lead time of apparel exports. Effect on delivery lead time creates delay in apparel shipments and also has cost implications to the exporter.
3.6.1. Hypotheses statements

Within the purview of the research objective about measurement of severity level of key issues and challenges and outbound logistics activities that affect delivery lead time of apparel exports in consideration, following hypotheses statements were made basis the literature review. For each proposition there are two hypothesis statements, null and alternative. The null hypothesis states that no difference exists between the parameter and the statistics being compared to it and the alternate hypothesis mentions about the difference (Cooper and Schindler, 2006). Hypothesis statements for research objectives are discussed below.
Literature review highlighted that export documentation activity of apparel exports has multiple document formalities to follow. There are complications involved in this lengthy documentation process. All concerned regulatory and clearing agencies may not have complete automation and integration of systems. Lack of clarity in export sales contract lead to erroneous documentation and there may be wrong declaration or typing errors also.

Therefore the hypothesis statements related to export documentation activity are:

- **H01:** There is no significant relation between severity levels of export documentation activity and its issues and challenges that affect delivery lead time of apparel exports.
- **H1:** There is a significant relation between severity levels of export documentation activity and its issues and challenges that affect delivery lead time of apparel exports.

Literature review for the present study explained that export packaging activity of garments requires stuffing of product in the container as garments are shipped in containerized cargo for sea mode. Lack of availability of container may impact the timely stuffing/packaging of garments. Moreover delay is involved in waiting for all shipments which are planned to get stuffed in one container under less than container load (LCL) mode.

Therefore the hypothesis statements related to export packaging activity are:

- **H02:** There is no significant relation between severity levels of export packaging activity and its issues and challenges that affect delivery lead time of apparel exports.
- **H1:** There is a significant relation between severity levels of export packaging activity and its issues and challenges that affect delivery lead time of apparel exports.

Literature review gave the insight that customs clearance of apparel exports is long and tedious process and has several steps of inspection and documentation. Lack of clarity on product and tariff classification may create issues. Lack of staff/officials/resources, lack of understanding of customs valuation/policies, limited
working hours, corruption/bureaucracy create hurdles in the process. Lengthy manual/physical inspection, lengthy appeal process against decision, operational limitation of EDI system, missing documents, heightened security initiatives, informal trade practices also hinder customs clearance process.

Therefore the hypothesis statements related to customs clearance activity are:

- \( H_03 \): There is no significant relation between severity levels of customs clearance activity and its issues and challenges that affect delivery lead time of apparel exports.
- \( H_a3 \): There is a significant relation between severity levels of customs clearance activity and its issues and challenges that affect delivery lead time of apparel exports.

Literature review explained that ICD/CFS warehousing and material handling activities have various issues and challenges. Waiting time of cargo at entry due to less entry points, lack of storage space, older technology involved in warehousing systems, lack of trained manpower, lack of rail sidings, insufficient cargo handling equipment and maintenance practices, lack of coordination amongst different stakeholders, insufficient security measures pose hindrances in ICD/CFS related activities.

Therefore the hypothesis statements related to ICD/CFS related activities are:

- \( H_04 \): There is no significant relation between severity levels of ICD/CFS warehousing & material handling activity and its issues and challenges that affect delivery lead time of apparel exports.
- \( H_a4 \): There is a significant relation between severity levels of ICD/CFS warehousing & material handling activity and its issues and challenges that affect delivery lead time of apparel exports.

Literature review for the present study explained that road transportation activity too has many issues and challenges. Bad quality/condition of roads, time bound vehicle entry restriction in cities, unavailability of trucks/trailers, delay at regulatory check points, older technology level of existing vehicles, lack of professionalism/skill
levels of drivers, inadequate road networks, traffic congestion, and unfavourable weather conditions are problem areas.

Therefore the hypothesis statements related to road transportation activity are:

- **H₀₅**: There is no significant relation between severity levels of road transportation activity and its issues and challenges that affect delivery lead time of apparel exports.
- **Hₐ₅**: There is a significant relation between severity levels of road transportation activity and its issues and challenges that affect delivery lead time of apparel exports.

Literature review highlighted that rail transportation faces issues and challenges like coordination/planning issues, absence of dedicated and good quality tracks, availability of rakes/wagons, low priority to cargo trains over passenger trains and unfavourable weather conditions.

Therefore the hypothesis statements related to rail transportation activity are:

- **H₀₆**: There is no significant relation between severity levels of rail transportation activity and its issues and challenges that affect delivery lead time of apparel exports.
- **Hₐ₆**: There is a significant relation between severity levels of rail transportation activity and its issues and challenges that affect delivery lead time of apparel exports.

Literature review for the present study explained that seaport warehousing and material handling has various issues and challenges. Lack of space for seaport operations, storage, lack of cargo handling equipment, maintenance practices, labour and bureaucratic issues, congestion of inbound traffic due to less entry points, coordination issues, challenges in consignment tracking, increased security regulations, outdated technology and inefficient IT systems, unfavourable weather conditions create hurdles in seaport operations.

Therefore the hypothesis statements related to seaport related activities are:
• **H_{07}:** There is no significant relation between severity levels of port warehousing & material handling activity and its issues and challenges that affect delivery lead time of apparel exports.

• **H_{a7}:** There is a significant relation between severity levels of port warehousing & material handling activity and its issues and challenges that affect delivery lead time of apparel exports.

Literature review highlighted that issues and challenges of logistics activities cause delay and therefore the hypothesis statements to test in context of present study are:

• **H_{08}:** Effect on delivery lead time due to issues and challenges involved in outbound logistics activities do not significantly cause delay in apparel export shipments.

• **H_{a8}:** Effect on delivery lead time due to issues and challenges involved in outbound logistics activities significantly cause delay in apparel export shipments.

Literature review for the present study explained that there are various cost implications due to the delay originating from logistics issues and challenges. The types of cost implications are administrative workload, transportation, inventory, customs-port charges, promotion and sales, account receivable and cash flow costs.

Therefor the hypotheses statements to test related to cost implications are:

• **H_{09}:** Delay in apparel export shipments due to issues and challenges involved in outbound logistics activities does not have cost implications to apparel exporters.

• **H_{a9}:** Delay in apparel export shipments due to issues and challenges involved in outbound logistics activities have cost implications to apparel exporters.

Literature supported the fact that different sourcing regions may have different set of logistics issues and challenges (Cho and Kang, 2000). The present study targeted to cover apparel clusters of two different regions, North India and South India. This two regions are distantly far from each other and are having different geographical
conditions. Therefore it was decided to test below mentioned hypotheses with respect to two different apparel cluster under study. The hypotheses were formulated to analyse that whether North and South India clusters under study have same kind of logistics issues and challenges and whether these issues and challenges result into same kind of delay lag and cost implications. In this context, the hypothesis statements to test are:

- \( H_{010} \): North and South India apparel clusters have similar severity level of issues and challenges involved in outbound logistics activities that affect delivery lead time.
- \( H_{a10} \): North and South India apparel clusters do not have similar severity level of issues and challenges involved in outbound logistics activities that affect delivery lead time.

- \( H_{010b} \): North and South India apparel clusters have similar kind of delay lag in apparel export shipments due to issues and challenges involved in outbound logistics activities.
- \( H_{a10b} \): North and South India apparel clusters do not have similar kind of delay lag in apparel export shipments due to issues and challenges involved in outbound logistics activities.

- \( H_{010c} \): North and South India apparel clusters have similar kind cost implications due to delay in apparel export shipments caused by issues and challenges involved in outbound logistics activities.
- \( H_{a10c} \): North and South India apparel clusters do not have similar kind cost implications due to delay in apparel export shipments caused by issues and challenges involved in outbound logistics activities.

Considering the hypothesis statements, the preliminary conceptual framework was modified to hypothesized model for empirical testing. Preliminary conceptual model (Figure 3.4) highlighted the effect of issues and challenges on particular logistics activity which affect delivery lead time. Hypothesis statements were formulated to measure the effect of issues and challenges on particular logistics activity. Each hypothesis (from one to eight) aimed to measure the severity level of issues and
challenges which affect the severity level of particular logistics activity affecting delivery lead time of apparel exports. The hypothesized model till hypothesis number 9 is depicted in Figure 3.5. The graphical model provides a visual picture of relationships between variables. (Malhotra and Dash, 2011)

**Figure 3.5: Hypothesized model**

![Graphical model showing relationships between variables](image)

### 3.7. Research Methodology Overview

The present research was divided into three phases. In the following subsection, research method of each phase is explained briefly. The rationale behind selection of research method and sample design will be explained in the subsequent chapters.

#### 3.7.1. Phase I study

The phase one was pilot study of manufacturer exporters and freight forwarders. There were multiple purposes for this study. The first objective was a.) To get expert opinion and validation on the outbound logistics process, related issues and challenges and cost implications due to delay in logistics activities of apparel exports and b.) To identify gaps in these above mentioned parameters, if any. The other
purposes were c.) To quantify the cycle time of outbound logistics activities in context of Indian apparel exports, d.) Quantify the manageable delay so that delayed apparel shipments may still have chance to get loaded on the planned vessel and e.) To find out seaports used for apparel shipments in India. The research method adopted for this study was Delphi Technique.

3.7.2. Phase II study
The phase two study was divided into two stages which are explained below.

3.7.2.1. Phase II- Stage I

The purpose of this stage of study was to identify key issues and challenges of outbound logistics activities that affect delivery lead time of Indian apparel exports. This primary research was conducted through survey method. Structured questionnaire was used with rank order scale, to cover freight forwarders, who were selected through snowball sampling method.

3.7.2.2. Phase II- Stage II

The purpose of this stage was to measure the severity level of the identified key issues and challenges that affect delivery lead time of apparel exports. Primary research was conducted through survey method. Structured non-disguised questionnaire was made using five point rating scale. The freight forwarders were selected using snowball sampling.

3.7.3. Phase III study

This phase of the study was conducted to do impact analysis of identified issues and challenges on delivery lead time with respect to delay lag in apparel shipments and cost implications to apparel exporters. This primary research was conducted through survey method. Structured questionnaire was made with rank order and constant sum scale. The apparel manufacturing units were selected through quota sampling. Figure 3.6 depicts the research methodology overview with overall structure of the research.
Figure 3.6: Research Methodology Overview

- Literature Review
- Research Gap & Questions
- Research Objectives
- Research Hypotheses
- Scope of the Research

**Phase I - Pilot Study**
- Exploratory Research Design (mixed approach - qualitative and quantitative)
- Research Instrument for data collection - Delphi Method
- Rest Phases of the main study
- Quantitative Research Approach / Strategy
- Research Design - Conclusive, Descriptive, Multi Cross Section Study

**Phase II**
- Stage I
  - Research Instrument for data collection - Survey Method
- Stage II
  - Research Instrument for data collection - Survey Method

**Phase III**
- Research Instrument for data collection - Survey Method

- Selection of Data Analysis Tools for each Phase
- Data Analysis and Findings

- Conclusion, Contributions
- Policy Implications
- Future Scope & Limitations