CHAPTER 5

DEVELOPMENT OF CASE STUDIES

5.1 Introduction

Case research has emerged as effective methodology for research in fast changing market. Case studies provide an in-depth, relatively unstructured, approach to develop frameworks and theories. According to Yin (2003) case research methodology is just one of many empirical approaches that aim to develop understanding of “real world” events on its ability to combine a variety of information sources including documentation, interviews and artifacts (e.g., technology or tools) by allowing the researcher to exercise control over factors/parameters to be studied. According to Lewis (1998), to cope with the growing frequency and magnitude of changes in technology and managerial methods, operations management researchers have been calling for greater employment of field based research methods. There are several challenges in conducting case research: it is time consuming, it needs skilled interviewers and care is needed in drawing generalisable conclusions from a limited set of cases and in ensuring rigorous research. Despite this, the result of case research can have very high impact. Unconstrained by rigid limits of questionnaires and models, it can lead to new and creative insights, development of new theory, and have high validity with practioners-the ultimate user of research (Voss et al., 2002). Meredith (1998) cites three outstanding strengths of case research.

- The phenomenon can be analyzed in depth.
- The case method allows the questions of why, what and how, to be answered with a relatively full understanding of the nature and complexity of the complete phenomenon.
- The case methods lends itself to early, exploratory investigations where the variable are still unknown and phenomenon not at all understand in its natural

Many researchers have used case study for their research (Gunasekaran and Cecille, 1998, Gunasekaran et al., 2001, Dangayach and Deshmukh, 2001, Taylor et al., 2004, Al-Najjar and Alsyouf, 2004, Cassel et al., 2006, Arshinder et al., 2007, Thakkar et al., 2008 and Singh et al., 2012). In the present research, the case study methodology is followed after conducting the exploratory survey. The combined case study and survey approach provides a strong foundation for understanding various issues of SC coordination and responsiveness in Indian SMEs. Case study method is used in conjunction with survey research to develop explanations for some of the findings on a more comprehensive basis (Eisenhardt, 1989, Beach et al., 2000, Spring & Dalrymple, 2000). In this research, two case studies are developed to get understanding of different coordination and responsiveness issues in depth and to supplement the empirical research. Brief description of these case companies are follows:

Case I: Manufacturer of auto parts

Case II: Manufacturer of electronic and electrical equipments

These case organizations have also participated in survey process of this study. The selection of companies for detailed case studies was based on two criteria. First, the consent for detailed study and the second criteria was geographical location. Both of these organizations were located in close proximity (National capital region, Delhi).

5.2 Methodology

Case study has been developed by collecting data from primary and secondary sources. Primary data and information have been collected, mainly through semi structured interviews of the concerned managers in each department. Secondary information has been collected through published sources and website of the organization. As requested by the organization, to maintain the confidentiality of information, the name of organization is not revealed in this study.
SAP–LAP methodology (Sushil, 2000) has been used to analyze coordination and responsiveness issues in supply chain of two manufacturing Indian SMEs in this study. It does in-depth study of two organizations and there is interplay between SAP and LAP. A framework of SAP-LAP is shown in Figure 5.1. SAP-LAP methodology has been used extensively by researchers for the case studies of different sectors. Majumdar and Gupta (2001) have used SAP-LAP analysis to study initiatives of Indian car manufactures in developing internet and e-business technology. Arshinder et al. (2007) used SAP-LAP model to analyze the status of coordination in supply chain of a leading automotive parts manufacturer in India. Thakkar et al. (2008) investigated the issue of IT adoption and implementation in Indian manufacturing SMEs towards enhancing the capabilities of their supply chains using SAP-LAP. Singh et al. (2012) used SAP-LAP model for analyzing implementation of SCM and its effectiveness in a medium-scale construction organization.

Sushil (2000) has recommended the use of SAP-LAP methodology for critically examining a case organization. This methodology consists of two steps. In the first step, the SAP analysis, the dynamic parameters of a case are highlighted through the three dynamic interface of any business system. These interfaces are situations (S), actors (A), and processes (P). The “situation” represents the present status, environment of an organization, and the driving forces for SCM implementation of an organization. The situation is treated like a journey and examines the past, present, and the expected trends in future. For the various actors under consideration, it inquires about their worldviews, roles and capabilities, and their respective freedom of choice. The “actors” are the individual participants, or group of members, which influence the situation and define an organization culture to evolve business processes. The process is examined in terms of three seminal questions, i.e. what, why, and how? The basic purpose of the process is questioned and then the questions are asked to generate the alternatives (Sushil, 2000). The “process” is an overall transformation process that converts a set of inputs into outputs to recreate the situation. Understanding situation brings out key points of the emerging situation of the case in terms of historical perspective, external environment,
competition, government policies, market condition, and organizational performance and so on. The second step is LAP synthesis. LAP has three components. These are learning issues (L), actions recommended (A), and anticipated improvement in performance (P).

The traditional models are not able to capture the overall gamut of supply chain activities in a holistic manner. The traditional models are also weak in capturing the dynamics of changing environment and flexibility required to face dynamics. The proposed model not only discusses the issues of SCM but also explains how to work on the SCM issues for various changes. Therefore, for the organizations, which are in the process of adopting new and complex technologies, SAP-LAP framework provides one of the most useful methodologies of analysis and synthesis.

Each of the organization was visited at least five times. Discussion with executives helped in identifying issues and collection of data in real scenario. These discussions were not restricted to questionnaire boundary. Open ended interaction was also carried out. Other sources of information about the organization were annual reports, controls charts, documentation of various processes and its website.

5.3 Case I: Case study of the auto parts manufacturing organization

In this section case study of the ABC Ltd. will be discussed by using SAP-LAP framework.

5.3.1. Profile of the case organization

ABC auto Ltd. (ABC Ltd.) was established in Oct, 2004. The organization has earned all these years to acquire a distinctive identity for its brands as well as organization name. ABC Ltd. manufactures various auto parts. ABC Ltd. is spread in 6000 square meters area with covered area of 3000 square meters. Total employees working in ABC Ltd. are about 150. Main product of ABC Ltd. is axle, supplied to different customers. Major customers of ABC Ltd. are Bajaj auto pvt. Ltd, Suzuki motorcycle India pvt. Ltd., Honda motorcycle and scooter India (Pvt.) Ltd., Hero motocorp Ltd. Machine tools used by ABC Ltd. are turning centers, machining center, forging centers, hobbing m/cs, and heat
treatment furnaces. ABC Ltd. operates in four shifts from 8 am to 4.30 pm (1st shift), 4pm to 12.30 am (2nd shift), 12am to 8.30am (3rd shift) and 9am to 5pm general shift. According to case organization’s vision statement, goals of organization include maintaining leadership in the Indian automobile parts manufacturing industry, creating customer delight.

5.3.2. Supply chain issues at ABC Ltd.

ABC Ltd. have different department like engineering or R&D, purchase, quality, production, heat treatment and logistics and have good collaboration in each department.
Whole supply chain of ABC Ltd. is divided in different parts. Firstly sales/purchase department receives order from its customers and then forwarded to engineering or R&D department. ABC Ltd. works on make to order scheme so product drawing are also supplied by customers with their orders. Product development plan is developed by ABC Ltd. as per customers drawing. Sample products are sent to customers for approval. After approval, formal procedure of production starts as per order of that customer. ABC Ltd. places its orders to raw materials suppliers and other vendors.

**Roll of vendor in SCM:** ABC Ltd. depends on vendors for supply of raw material and other services. It has vendors, and yearly it give rating to them according to their performance. Some customers also recommend vendor to ABC Ltd. In that case for buying specific parts ABC Ltd. have to depend permanently on that vendor. So SCM plays a big role in vendor development. ABC Ltd. makes detail schedule in advance for its purchases and supplies.

![Figure 5.2. Supply chain of ABC Ltd.](image-url)

**Inventory:** Inventory management is the most important area of SCM. Inventory on other hand helps in smooth running of production. But inventory carrying cost adds to expenses. Sometimes a customer request for safety stocks of finish products. In that case that particular customer has to bear inventory carrying cost of that safety stock. In ABC
Ltd. one shift safety stock of finish items is kept normally by observing order history of customer.

**Costing:** In ABC Ltd. all purchase decision are taken by top management. Purchase department keep records of all purchases done in the organization. Final costing of the products is done keeping in mind the raw material cost, manufacturing cost, overheads, transportation, inventory cost and market competitions.

### 5.3.2.1. Inbound logistics

Inbound logistics includes sourcing, order placement and expediting, transportation, receiving and storage. All orders placed by ABC Ltd. are based on customer’s demand received.

**Customer order:** SCM play a wide role in the all department simultaneous. In ABC Ltd. customer orders may be received by letters, mail, fax or phone and sometimes order are placed by customers in formal meetings. For orders formal purchase orders are required from customers.

**Raw material:** Purchasing of raw materials and others items is done by purchase department. Vendors are listed for purchasing every item. Terms and conditions are prepared. Vendors assure timely deliver at door step of ABC Ltd. Inspection of raw material for quality and other criterions is done by purchase team. Defective items are rooted back from the gate of the organization. All cases are reported for vendor evaluation purpose.

**Inventory:** Inventory depends on customer demands. Generally, one week inventory of raw materials is kept as safety stock by ABC Ltd. to avoid breakdown in customer production line. If breakdown occurred in the supply of products to the customers than ABC Ltd. have to pay for that loss. Sometimes vendor ask ABC Ltd. to keep inventory of ten-fifteen days, in that case customers have to pay for extra inventory carrying cost.
**Power and fuel:** The unit requires power load of 1200 KVA to run machines. Provision of diesel generator set also been made to operate the critical item of machinery during power cuts.

**Water and its disposal:** The suitable provision of bore-well with water storage tank has been made in the plant. The waste water is treated in waste water treatment plant in ABC Ltd.

### 5.3.2.2. Outbound Logistics

Outbound logistics starts from manufacturing unit and ends at the customer procurement cycle.

**Order management:** Customer orders are well managed in the organization. A record of customers with their daily demands is kept and maintained. Safety stocks are kept for untimely changes in customers’ demands.

**Finished goods inventory:** A good purchased as "raw material" goes into the manufacturing of a product. Semi finished items are counted under “work in process inventory”. Inventory of finish goods is counted as “finished goods inventory”. They should be stored at right place in dispatch section, so that proper stock details are kept. Inventory of finished goods is also serves as safety stock for untimely changing customer’s demands.

**Packaging and handling:** Final products are stored in dispatch section. The size, weight and shape of packaging are designed and planned as per requirement of customers. Because customer wants that working people in his organization should not face problem in unloading and storage of the product. Product life cycle should also be considered while designing packaging boxes. In other case if packaging is not good then corrosion may damage the products. The anti rust oil coating is done on products prone to rusting or organization use anti rust polythene begs.
Transportation: Final products are delivered to customer plants by own transports of ABC Ltd. So that timely delivery of goods can be insured. It plays a big role in the SCM. Organization has thirteen vehicles for transportation of final product to the customers. Before the material is loaded into the vehicle, they are physically checked for any breakage, cleanliness and dirt.

5.3.2.3. Vendor development strategy

ABC Ltd. vendor development is one of the key factors for reducing production costs, and thereby a key factor for the firm’s remarkable growth. ABC Ltd. sources raw material and other supplies from local market, within the distance of five to ten kilometers. For job-works like plating ABC Ltd. source from its local vendors in industrial area within a circle of five km. They are scheduled to deliver per-shift. For supplies like raw material ABC Ltd. keep a stock of two days. For supplies like machine parts and other daily usable items ABC Ltd. keep a stock of one week.

5.3.3. SAP-LAP analysis of ABC Ltd.

In this section, we analyze the ABC Ltd. case using SAP-LAP framework. The analysis is conducted in the context of the coordination and responsiveness issues of SCM in the organization.

5.3.3.1. Situation

This section describes the present status of ABC Ltd. in terms of different issues of SCM and its future plan, technology, R&D, coordination, responsiveness, competitive advantage, and performance.

Interestingly, from establishment in 2004, ABC Ltd. is progressing in a well planned way. In financial year of 2007-2008 it did a total business of Rs.120 million. During financial year of 2008-2009 it did a total business of Rs. 140 million. After the entry of many foreign auto manufacturers in Indian market, case organization has got lot of opportunities. But opportunities also brought lots of challenges for it. Case organization was facing a very tough competition from different competitors. To excel in cut throat
market competition it needed a strong network of suppliers and vendors which it was lacking. Initially there was always fear of business loss in the market from competitors. After dedicated efforts from management toward suppliers and customers networking and implementation of other supply chain management tools in year 2010-11, case organization got a total business of Rs.200 million in financial year of 2010-2011 and got new customers also.

Currently different SMEs are offering very tough to ABC Ltd. The continual decrease in its market share and profit is always a matter of concern for it. There is continuous pressure to maximize the efficiency and to increase responsiveness, agility and adaptability of the supply chain. Case organization has a focus on cost reduction and new customer formation. There is always a cut-throat competition on cost and technology front from others competitors.

5.3.3.2. Actor

The views about supply chain management presented in this study are based on semi structured interviews with different actors and interlocutors during field visits. Those approached include top management and middle level managers, employees, vendors and sub-vendors of the case organization.

5.3.3.3. Process

The supplier supplies raw material to the ABC Ltd. as per scheduled order. Customer orders are received through letters, mail, fax or phone and sometimes orders are received in meeting with customers. Raw materials are supplied by selected/suggested (by customers) vendors by proper contract. Suppliers are bound to deliver raw material at the door step of the case organization. Proper inventory management is done to reduce inventory carrying cost and stock outs. The initiatives of supply chain like standardization of parts, Just in Time (JIT) are used to reduce cost and inventory. The internet and telephone are used to improve information sharing between different members of supply chain. The order processing time has reduced from few days to few
hours. The production forecasts of ABC Ltd. are based on its customer’s orders and past records. All vendors and customers are connected through email, fax and phone for transferring real time information. The tracking of finished goods on outbound side is being done mainly by phone and fax. Vendors are rated on bases of their performance evaluated on regular intervals.

5.3.3.4. Learning

In global market, customer’s satisfaction is a challenge. To face this challenge SC of the organization should be coordinated and responsive. The case organization realized this and started strategic use of its resources. The total cost of raw material in the finished product is between 50 and 55 percent. Therefore, efficient management of inbound logistics and materials procurement are the critical issues for better management of its supply chain. ABC Ltd. use to test and rate its vendors from time to time. The standardization of parts has helped case organization in achieving risk pooling which, in turn, reduces average inventory. Similar parts from different customers are grouped, that has significantly helped in inventory management and logistics services. Delivery of the final products are done by organization own transports. Inbound transportation and outbound transportation cost to organization about 10 to 12% of total cost. This can be reduced by selecting vendors and customers in close vicinity of the plant. But location of customer does not come in will list of SMEs.

ABC Ltd. needs to improve its relation with vendors and customers. Some of loyal vendors are selected and linked with main plant using modern technology techniques. Strength of supply chain can be increased by actively involving all members and use of modern IT tools. To avail maximum benefits of modern IT tools, all members of supply chain should be willing to invest for it. The E-commerce has created new opportunities and challenges in the sales and procurement. Trust is necessary for information sharing among the various partners of a supply chain.

The availability of real-time data leads to improvement in forecasting and thereby enables production to be more in tune with the customers demand. In absence of real time
information sharing about delivery status with the logistics operator or transporter lead to uncertainties. It also results in high transportation costs or last moment changes in the delivery schedule. But due to scarcity of resources ABC Ltd. has not deployed e-business technologies to all areas and all customers/vendor links.

5.3.3.5. Action

Since ABC Ltd. is the active member of its supply chain, it can make use of its importance in the supply chain and ask the vendors to use the latest IT tools and industrial engineering practices for supply chain performance improvement. The case organization developed a system for improving coordination and responsiveness of its supply chain. This helped the case organization in benchmarking its supply chain practices with the best in the business. It periodically reviewed its supply chain policies. New industrial tools/techniques were used to identify the gray areas in its supply chain. Currently raw material supply/services are totally depends on its vendors. Therefore, vendor management needs to be made the thrust area. The vendor performance needs to be evaluated on regular bases. The number of vendors can be brought down. For improving coordination in supply chain, ABC Ltd. needs to focus on accurate data-sharing with its vendors, utilize business intelligence systems to support automated replenishment, and make its collaborative planning, forecasting and replenishment system more mature. The strategic use of IT in vendor/customer interaction can improve supply chain performance. Proper incentives need to be provided to the vendor for information sharing and for use of IT tools in the supply chain. These incentives could be in terms of technological assistance, long-term contracts, status of most preferred vendor etc. The e-business technologies should be used to involve customers, suppliers and sub vendors. Resources should be devoted to use modern technology within organization and in supply chain.

5.3.3.6. Performance

ABC Ltd. measures its vendor on quality, cost, and on time delivery parameters. The parameters like adaptability, agility and alignment can be added to the process of vendor-
selection. This will result in selecting vendors who can better deal with uncertainty. The performance measurement and benchmarking of supply chain would provide ABC Ltd. an opportunity to identify the gaps in its supply chain practices. The reduced vendor-base is likely to add to the smooth and reliable functioning of its supply chain. This will help in development of strategic relationship, lowering of expenses in IT deployment, reducing work-burden on people and the system. Use of modern IT tools for inter-department coordination helps in making system more agile. The periodic discussion with the customers and other supply chain partners will help achieve better supply chain integration.

Connectivity of customers, vendors and service providers to the organizations network will serve dual purpose. First, it will provide the organization a database of the nature of complaints in its products and accordingly it can analyze these complaints and further improve the services of the product. Second, it will boost up the faith of its customers in the organization and its product. The reduction in number of vendors, deployment of e-business technologies and processes all across the value chain would result in satisfied customers in the supply chain. The website needs to be made for the organization and it should be more customer-focused to the extent that the customers may choose the configuration of products within technical and economic constraints. New features should be added on website to attract new customers. There should be options to place order for new customer on website. IT-based real time information sharing towards modularization and postponement will reduce inventory as well as working capital requirement.

5.4. Case II: Manufacturer of electronic and electrical equipments

In this section, the study will analyze the case of an electronic and electrical equipments manufacturing organization (XYZ Ltd.). Analyses is done using SAP-LAP framework. The analysis is conducted in the context of coordination and responsiveness issues of the SCM in the organization.
5.4.1. Profile of case organization

XYZ Pvt. Ltd (XYZ Ltd.) was established in 1994. The organization has earned all these years to acquire a distinctive identity for its brands as well as organization name. Case organization is a lead manufacturer of various illumination sources. General lighting lamps, automotive lamps and electronic control systems and optoelectronic semiconductors are the strong areas of the case organization in illumination sectors. Main products of XYZ Ltd. are metal halide and high intensity discharge lamps, automatic halogen and discharge lamps, photo-optics lamps for film TV, theaters and high technology lamps for medical, germicidal U.V. lamps, incandescent lamps. XYZ Ltd. is located in NCR of Delhi. It is spread in fifteen thousand square meters area with covered area of ten thousand square meters. Total employees working are about two hundred and fifty. Domestic and other illumination products are directly marketed to Indian and foreign markets. For automotive lamps all leading automobile manufacturers of India are customer of the case organization such as Tata motors, Maruti Udyog Ltd., Hyundai Motors, Honda car, Bajaj auto pvt. Ltd, Suzuki motorcycle India pvt. Ltd., Honda motorcycle and scooter India (Pvt.) Ltd., Hero motocorp Ltd.

It operates in four shifts from 8 am to 4.30 pm (1\textsuperscript{st} shift), 4pm to 12.30 am (2\textsuperscript{nd} shift), 12am to 8.30am (3\textsuperscript{rd} shift) and 9am to 5pm general shift. It has a capacity of producing over 1, 30,000 lamps of different types per month. All production units are divided in three divisions such as general lighting, automotive lamps and optoelectronic semiconductors. For sale and marketing purpose it has its head office in Delhi with its regional office set at Mumbai, Calcutta, Bangalore and distribution centers at fourteen other locations in India. According to XYZ Ltd. vision statement, its goals include maintaining leadership in the world illumination industry, creating customer delight.

5.4.2. SAP-LAP analysis

In this section, study analyzes the XYZ Ltd., case using SAP-LAP framework. The analysis is conducted in the context of present scenario of SCM in the organization.
5.4.2.1. Situation in XYZ Ltd.

This section describes the present status of case organization in terms of market share, technology, research and development (R &D), flexibility, coordination, competitive advantage, and performance. The managers were interviewed to gauge the following situational parameters about the status of coordination in case organization:

- Interestingly, since establishment in 1994, XYZ Ltd. is progressing in a well planned way. In financial year of 2005-2006, it did a total business of 50 million (US $). During financial year of 2007-2008 case organization did a total business of 61 million (US $). After the entry of foreign competitors in Indian market, it is facing a tough competition. It has become very challenging for case organization to excel in cut throat market competition. After dedicated efforts from management toward suppliers and customers networking and implementation of SCM in year 2009-11, case organization has got a total business of 260 million (US $) in financial year of 2010-2011.

- Case organization faces intense competition from different players. The continual decrease in its market share and profit is a matter of concern for the case organization. There is increasing pressure of quality improvement, cost reduction, meeting customers’ orders on time and offering innovative products. Due to globalization of market, quality products at very low prices are available from China and other countries. Other Indian competitors are also offering the product at far lower price, and giving tough competition in both technology and cost. In this scenario only committed and collaborative efforts can help any organization to come out of it. Case organization has to make efforts in improving coordination and flexibility of its supply chain.

- Advance research and development efforts help in meeting global standards in terms of quality and cost. It has a professional management set up, which emphasizes on continuously modernizing and upgrading the product range. Case organization has developed an ever expansion strategy for the introduction of new
products and accordingly, they have divided production in three main divisions such as general lighting, automotive lamps and optoelectronic semiconductors.

- The marketing and sale network of case organization spans across all over India with head office in Delhi and regional offices at Mumbai, Calcutta, and Bangalore. Main distribution centers are located in fourteen other locations all over India who ensures widespread availability of both products and after sales services.

- In XYZ Ltd. the members from various departments are well coordinated and share information regarding their respective functional area. The shared information helps in joint planning of forecasted demand and production schedule. The same concept of coordination between different functional departments is extended to inter-organizational systems to improve the performance of supply chain of the case organization.

- The inter-organizational coordination can be better achieved by identifying and working on the gaps in coordination with the other members of supply chain. These gaps can be filled by understanding the needs of members, objectives, technology, schedules, expectations, flexibility and align these attributes of other members with the attributes of inter-organizational system.

5.4.2.2. Actors in XYZ Ltd.

The views about supply chain management presented in this study are based on semi structured interviews with different actors and interlocutors during field visits. Those approached include top management and middle level managers, employees, vendors and sub-vendors of the case organization. There is also a core team of managers and middle management. But all major decisions are finally taken by top management. Core team has regular meeting with vendors and other employees.
5.4.2.3. Processes in XYZ Ltd.

Supply chain dependencies in XYZ Ltd. can be seen as; while procuring the raw material the suppliers and case organization are dependent on each other for certain activities like design and acceptance of quotations, supplier selection, contract design, order management and order acquisition along with activities like information sharing and joint decision making operational parameters. Similarly it is dependent on the buyers to know their order information, due delivery date and other product related information. To manage above mentioned dependencies, the employees work in close relationship. In this organization, different products are manufactured in different plants such as glass plant, CFL plant, lamp plant, T-8 and T-12.

XYZ Ltd. have different departments like engineering or R&D, purchase, quality control, production and logistics. Logistic management department of case organization has been named as supply chain department in year 2009. In R&D department, regularly new products are designed and developed. Market survey, customer’s feedback and competition to offer new and innovative products work as inspiration for R&D people. Other important processes are discussed as below.

5.4.2.3.1. Inbound coordination

To remain competitive in today’s dynamic market the organization has to deliver good quality products in short time and in right quantity. The quality of product is highly dependent on quality of raw material. Suppliers supply raw materials as per the orders placed by the case organization. Inbound logistics include inviting and handling quotations, supplier selection and evaluation, customer’s orders and market demands, operations planning and information sharing. Overall, procurement operations are called inbound logistics. All orders are based on the demand, from its customers and market scenario. Some of the activities of inbound coordination are:
• **Inviting and handling quotations for raw material:** The quotations specifying the price, technical specifications, terms and conditions for delivery and payment are handled manually, which need considerable efforts.

• **Supplier selection and evaluation:** A supplier is selected on basis of certain pre-decided criterions. Case organization evaluate its suppliers on quality, cost, and on time delivery parameters. A list of questions is made regarding these parameters and the persons from purchasing, quality and logistics department evaluate the suppliers based on judgment.

• **Customer’s orders and market demand:** In automotive section, customer orders are received directly from respective customers. Customer orders are received through letters, mails, fax or phone and sometimes orders are placed in customers meetings. Sales orders are prepared accordingly. For general lighting section, market demand is sensed by orders from members down in supply chain. Past data of demand also help in planning for production schedules. Accurate and timely sharing of demand data helps in better coordination of all activity of supply chain.

• **Operations planning:** Operations planning with suppliers need collaborative efforts. Case organization analyzes supplier’s performance yearly and gives them rating. Generally capacity and orders information is shared with its suppliers. Some customers also recommend vendors for raw material and other services. In that case for buying specific parts, case organization has to depend permanently on these vendors. Suppliers assure delivery of raw material at door step of case organization. Main raw material for glass manufacturing is silica sand, dolomite, soda, scraps of broken glass (cullet) and aggregate (feldspar, sodium, carbon powder).

• **Information sharing:** The supply chain members may coordinate by sharing information among each other. In XYZ Ltd., the level of information sharing with the supplier is very high regarding capacity, production schedule, lead time, order
information, product specifications. Only moderate information sharing is there regarding inventory, end customer data and sales data. There is very low level of information sharing regarding cost related data, price schemes, product design, and research and developments.

5.4.2.3.2. Outbound coordination

In outbound coordination, different activities related to customer/buyers demands are coordinated. There are different activities in outbound coordination such as order management, finished goods inventory, forecasting and replenishment, packaging and handling and transportation.

- **Order management**: The demand for every period is not constant. Although XYZ Ltd. gets some inputs about the annual demand from their buyers, the order quantity varies with period. The buyer commits certain minimum order quantity. This initiative helps to improve the profits and reduces uncertainty in order quantity. For automotive section, customer orders are well managed in the organization. A record is prepared in which all customers’ names with daily/period-shift demand are recorded. There may be changes from customers at last minute; case organization is flexible enough to manage that fluctuation of demand. For general lighting section, average inventory of items is always kept to meet fluctuation of demands in market.

- **Finished goods inventory**: Inventory of finished good plays a crucial role in inventory carrying cost of supply chain. Finished goods should be stored at right place in dispatch section, so that loading becomes easy. Organization generally keeps provision of inventory as safety stock to compensate variation in customer demands, if any. Because organization also wants that there should be no breakdown of supply of finished goods to its customers. Sometimes customers pay for extra inventory kept by case organization.
• **Forecasting and replenishment**: The decision regarding forecasting and replenishment are taken collaboratively with the buyers. It helps in reducing the forecasting error and hence, results in less demand variation. Joint replenishing decisions and online transactions also help to reduce the lead-time. Orders are received online through EDI, which leads to quick and error-free transactions.

• **Packaging and handling**: Final product is placed in corrugated box in palletized form. The size and shape of packaging are designed and planned by customer. Customers specify shape and size of products packaging. There is always fear of damage of items during handling and transportation. So there are special designs of packaging boxes to keep lighting items safe. In designing the shape, size and weight of the box, organization should also ensure that staff working on product line can handle it easily. Product life cycle also had been taken in to account when designing the box.

• **Transportation**: Final products are delivered to customers plant and market by own transports of case organization. This help in on-time delivery of finished items. It plays a critical role in the SCM. Organization has ten vehicles of its own and others on contract for transportation of final product to the customers and market. Before loading the items to the transportation, they are physically checked for any breakage, cleanness and dirt.

5.4.2.4. Learning from XYZ Ltd.

There are various situation related parameters like good R&D facility, know-how and innovation in developing new products using advanced technology, expertise in delivering good quality products. In scenario of global competition, cost cutting is very important but not at cost of customer satisfaction. Therefore, case organization has to make its supply chain more coordinated and efficient.

The learning related to various processes of outbound and inbound coordination of XYZ Ltd. is as follows:
• Inviting and handling quotations for raw material: Manual handling of quotations takes more time and there are chances of more errors because of huge paperwork.

• Supplier selection and evaluation: Selection of suppliers based on the traditional attributes like cost, quality and delivery is not sufficient in today’s competitive scenario.

For quick information transfer and to avoid ambiguity, attributes related to information technology and coordination can also be incorporated.

• Customer’s orders and market demand: At present, the transactions are done online only with few suppliers. All suppliers need to be encouraged to send the orders online. Since suppliers are located at far places; online order management may reduce the transactions cost. They may also share other information regarding operations planning along with the orders.

• Operations planning: Sharing of capacity and order information are not sufficient to reduce the uncertainties in supply lead times. There is need of providing training and assistance to the suppliers. There is no product design collaboration with suppliers. There is need to develop trust between the members of supply chain, so that other initiatives like vendor managed inventory (VMI) can be successfully implemented. Some support and assistance should be given to the suppliers to install good and compatible information systems for quick and accurate information sharing.

• Information sharing: The demand of products is increasing continuously. XYZ Ltd. should have enough flexibility to accommodate the increase in demand. This increase in demand can be met either by increasing capacity and/or by effectively sharing capacity information with the buyers. In such cases sharing of advance demand information by buyer will also help in reducing the demand uncertainties. Similarly, information sharing regarding capacity, inventory and production
schedule with suppliers will help in reduction of supply uncertainties. Information system used within XYZ Ltd. is not efficient.

- **Inventory management**: There is mismatch in inventory shown by computerized system and actual inventory present at the shop floor. This is because the production people do not update the information regularly. It affects the ordering cycle.

- **Forecasting and replenishment**: There is an absence of good forecasting tools. The lack of compatibility in the information systems at suppliers end and at the buyers end is quite common. The suppliers systems are old and insecure for data transfer and at the customer’s end; there are very good web based information systems.

- **Transportation**: Meeting customers’ orders by organizations own transport is a difficult task. There is need of improvement in it. Modern concept like 3PL can be used for timely delivery of items.

### 5.4.2.5. Actions as per learning of from XYZ Ltd.

Based on the situation, actors and processes, the following improvement actions are taken in XYZ Ltd.

#### 5.4.2.5.1. Inbound coordination

A better procurement system is proposed by achieving coordination between suppliers and case organization. The procurement processes in the existing system can be improved in the following way:

- **Inviting and handling quotations for raw material**: A set of web based technologies is used to reduce the documentation cost. Modern IT can help in this process.
• **Supplier selection and evaluation:** Along with traditional attributes some modern attributes are also used. The parameters like investment in plant and machines, use of modern technology, flexibility in production, agility and willingness to share information are added to the process of suppliers-selection. Supplier development is also a key issue for reducing production cost and inventory management and thereby a key issue for the firm’s remarkable growth. Suppliers are evaluated on cost effectiveness, commitment to quality, on time delivery capability, transportation flexibility, proximity to plant and investment in plant and machines. Selected suppliers are, encouraged to form a formal contracts with the organization on specifying parameters such as quantity, price, time of delivery and quality of material. These practices help in forming long term relationships with suppliers. The rationalization of suppliers is likely to add to the smooth and reliable functioning of its supply chain. The reduction in number of vendors, deployment of e-Business technologies and processes all across the value chain would result in satisfied customers in the supply chain.

• **Customer’s orders and market demand:** Proper management of customer’s orders and market demand is achieved through regular follow up with customers, coordination with suppliers, periodic meeting with all supply chain members, reliable logistic system, proper network of information sharing and development of flexible production system. This helped in development of strategic relationship, lowering of expenses in IT deployment, reducing work-burden on people and the system. Use of modern IT tools such as e-commerce, radio frequency identification devices (RFID), enterprise resource planning (ERP), advance shipment notice (ASN) and electronic data interchange (EDI) helped in making system more agile and responsive. The periodic discussion with the customers and other supply chain partners helped in improving coordination and flexibility. Connectivity of customers, vendors and service providers to the organizations network served dual purpose. First, it provided the organization a database of the nature of complaints in its products and accordingly it analyzed
these complaints and further improved the services of the product. Second, it boosted up the faith of its customers in the organization and its product.

- **Operations planning:** Vendors and suppliers play a critical role in SCM. Therefore, vendor management is made the thrust area of improvement. For improving coordination with suppliers and customers case organization increased their involvement in new products design and development, inventory management, manufacturing and planning, logistic management, design of supply chain and application of new technologies/IT tools. Case organization evaluates the performance of vendors on regular bases.

- **Information sharing:** For improving coordination in supply chain, case organization focus on accurate data-sharing with its vendors, utilized business intelligence system to support automated replenishment, and make its collaborative planning, forecasting and replenishment system more mature. A good ERP package is required to automate various processes of case organization.

5.4.2.5.2. **Outbound coordination:** For improving coordination and flexibility of outbound supply chain, XYZ Ltd. improved its relation with its customers. For improving outbound coordination following actions are taken:

- For predicting customer demand accurately, forecasting is done timely and real. Gaps in real data may lead to bullwhip effect. In absence of real time information sharing about delivery status with the logistics operator or transporter lead to uncertainties. It also results in high transportation costs or last moment changes in the delivery schedule. IT-based real time information sharing towards modularization and postponement will reduce inventory as well as working capital requirement.

- For improving coordination and flexibility in supply chain, XYZ Ltd. pay attention to certain factors such as follow-up with customers for feedback,
networking with suppliers and customers, periodic interdepartmental meeting, reliable logistic system and information sharing with all members.

- For improving flexibility and use of modern technologies case organization focus on use of following IT tools: e-commerce, own website, ERP software, intranet/extranet, electronic payment, electronic data interchange (EDI), advanced ship notice (ASN), RIFD etc.

5.4.2.6. Performance

The performance measurement and benchmarking of supply chain would provide an opportunity to identify the gaps in supply chain practices. Performance of case organization is judged on different issues related to customer service and satisfaction, innovation and growth, finance and internal business.

- On parameters of customer service and satisfaction, performance of XYZ Ltd. was observed and found improvement in ability to resolve customer complaints, product delivery on time, follow up customer inquiries, determines future expectations of customer and order fill rate.

- On parameters of innovation and growth, performance of XYZ Ltd. was observed and found improvement in ability to implement new technology, response to customer demand for new features and ability to compete based on quality.

- On parameters of finance, performance of case organization has improved in terms of sales turn over, market share, return on investment and net profit.

- Export share of case organization has decreased in year 2008-2009, but slightly improved in year 2010-2011.

- Operating profit of case organization has increased from 6.22% (in year 2008-2009) to 19.5% (in year 2010-2011) (Table 5.1). Sharp increased was observed in years from 2009-2010 during SCM implementation phase and after that.
• In effort to reduce production cost, XYZ Ltd was working from the day one, after implementing SCM it reduces from 70.7% to 67.5% (with respect to % of sale) (from year 2010-2011).

• Productivity has increased from 52.8% in year 2009 to 85% in year 2011 after implementation of SCM.

• Internal business performance of case organization was found improved in last three years on certain parameters such as ability to reduce the inventory, development of cross functional team, use of modern quality control techniques and level of team work and coordination among internal departments.

<table>
<thead>
<tr>
<th>Performance parameter</th>
<th>2008-2009 (Millions of US $)</th>
<th>2009-2010 (Millions of US $)</th>
<th>2010-2011 (Millions of US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>85</td>
<td>179</td>
<td>260</td>
</tr>
<tr>
<td>Operating profit</td>
<td>6.22</td>
<td>14.19</td>
<td>19.5</td>
</tr>
<tr>
<td>Net profit</td>
<td>4.8</td>
<td>9.8</td>
<td>13.1</td>
</tr>
<tr>
<td>Net worth</td>
<td>17.01</td>
<td>26.90</td>
<td>68</td>
</tr>
<tr>
<td>Capital employed</td>
<td>31</td>
<td>51.01</td>
<td>121.56</td>
</tr>
</tbody>
</table>

5.5. Concluding Remarks

For analyzing different issues of coordination and responsiveness of supply chain of Indian SMEs two case studies are developed in this chapter. First organization is manufacture of automotive parts. Second organization is a manufacturer of electric and electronic equipments. Both case organizations included in this study have shown awareness and commitment for supply chain practices. They have a vision for becoming globally competitive. All these organizations are gradually changing themselves in terms of strategy development for supply chain, improving coordination with suppliers and customers, improving responsiveness of overall supply chain and improving performance. It indicates that, these organizations are dynamic in strategy development.
for supply chain. It is observed that these organizations are facing similar kind of problems in supply chain such as Uncertainty of customer orders /demand, insufficient knowledge of SCM, Involvement of middlemen in supply chain, over dependence on bigger supply chain partner(s) and non availability of right information at right time. Fluctuating prices of raw material, sharing of sensitive information, seasonality of demand, transportation delay and currency fluctuations are the major risks for them. Similar findings are also observed during analysis of survey data.

Before economic reforms, SMEs were surviving even without collaboration in supply chain in global or domestic market. Indian SMEs were dependent mainly on old technology with little orientation for emerging management tools. From these case studies it is observed that present scenario of global competition has forced SMEs to reform their old thinking. Now supply chain practices of coordination and responsiveness are not confined to only large scale enterprises (LSEs) as earlier but it has become part of SMEs regular functioning. SMEs cannot be differentiated from large scale enterprises (LSEs) in terms of these areas in spite of their limited resources. From these case studies it is also evident that awareness among SMEs for supply chain has improved. They are taking initiative for improving coordination with suppliers and customers, product development flexibility, IT applications and finally to improve their performance in domestic and global market.

From these two case studies, an in-depth insight has been gained about various issues of coordination and responsiveness of supply chain for Indian SMEs. Based on this knowledge and research findings from survey, critical factors for coordination and responsiveness will be identified and Interpretive Structural Modeling (ISM) will be used to develop a model in the next chapter.