Chapter 1

Introduction

1.1 Background

Distribution channel refers to the medium for transfer of goods from the manufacturers to the end users and consists of intermediaries who perform a variety of functions such as buying, promoting, stocking, selling, order fulfillment and servicing.

Low voltage switchgear comprises of products which are used for controlling and protecting low voltage devices used at factories, shops, homes and farms. These are the standard products and generally sold through a distribution channel consisting of distributors.

Globalization has not only increased the competition but has also created pressure on the margins of the manufacturers as well as distributors. Hence there is a need to improve the channel effectiveness and return on investment.

Internet presents opportunities for re-engineering the distribution channel and enhancing the competitive edge. Internet enabled applications facilitate manufacturers to shorten their response times, compress delivery cycles, improve service levels and increase the market coverage. While these initiatives call for capital investment, they also provide opportunities for cutting distribution costs.

This study will help the manufacturers in evaluating and implementing the appropriate internet enabled applications to improve the operational effectiveness of their distribution channels and enhance their service levels to customers.

1.2 Introduction to Low Voltage Switchgear

Switchgear is a generic word used for all equipment that is used for the control of electricity and the protection of electrical devices. The typical electrical distribution system, from generation through transmission to distribution is shown in Figure 1.1.
Low voltage (LV) switchgear consists of a wide range of products such as Air Circuit Breakers, Moulded Case Circuit Breakers, Miniature Circuit Breakers, Residual Current Devices, Contactors, Motor Starters, Relays, Switch Dis-connector fuses, Timers, Actuators, Meters, Capacitors, etc, which are used for protecting electrical equipment used in farms, industries, utilities and buildings.

Switchgear used at far end of the distribution system, i.e. homes, farms, factories, etc. is called Low Voltage Switchgear. *This research is confined to the study of Low Voltage Switchgear Industry in India.*

The customers of switchgear products can be classified into following segments:

a) **End users:** those customers that are final users of switchgear from the following sectors.
• Agriculture: These are primarily the farmers who use electric motor pump sets for irrigation and use motor starters for protection of pump sets.

• Industries: These are the various types of industries who use switchgear for power distribution and control.

• Commercial and Residential buildings: Switchgear is used for controlling lighting, air conditioning, heating and ventilating loads in various types of commercial and residential buildings.

b) Panel builders: They assemble the switchgear products in an enclosure and wire them up as per the control scheme needs of the user. Most of the actual users such as industries and commercial establishments buy switchgear from panel builders.

c) Original Equipment Manufacturers (OEMs): They use switchgear products as components in the machine tools and other equipment manufactured by them.

d) Contractors: They use switchgear products as part of the construction of the industrial, residential and commercial projects.

e) Retailers: They purchase switchgear products from the distributors in bulk for stocking and selling them as components to end users in the local areas.

1.3 Low Voltage Switchgear in India: A Snapshot

Indian LV Switchgear industry is a mature industry comprising of some homegrown manufacturers as well as leading multinationals. India is considered among the high growth countries of the future and all manufacturers are trying to get a toe hold here. The leading players are Larsen & Toubro, Schneider Electric and Siemens who together accounts for over 55% of the market share. (Table 1.1)
Table 1.1  LV Switchgear Market: Company Market Share by Revenues (India), 2008

<table>
<thead>
<tr>
<th>Company</th>
<th>Revenues ($ Million)</th>
<th>Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larsen and Toubro Limited</td>
<td>220.0</td>
<td>25.9%</td>
</tr>
<tr>
<td>Schneider Electric India Pvt. Ltd.</td>
<td>142.7</td>
<td>16.9%</td>
</tr>
<tr>
<td>Siemens Ltd.</td>
<td>109.2</td>
<td>12.8%</td>
</tr>
<tr>
<td>ABB Ltd.</td>
<td>86.7</td>
<td>10.2%</td>
</tr>
<tr>
<td>Legrand (India) Pvt. Ltd.</td>
<td>72.2</td>
<td>8.5%</td>
</tr>
<tr>
<td>Others</td>
<td>219.2</td>
<td>25.8%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>850.0</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

Note: All figures are rounded; the base year is 2008. Source: Frost & Sullivan

Demand for LV switchgear is driven by the macro economic factors such as electricity generation, industrial production and the construction activity. The market for LV switchgear was around US$850 million in 2008 showing an 11.4 percent increment over the previous year. Frost & Sullivan forecasts that the market revenues are expected to increase gradually and reach US$2216 million in 2015, growing at a compounded annual growth rate (CAGR) of 14.7 percent from 2008 to 2015. (Frost and Sullivan report 2008).

The growth of low voltage switch gear industry is closely linked to the addition of power generating capacity in the country. As the Indian economy continues to surge ahead, its power sector has been expanding concurrently to support the growth rate. The demand for power is growing exponentially and the scope for the growth of this sector is immense. According to the Ministry of Power, India’s total installed capacity as on March 31, 2010 is 159,398.49 megawatt (MW).

A study by McKinsey called “Powering India: Road to 2017” released in 2007 estimates India’s power demand to increase to 335 Giga Watts by 2017, if India grows at an average of 8 per cent during 2007-17. This would require a five- to ten-fold rise in power production, entailing investments worth US$ 600 billion.

Power demand in India is far greater than the availability of power. To bridge this demand supply gap, a number of power plants are under construction and many more are being planned. The expected average capacity addition during the period 2012-27 is 27,000 MW/year (Table 1.2).
Table 1.2: Expected Additions to generating capacity

<table>
<thead>
<tr>
<th>Additional Capacity</th>
<th>Average / Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance 11th Plan (2007 - 12)</td>
<td>44,000 MW</td>
</tr>
<tr>
<td>12th Plan (2012 - 17)</td>
<td>105,000 MW</td>
</tr>
<tr>
<td>13th Plan (2017 - 22)</td>
<td>135,000 MW</td>
</tr>
<tr>
<td>14th Plan (2022 - 27)</td>
<td>165,000 MW</td>
</tr>
</tbody>
</table>

Source CEA Website: Planning Commission Website

The growth in GDP coupled with increased availability of electrical power will spur the demand for low voltage switchgear in India and hence the Indian switchgear industry is poised to grow many folds in the coming years.

1.4 Distribution Channels

LV switchgear products are standard products with a large variety of sizes and ratings, the number of stock keeping being around 40000. This large variety poses serious challenges for manufacturing, distribution, and inventory planning and order fulfillment.

The customers need the products in lots of assorted sizes and ratings. The switchgear products also need to be customized to meet the local requirements. The large customer base which is spread over the whole country also poses logistics challenges for order receipt and fulfillment for the manufacturers.

Hence, LV switchgear products are generally sold by the manufacturers through their distribution network consisting of their wholesalers (hereinafter called distributors). Though the distributors perform a variety of selling and marketing activities, their predominant role is handling of logistics functions i.e. order receipt and fulfillment, order processing and indenting, stocking of materials and extending credit to customers. The distributors perform these functions at a cost much less than that of manufacturers. They also bring in local specialization and knowledge of the customers. Hence the manufacturers prefer to sell their products through their distributors and compensate the distributors for these services by offering discounts on their supplies. Only a small number of key accounts are handled directly by the manufacturers for strategic reasons.
inventory levels. Application of internet offers the opportunity to the manufacturers for carrying forward these benefits into their distribution channels.

Distributor is a critical link between the manufacturer and the customers in ensuring the availability of the products. Hence improving the operational effectiveness of the distributors has been the focus of attention of the manufacturers. During the last decade the manufacturers have adopted the internet for enhancing the performance of their distribution channels.

Although there is a growing body of literature on adoption of internet for distribution, the majority of the papers originate from foreign countries. The adoption of internet for management of distribution channels is a recent development in Indian switchgear industry and there is not any literature available on this subject. The research findings in this area will benefit the industry in understanding the various issues involved and developing appropriate strategy for adopting internet for enhancing the operational effectiveness of their distribution channels. The learnings would even be valid for distribution of other similar discrete industrial products and could be applied for managing their channel strategy. The findings would also throw light on the specific issues relevant to Indian environment and culture in adoption of new technology.

1.6 Scope of the Research

The current research aims at enriching the knowledge and understanding of the adoption of internet by the Indian switchgear manufacturers for enhancing the operational effectiveness of their distribution channels. Adoption of internet for distribution is defined as the use of internet for establishing connectivity between the manufacturer and the distributors either for exchange of information or products or both.

The scope of the research is confined to the study of the Indian low voltage switchgear industry regarding the adoption of internet by the manufacturers for enhancing the performance of their distribution channels. The study includes the topics such as: the motives of the Indian switchgear manufacturers in adopting internet for their distribution channels, the various applications of internet which the
The distributors book the orders from their customers and consolidate them into bulk indents which are released on the manufacturer. They also maintain certain level of inventory of products to meet the urgent requirement of their customers. They interact with the manufacturer regarding status of their orders and keep the customers informed about the expected date of availability of materials ordered by them. They extend credit to the customers for their supplies.

A manufacturer’s distribution channel consists of a set of distributors appointed at various strategic locations in the country. A typical distribution network is as given in Fig 1.2.

![Fig 1.2 Typical distribution channel for LV switchgear in India](Source: Developed for this research)

**1.5 Justification for Research**

The critical success factors for LV switchgear distribution are: availability of their products in the market and efficient management of working capital. Hence manufacturers have been exploring the opportunities for improving the availability and reducing the cost of working capital. The typical supply chain of a LV switchgear manufacturer is given in Fig 1.3.

![Fig 1.3 Typical distribution channel for LV switchgear in India](Source: Developed for this research)

Adoption of Enterprise Resource Planning (ERP) solutions by the manufacturers has enabled them to compress manufacturing cycle times and rationalize warehousing and logistics functions. This has resulted in the improvement of availability of their products to the distributors and reduction in manufacturers’
manufacturers have enabled for their distributors, the facilitating factors for adoption of internet by the distributors and the impact of adoption on their performance.

The main research issues and the consequent research objectives are framed as below:

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Research Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. What are the factors which have facilitated adoption of internet by the distributors?</td>
<td>To study the various enabling, motivating and other factors for adoption of internet by their distributors.</td>
</tr>
<tr>
<td>b. What is the impact of adoption of internet on the operational parameters of the distributors?</td>
<td>To study the impact of adoption of internet on the operational parameters of the distributors.</td>
</tr>
</tbody>
</table>

1.7 Research Methodology:

A review of literature has been carried out to provide the theoretical background for the three basic aspects concerning the research: e business technology, technology adoption and industrial distribution.

A case study of the Indian LV switchgear industry has been carried out by adopting SAP–LAP mode of inquiry. Three leading manufacturers and their distributors have been covered in this study. The purpose of the case study is to identify the key issues relevant to the adoption of internet in the Indian switchgear industry.

The findings of literature review and the issues thrown up by the case study have been combined to develop a conceptual framework for the research. The next step was collection of data through questionnaire survey of the distributors, testing of the hypotheses and validating the conceptual model through Structural Equation Modeling (SEM).

1.8 Definitions used in this Research

Definitions adopted by practitioners and researchers in the field of internet adoption in switchgear industry vary. Hence the terms that represent important concepts in the Indian switchgear industry is defined in this section in alphabetical order.
### Table

| **Availability to Promise (ATP)** | ATP is a business function that provides a response to customer order inquiries, based on resource availability. In other words ATP information contains quantities and due dates for which delivery can be committed. Therefore, ATP supports order promising and fulfillment. |
| **Dispatch to Invoice Cycle** | Duration from the time of dispatch of material till the time of preparation of invoice. Invoices can be prepared only after receipt of shipping documents. Hence early availability of shipping details enables the distributor to expedite preparation of invoices. Since due date of payment by the customer is with reference to the date of invoice, reduction in dispatch to invoice cycle helps in earlier realization of payments. |
| **Order Fill Rate** | Percentage of customers’ orders satisfied from stock at hand. It is a measure of inventory’s ability to meet demand. Increased customer satisfaction associated with a high fill rate must be weighed against the higher expense of maintaining a greater depth and breadth of inventory. |
| **Order Turnaround Time** | Duration from the time of receipt of order at the company to the time of dispatch of the available material. |
| **Project Orders** | Orders placed by the distributors at prices which are negotiated on case to case basis. These orders need to be authorized by a competent person of the company before they can be entered in to the system. |
| **Standard Orders** | Orders placed by the distributor at the prices which are as per the company’s declared pricelists. |
| **Working Capital** | It is the sum of monetary value of finished goods inventory and receivables from customers. |

### 1.9 Overview of Research

Chapter 1 gives a snapshot of the Indian switchgear industry and the role of distributors. It covers the justification for the research, scope of the research, the research issues and the definitions used in the research. The research methodology is briefly reviewed. The chapter ends with an overview of the research.

Chapter 2 covers a survey of literature regarding e-business concepts, technology adoption and industrial channel management. A few selected papers on these areas have been reviewed.

Chapter 3 presents the SAP-LAP analysis of Indian Low Voltage switchgear industry and the key issues identified regarding adoption of internet. In Chapter 4, the
findings of this case study have been blended with the literature review and a conceptual framework for the research has been developed.

Chapter 5 covers the Research Methodology including the Research Design. Details of questionnaire design, pilot testing, sample design and data collection have been explained. A brief review of the Structural Equation Modeling has been carried out.

Chapter 6 covers the analysis of data, testing of hypotheses and validation of the conceptual models through Structural Equation Modeling. Chapter 7 reviews the results of testing and the key findings are discussed.

Chapter 8 summarizes the conclusions of the research and their implications for theory and practice. The chapter ends with the limitations of the research and directions for the future research.