Final Project Report on

"Supply Chain and Customer Relations: An Indian Defence Company Perspective."

Submitted By:

Abhishree Bani

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Under the Guidance of:

Mr. Abhinav Choudhary

Assistant Professor

DELHI SCHOOL OF MANAGEMENT

Delhi Technological University

Bawana Road Delhi 110042

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CERTIFICATE

This is to certify that the dissertation report titled **"Supply Chain and Customer Relations- An Indian Defence Company Perspective"** is a bonafied work carried out by **Ms. Abhishree Bani** of **MBA 2015-17** and submitted to Delhi School of Management, Delhi Technological University, Bawana Road, Delhi-42 in partial fulfillment of the requirement for the award of the Degree of Masters of Business Administration.

Signature of Guide **Signature of Head (DSM)**

Seal of Head

Place:

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DECLARATION

I, **Abhishree Bani**, student of **MBA 2015-17** of Delhi School of Management, Delhi Technological University, Bawana Road, Delhi – 42, hereby declare that the dissertation report **"Supply Chain and Customer Relations- An Indian Perspective"** submitted in partial fulfillment of Degree of Masters of Business Administration is the original work conducted by me.

The information and data given in the report is authentic to the best of my knowledge.

This report is not being submitted to any other University, for award of any other Degree, Diploma or Fellowship.

Place: **Abhishree Bani**

Date:

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ABSTRACT

In recent years supply chain has become the most dynamic factor in growth of any manufacturing industry. Market leaders today are getting pulled towards different tools and techniques that drive the supply chain to meet the ever-changing demands of the consumer. Supply chain is a crucial element to operational efficiency. Supply chain management is widely being used as integration of multiple business processes across the supply chain. Clearly the impression that SCM has on business is notable and exponential. The evidence can be stated as SCM boosts customer service by making sure that the right product conglomeration and quantity can be delivered in an opportune manner. Also it has a tremendous impact on the bottom line. While many organizations have correctly identified the connection between the supply chain and expansion of their businesses, most of them are clueless about activities and sub processes that are contained in each supply chain process. Nonetheless organizations know that supply chain strategies are the critical backbone to any business organization today. Effective market reach, availability of goods at places that hold the key to revenue recognition, most of these and other factors depend on the effectiveness of supply chain strategy rolled out. The main thrust of this research paper qualitatively examines the dynamics of the relationship between suppliers and the company in context of Indian manufacturing industry. Today, focus is put on the idea that stronger the trust between supplier and a company, better is the supply chain strategy. Suppliers are no longer viewed as mere vendors to an organization. In fact, for a business to flourish, it is important that a supplier feels ownership towards the organization. Over the course of the paper, the important elements of a customer-supplier relationship have been explored and later the thought process has been built upon by inputs provided by the supply chain head of an Indian manufacturing company in the field of Defence aerospace.

Table of Contents

1. Introduction

Every little thing that is around us for our use has a story to tell. A story about its origin. Right from the pens that you use to write to the bottles of mineral water that you drink, every object has a complex supply chain network behind it. While it is as easy for you to go to a nearby store and pick up any item that you require, making sure it reaches you is an extremely mind-boggling process.

Companies face challenges when they buy things, make things, move things and sell things. Supply chain management ensures all this happens at minimum cost and with maximum efficiency.

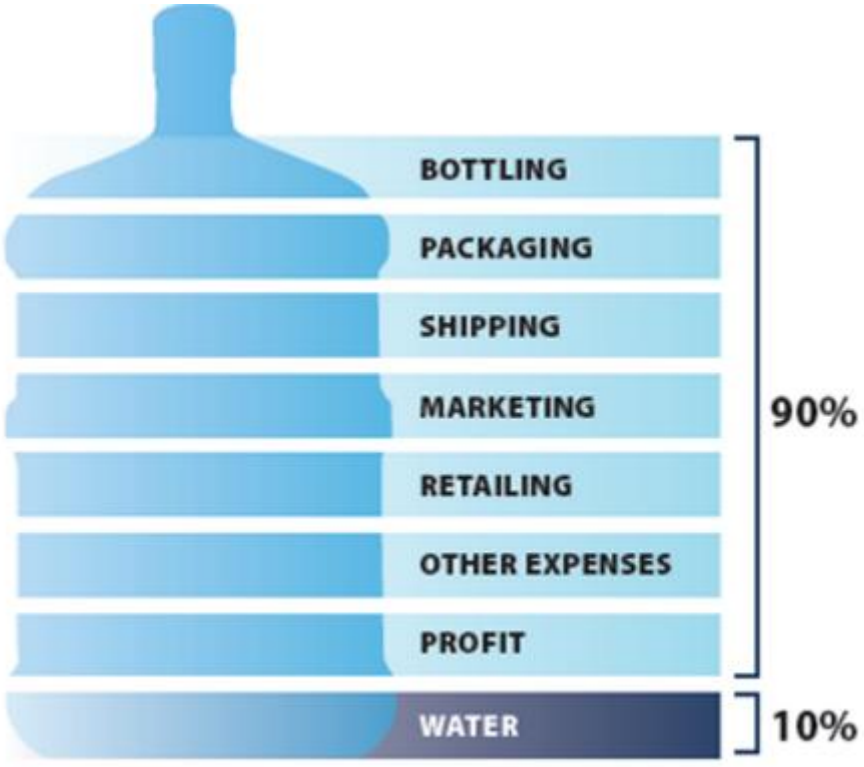

Fig 1. Breakdown of bottled water cost

1.1 Industry Profile

Defence Industry of India

The **Defence industry of India** is a strategically important sector in India. With strength of over 1.3 million active personnel, it is world's 3rd largest military force and has the world's largest volunteer army.

Between 2006 and 2010, India surpassed China as the world's largest importer of weapons systems, reflecting the nation's intent to modernize its armed forces and replace obsolete equipment. India's Defence spending has grown tremendously to 38 billion USD in 2012 as against 30.52 billion USD in 2009 at a compounded annual growth rate (CAGR) of 7.58%. The Defence expenditure of the government accounts for about 13% of its total expenditure.

The government opened this sector to private and foreign investment in 2001. Further, it has sought to build a domestic industrial base and has set itself a challenging target of achieving 70% indigenization. To broad base the acquisition, the Government has made transparent global bidding guidelines in the Defence Procurement Procedure (DPP), which is revised annually. The DPP also lays out the Defence Offset Policy. To fully exploit this opportunity and fulfil offset obligations, original equipment manufacturers and their suppliers should leverage India's competitive advantages in manufacturing and information technology by setting up units in India. A large number of Indian private companies and publicly funded research laboratories are looking for international partners. India has emerged as a global R&D hub with 150 of the Fortune 500 setting up R&D labs in India. A liberal special economic zone (SEZ) policy creates a competitive eco-system for exports by providing attractive fiscal incentives. Such a strategy would allow companies to fully participate in the Indian market, using India's competitive advantages to create a low-cost regional or global manufacturing hub, as has been done successfully in the auto sector.

To provide further impetus to building a domestic industrial base, in 2006, the government announced a defence offset policy that mandated a minimum 30%

plough-back of foreign outflows from Defence procurement exceeding INR 30 billion into the Indian Defence industry. The policy allows foreign suppliers to choose their Indian offset partner—in either the private or public sector—in discharging their offset obligations. This offset policy has been revised in 2008 and 2010. In August 2012, the Defence ministry announced a slew of keenly anticipated modifications to its Defence offset policy. Transfer of technology (ToT) has been made eligible for offsets, multipliers allowed; banking provisions liberalized, and time frames for the discharge of offsets relaxed. Moreover, the objectives of the offset policy have been spelt out clearly, making it easier for vendors to structure their offsets. These changes are likely to make the offset burden less onerous and encourage technology transfers and setting up of production units in the country. The latest Defence Procurement Procedure was revised in 2016 and it caters to the shortcomings of the previous DPP.

According to the latest stats, the government now plans to increase the Defence Budget allocation to 3% which is the highest ever.

The Modi government in its first year cleared 39 capital procurement proposals, of which 32 proposals worth $ 889 billion (US$14 billion) (or 96% of value of total proposals) were categorized as Buy (Indian) and Buy and Make (Indian)—the top two prioritized domestic industry-centric procurement categories as per the Defence procurement procedure (DPP).

There are several Indian SMEs that cater to the Defense industry by supplying sub-assemblies and components and providing services like system integration. Under the Make in India initiative, these organizations are set to enhance their manufacturing and development efficiency, thereby contributing to making India self-reliant in defense production. Some of the system Integrators catering to the Defense sector in India are Mistral Solutions, Alpha Designs, Astra Microwave and SLN Technologies among others.

Name	Specialization
State Owned	
BEL	Avionics
HAL	Aerospace Manufacturers & Avionics
NAL	Research & Development
DRDO	Research & Development
Bharat Dynamics	Ammunition & Missile Systems
Ordnance Factories Board	Defence Equipment & Support
Goa Shipyard	Ship Building
Private Players	
TATA Group	Multiple Projects
Mahindra Group	Multiple Projects
Reliance Group	Multiple Projects
Godrej	Lighting Systems
Samtel Avionics	Avionics
Data Patters	Avionics
Milcom	Avionics
L&T	Multiple Projects
Taneja Aerospace	Landing Gear

Table 1.1 List of Govt. and Private Players in Indian Defence Industry

1.2 Organization Profile

SAMTEL AVIONICS PVT LTD

Samtel Avionics Ltd. (SA) is a key Indian player in high-technology products and solutions for military applications. Samtel Avionics straddles the entire value chain from design, development, manufacture, testing, qualification, repair & maintenance to obsolescence management of military products and equipment.

The company operates in the domains of Displays, Built-to-Print for Avionics LRUs and Opto-electronics. Its products and services include Multi-Function Displays (MFDs), Smart Multi-Function Displays (SMFDs), Full Colour Displays (FCD) for commercial aircraft, Head Up Displays (HUDs), Helmet Mounted Sight Displays (HMSDs), Automated Test Equipment (ATEs), Multifunction Indicators: 3ATI & 4ATI, EL Displays, Optronics (Infra Red Search and Track (IRST)), Rugged displays for Land, Naval and Airborne platforms, Built-to-print (BTP)/ Built-to-Specs (BTS) manufacturing, MRO services, and Obsolescence Management.

Samtel Avionics has created two joint ventures with Hindustan Aeronautics Ltd. and Thales.

The Samtel-HAL JV already enjoys the unique distinction of being the first public-private partnership in defence avionics space in India to indigenously design, qualify and serial produce multifunction displays which are currently flying on Su-30 MKI. As a part of the Indigenization programme (under the aegis of DARE, DRDO), we have been able to indigenously develop the technology to ruggedize Bare AMLCD COTS panel to withstand harsh avionics environment meanwhile

maintaining high level of optical and functional performance of these displays during the operation. It is important to note that the technology developed over an exigent five-year long development and qualification journey, is not product specific, and can be laterally deployed on any fixed or rotary platform. Samtel-HAL JV is the first Indian company to receive type approval from CEMILAC in the domain of avionics displays and has supplied more than 1000 cockpit displays for Su-30 MKI platform.

On the other hand, the Samtel-Thales JV is aimed at manufacturing indigenous Helmet-Mounted Sight and Display Systems, Infra-Red Search and Track (IRST), and modern Avionics Systems for the Indian and export Defence markets.

Joint Ventures

Samtel HAL Display Systems Ltd. - JV between Samtel and Hindustan Aeronautics Ltd. (HAL)

Samtel HAL Display Systems Ltd. (SHDS) was created to address the avionics requirements for all HAL star platforms - both fixed and rotary wing. The JV has achieved the unique distinction of being the first public-private partnership in defence avionics space in India to indigenously design, qualify and serial produce multifunction displays which are currently flying on Su-30 MKI.

Samtel's joint venture with HAL is a prime example of how DPSUs can successfully partner with private sector to leverage on the strengths of both the companies to support indigenous production. More than 1000 units of MFDs have been delivered by Samtel-HAL JV for induction on Su-30 MKIs, and are already flying.

Samtel Thales Avionics Ltd. - JV between Samtel and Thales Avionics

Samtel Thales Avionics Ltd. is a JV between Samtel and Thales Avionics, and intends to locally develop, customize, manufacture, sell and maintain indigenous Helmet-Mounted Sight, state-of-the-art IRST and modern avionics systems. The JV is aimed at developing new product lines based on THALES technologies, creating offsets in the avionics and optronics fields through TOP/TOT and

proposing services such as obsolescence treatment through redesign, either for the Thales Group or others with similar offset obligations in India.

Samtel Thales Avionics JV has recently been granted defence licence by DIPP, aimed at boosting defence manufacturing in the country. The JV has already delivered multifunction displays for Mirage2000 upgrade through its production facility in Delhi/NCR.

Partnerships across the globe

- **General Dynamics Mission Systems - Canada :** Samtel is partner to General Dynamics Mission Systems Canada for co-production and co-marketing of products for military/ ground market.
- **Honeywell :** SA has signed a long-term contract with Honeywell to supply avionics equipment for aircraft in the US, and is the sole source for Honeywell worldwide for avionics equipment for their General Aviation range in the US.
- **Curtiss Wright, UK :** Samtel is a part of the global supply chain for Curtiss-Wright Controls Defense Solutions (CWCDS), where Samtel is collaborating with them for a new generation of intelligent, rugged displays for the defense and aerospace markets.
- **DARE (DRDO) :** Samtel partnered with DARE (DRDO) in 2004 as part of MoD's indigenisation programme for technology development of Multifunction Displays (MFDs) for Sukhoi 30 MKI aircraft. The technology developed over an exigent five-year long development and qualification journey, is not product specific, and can be laterally deployed on any fixed or rotary platform.
- **BEL :** Samtel has partnered with BEL for development and production of a variety of displays for the Indian Army.
- **Indian Air Force (IAF) :** Indian Air Force is not just the end-customer and user of products manufactured by Samtel through the Samtel-HAL JV, but has also partnered with Samtel on some specific products directly.

- **Windriver :** Samtel is a Silver Member of Windriver's partnership program. Wind River Systems provides its VxWorks RTOS technology to Samtel, supports and facilitates development of BSPs for Multiple Processor families and Multiple Architectures. Using this, Samtel builds a variety of products used in aircrafts/helicopters/UAVs for safety/mission critical applications. Once Samtel supplies these products to its customers, it enables Windriver to sell VxWorks licenses to those customers.
- **Hanwha Systems:** Samtel Avionics has collaborated with a leading defense electronics company, Hanwha Systems, based in Korea. The new partnership is announced to bring in synergies of both the companies for futuristic technologies such as Guided Missile, EOIR, and Laser Guided Bomb (LGB).

1.3 Objective of the study

As it is noticed that supply chain management and customer relations management are not quite the same but are separated by a very thin line. This research aims to identify the connection and figure out how the two are related to each other in todays' business scenario.

No business can thrive without a proper supply chain and there is no business without a customer.

The main crux of the paper will be to analyze some customer relations tools with respect to a suppliers' point of view.

For this, a case study on an Indian Defence product manufacturing firm was conducted and the head of Supply Chain was interviewed. After analyzing his inputs a few tools were deduced which are required in general for most of the manufacturing firms across India, to form a sustainable relationship with the customer.

- The study aims to identify the supply chain management and its impact on customer service, as well as indicating the role of supply chain management in improving sales and identifying the views of managers working in the corporate about supply chain management.
- The purpose of the study is to reach at a true understanding of the elements of supply chain management' effect in companies represented by their relations with their suppliers, dealers and customers, on standards related to customer service in terms of quality of service.

Most of the studies in this field focused on the general framework of the supply chain and on identifying its elements and technical aspects, while the current paper describes the aspect related to the management of supply chain and its impact on

sales management and customer service, from the point of view of managers in senior positions and customers.

2. Literature Review

Supply chain is the entire set of activities which are involved in the manufacturing and delivery of a product starting from procurement of Raw Material to the finished good reaching your hands.

Every department in an organization is directly or indirectly linked to the supply chain of any organization. It is the integration of key business processes from end users through original suppliers that provides products, services and information that adds value for customers and other stakeholders. The supply chain includes all the value chain processes from suppliers to end customers.

Supply chain management strategies enable companies to ensure the business has the materials, information and financial resources it needs to produce quality goods and services in a timely manner. By coordinating the flow of work from vendors to manufacturers and then from distributors to retailers, effective supply management techniques reduce inventory and ensure product availability when required. Customer relationship management programs are used to ensure parts and service get to customers when needed after sales are completed by automating business processes used for sales, service and support. Integrate supply chain management and customer relationship management functions to maximize your operations.

Supply chain management personnel ensure that all departments in the business get the raw materials they need to complete their work, while customer relationship management personnel deal with customers to make sure they get the support and services they need. Supply chain personnel work with vendors, while customer relationship personnel work with customers.

The supply chain management function ensures that movement of resources from suppliers to manufacturing occurs smoothly. For example, at a small brochure printing business, supply chain management personnel buy and distribute the paper products and ink required to run the business. The customer relationship management function takes and transmits orders and ensures that product returns and customer support needs are handled. At the small brochure printing business, customer relationship personnel take orders from customers who want brochures printed by the business.

Supply chain management professionals use data generated from software applications to ensure their suppliers provide the right raw materials to create products and services. Accurate analysis and interpretation allows them to improve the production schedules, reduce costs, and eliminate bottlenecks and plan for future work. Customer relationship management professionals also need access to data regarding spare parts availability to support consumers. Customer relationship management personnel work with customers to take orders, solve problems and get new business.

Supply chain management personnel need accurate manufacturing and inventory data from suppliers. This enables them to ensure the small business has the raw materials it needs to conduct business in a cost-effective manner. By contrast, customer relationship management personnel need to be able to respond quickly to customer needs. By establishing good relationships with suppliers to obtain access to current spare parts availability and pricing information, small businesses can get the information they need to run a profitable operation.

The need for firms to develop closer relationship with their customers is increasing day by day. Aggressive Globalization, Internationalization, Deregulation and technical innovations are some of the factors that have led to the emergence of the relationship paradigm for creating long term relationships among customers and suppliers.

The relationship paradigm refers to all activities directed towards establishing, developing, and maintaining successful relational exchanges (Morgan and Hunt, 1994).

With the evolution of the customer-supplier dyad, there has been a significant change in the nature of the relationship between customers and suppliers.

In the past customers relied upon their power to give business or to take it away in supplier relationships, often setting up a win lose situation. Frequently, customers practiced the theory of keeping multiple suppliers, with an efficiency parameter for continuation of the relationship. Though even in this relationship there is an extent of technology and funds transfer, but it exists with the mindset of keeping suppliers competing amongst each other.

Earlier, the focus was more on getting quality products at a reduced cost, than on creating greater value in the exchange through a full exploration of what each partner has to offer to the exchange and value creation process.

Inter organizational collaboration is suggested to catalyze the organizational learning process, by stimulating reconsideration of current practice and challenging assumptions which can result in more innovative outcomes. An organization's ability to learn from another firm is argued to depend on the similarity of firms' knowledge bases, organizational structures, compensation policies and dominant logic.

Inter-organizational collaboration catalyses the learning process along with solidifying relations with the customers.

These days' organizations collaborate with customers, suppliers and competitors forming new networks of learning. Such links also enable organizations to access and internalize the skills and capabilities of their partner.

According to Sako (1992), there are two basic models of customer-supplier relationships:

The Arms Length Contractual Model

The Obligational Contractual Model

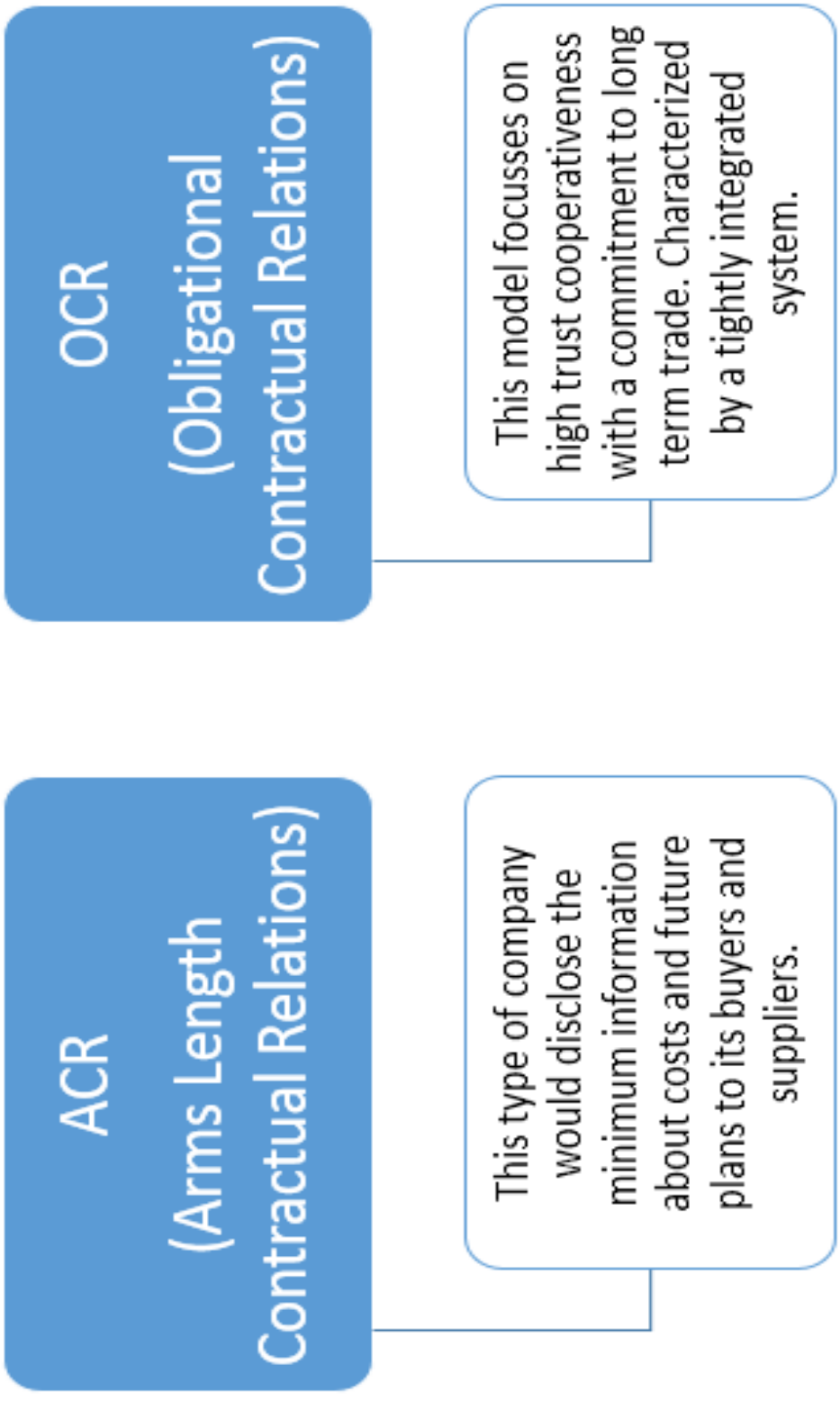

Fig 2. Arms-Length and Obligational Contractual Relations

The following models capture complex variations in customer-supplier relations and onto which an organization can be placed.

At one extreme, organizations rely on ACR if they want to retain control over their destiny. This type of company would disclose minimum information about costs and future plans to existing and potential buyers.

OCR is at the other end of this continuum, which depends upon high trust cooperativeness with a commitment to long term trade. The benefits lie in good quality and service, growing and stable orders and other non price aspects of trading. It is characterized by a tight integrated system of supply and assembly, with a minimum of waste in terms of inventories and inspection activities.

Under ACR the supplier may guard information on costs and operations, and will not place any trust in a long-term relationship. Not only does this type of relationship affect trust , but also customers who play bidders against off each other make the suppliers reluctant to share ideas on improvements in production methods and processes.

Feature	ACR	OCR
"Goodwill trust"	Multiple sourcing by supplier, combined with supplier's low transactional dependence	Sole sourcing by buyer, combined with supplier's transactional dependence
"Competence trust"	Thorough inspection on delivery	Little or no inspection on delivery for most parts (Customer may be involved in establishing supplier's quality-control systems)
Technology transfer and training	Only the transfer, training and consultancy which can be costed and claimed for in the short run	Not always fully costed, as benefits are seen as partly intangible and/or reaped in the distant future
Communication channels and intensity	A narrow channel between the buyer's purchasing department and the supplier's sales department, with frequency kept to the minimum necessary to conduct business	Extensive multiple channels, between engineers, quality assurance personnel, top managers, as well as between purchasing and sales managers. Frequent contact, often extending beyond the immediate business into socialising
Risk sharing	Little sharing of risk; how risk, resulting from price and demand fluctuations, is to be borne by each party is spelt out in explicit prior agreement	Much sharing of risk, in the sense that the relative share of unforeseen loss or gain is decided case by case, by applying some principle of fairness

Fig 3. Table depicting the differences between ACR and OCR

The significance of supply chain has begun after the scientific revolution, which had a big role in all walks of life, including management. In the light of the scientific

revolution, and with the great technological development, the interest in the supply chain has become a necessity, where supply chain management processes became an important element in the company's efficiency and effectiveness.

There is no doubt that the supply chain in the organization deals with the most delicate stages within the institution that intervene directly in the product configuration, so its role is the most prominent in the production, sale, making profit, and achieving continuity through customer service that keeps the market share of the institution.

Because a lot of foundations and administrative concepts changed in the last decade, where the shape of the relationship with suppliers and customers has changed, towards more cooperation and coordination for the formation of the supply chain, and achieve goals such as reducing cost, the main question was formulated:

“What is the role of Customer Relations in improving the effectiveness of the supply chain of a manufacturing company? “

3. Research Methodology

As it is noticed that supply chain management and customer relations management are not quite the same but are separated by a very thin line. This case study aims to identify this connection and figure out how the two are related to each other in todays' business scenario.

No business can thrive without a proper supply chain and there is no business without a customer.

The main crux of this paper will be to analyze some customer relations tools with respect to a suppliers' point of view.

For this, a case study has been conducted on an Indian Defence product manufacturing firm by interviewing the head of Supply Chain. After analyzing his inputs a few tools were deducted which are required in general for most of the manufacturing firms across India, to form a sustainable relationship with the customer.

In order to achieve the objectives of the study, the researcher used the exploratory method, which attempts to assess "the impact on effectiveness of a supply chain because of improved customer relations " through a Case Study conducted on Defence manufacturing Company in India; the approach tries to analyze, explain and evaluate, in the hope of reaching meaningful generalizations than can increase knowledge on this subject.

4. Case Study

4.1 Introduction to the Case

Samtel Avionics (SA) is a key Indian player in high-technology rugged military systems and products, straddling the entire value chain for their design, development, manufacture, testing, qualification, repair & maintenance, as well as obsolescence management. Samtel offers the complete range of state of the art systems for high end applications like airborne electro optic systems, electronic warfare systems, and various packages for complete upgrade of armoured vehicles including day and night sights, Fire Control Systems, Ballistic Computer, smart computers with displays. The product portfolio also includes PFD, MFD, Standby systems and mission computers for airborne platforms.

SA is a part of the 4-decade old SAMTEL GROUP - India's renowned integrated manufacturer with a well-established history of manufacturing a wide range of displays for avionics, military, industrial and professional applications.

It caters to customers like DRDO, HAL, NAL and BEL.

Other manufacturing features of the Company:

- SA Facility is located at Wegmans Business Park, Greater Noida, India
- Scope for further expansion exists
- DGAQA approved manufacturing facility
- CEMILAC approved design house
- Class 100, 1000 and 10,000 clean rooms
- ESD compliant manufacturing facility
- Environmental Test Facilities for qualification:
    - Thermal Chamber (-55°C to +85°C)
    - Shock and Vibration Machine with slip table (780 kgf)
    - Humidity Chamber (upto 95% RH)
    - Altitude Chamber (upto 60,000 feet)

- ESS setup for manufacturing
- Dark Rooms and Sun light simulation for Optical measurements
- Elaborate Test establishment – CCA level, module level, Functional and System Test Benches with spectroradiometers, Colour analyzers', etc.
- Thin film coating plant with turbo-molecular pumps and e-beam guns

Design Competencies

- COTS AMLCD Ruggedisation for airborne and ground displays upto 24.0"
- NVG compliant displays as per MIL STD 3009
- Touchscreen technologies available:
    - 5 wire Resistive Touch Screens
    - Multi Point Touch (5/10 point) PCAP Touch Screens
    - Surface Acoustic Wave (SAW) Touch Screens
- LED based Backlights upto dimming ratio of 3000:1
- Offering several types of configurations of NVG compliant, illuminated Bezel assemblies depending on the platform requirements
- High Speed Processor Boards
- FPGA Boards: Video Decoding and Video Format Conversion, Graphics Generation, Digital Signal Processing, Image Processing
- Communication protocols: MIL1553B, ARINC429, FC-AE-ASM, Gigabit Ethernet, USB 2.0/3.0, CANBus 2.0
- Video Interfaces: STANAG3350, RS343A, DVI, ARINC818
- Power Supply design in accordance with MIL STD 704
- Analog Signal Processing
- Real Time Operating Systems – Integrity and Vx Works
- BSP, Device Driver and OGL Driver Development for in-house developed boards

- Embedded Application development On-axis and off-axis optical systems using aspherics and toroidal surfaces
- Multilayer, graded beam combiner
- Thermal analysis including Fanless design capability
- Structural analysis capabilities
- CG Analysis & Weight Budgeting Analysis
- IP 65 and IP 67 capability
- Methodologies of Software, Hardware and Environmental certification: DO178B, DO254 and DO160/MIL STD 810 and MIL STD 461
- Optical and Electrical Test Systems for qualification, manufacturing and field support

Manufacturing Competencies

- Methods Engineering Group for facilitating transfer of product from design to manufacturing
- Demonstrated NPI process
    - Reception of Manufacturing Data File
    - Development of facilities and requisite skill sets in a time bound manner
    - Creation of Work instructions and SOPs
    - FAI and PRR processes established
- Employees' training and certification on ongoing basis including IPC levels
- Assembly workmanship as per IPC-A-610, Class 2
- Lean manufacturing – cycle time reductions, wastage reductions, etc
- p-FMEAs
- Defect Investigation capabilities
- On time deliveries for overseas programs with stringent definitions for OTD

- Repair services with fast Turn Around Time (TAT)

Deep-rooted Technology Focus and Quality Commitment

- Historically strong R&D culture
- Have developed series of cutting edge technology displays over past three decades
- Quality systems
- ISO 9001:2008
- AS 9100C for Avionics
- Six Sigma methodology: DFSS, DFM, FMECA, MSE
- Licensing and regulatory approvals
- Industrial license from MoD, India
- DOMW registration.
- SAP Enterprise ver. 4.7c implemented.
- CEMILAC approved Design House
- DGAQA approved manufacturing facility

Quality System

At SA, the belief is to build quality into the products and all aspects of business processes through continuous improvement in human capabilities, machines, materials and methods for achieving zero defects and total customer satisfaction.

The operations of the company are primarily focused on avionics, for civil and military applications. SA is operating with SAE/AS 9100 Rev-C quality system

standard. This standard encompasses ISO 9001:2008 and is specifically meant for the avionics industry. The products for military applications are designed & produced in accordance with a series of military standards.

Supply Chain

- The supply chain is spread across multiple vendors, suppliers and customers. While the Electronics manufacturing and assembly takes place in greater Noida, the mechanical part of the products is outsourced to other parts of the country like Chandigarh and Mysore.
- Type of supply chain is flexible and lean i.e. the system is pulled according to the customer demand.
- ERP being used is SAP version 4.7
- Six Sigma methodology: DFSS, DFM, FMECA, MSE

4.2 Data Collection

For the purpose of this research, a questionnaire was formulated keeping in mind the objective of the thesis. The supply chain head of the organization was the interviewed and on the basis of his answers, the results were compiled.

The data collected and the analysis done is purely qualitative in nature. Questions have been prepared keeping in mind the result that needs to be extracted from the information provided.

The research has then been divided into two parts. The first part deals with the important tools that are required in a defence manufacturing industry to maintain cordial customer relations and the second part analyzes how good customer relations will increase the efficiency of the supply chain.

4.3 Interview with the Supply Chain Head of Samtel Avionics

a) Is it true that the customer is always right?

No. Yes, you are there to serve the customer and act according to their demands. But sometimes the customer might not be technically or commercially sound. Which is why it is important to draw the line and set forward your opinion.

b) Does good Customer care cost Money?

It does. You have to invest in the customer for long term business. A happy customer will bring in more business.

c) **Is there a different part of budget allocated to ensure good customer relations? Please explain in detail.**

Yes.

For instance, there are various checkpoints during the manufacturing of a product wherein the customer is invited at the plant to inspect as per his/her satisfaction. All such visits are sponsored by the company.

There are instances of after service being provided by the company to the customer at their location. There is a separate budget allocated for this.

d) **According to you, what are the key factors or methods to maintain healthy customer relations?**

Trust. Communication. Quality. Timely Deliveries.

e) **Is technology transfer or knowledge transfer often an expectation of the customer?**

Yes. In a manufacturing industry, especially electronics for military applications, the customer expects a ToT.

f) **Is quality built into your supply chain or do inspection and correction occur after the fact?**

Quality is very much embedded in our supply chain right from the point of procurement of raw materials to delivery of the finished product as well as after sale services. But there are times when customer requirements keep changing from time to time and in such a situation, corrections have to be made.

g) **So, would you say your supply chain is flexible and lean?**

Yes. Very Much.

h) **Is the movement of money and information in your supply chain as crucial as the movement of materials?**

Without a doubt.

i) **Would you agree that the integration of IT and Information Systems has been a boon for the supply chain of a manufacturing industry?**

Absolutely. Implementing ERP and MRP systems in our chain has reduced cycle times to good extent. Also, everything has become more organized.

j) **Is supply chain management a strategic senior level position in your organization or is it a part of an operations activity?**

Strategic Senior Level Position.

k) **Does your supply chain minimize the amount of touches and the touch time in supply chain transactions, so as to reduce the number of potential failure points?**

To a great extent.

l) **Do you have a built-in change management process that constantly reviews the elements of your supply chain and looks for opportunities to improve quality and operational efficiency?**

Yes. As a matter of fact we constantly keep a check on customer grievances too and try to make changes to suit deliveries wherever possible. Ours is a flexible supply chain and we look forward to improving the quality on a regular basis.

m) **Last Question! Would you say that Customer relations have had any impact on your supply chain efficiency?**

Why shouldn't it? I think customer is the best judge of how things work in your company. As far as our supply chain is considered, it is already based on a pull system. Thus, customer interaction is very important if we want to know where we lag as a system.

4.4 Data Analysis

The issues encompassing these inquiries spin around culture; ability, adaptability, limit and innovation; frameworks and procedures; repeatability and unwavering quality; and cooperation.

• When we discuss culture, we discuss whether associations with store network accomplices—both inward and outer—are antagonistic or community oriented, and whether all gatherings are focused on quality. We likewise discuss whether the association is inclined to going out on a limb opposed. An organization's way of life

additionally decides if inventory network administration is thought to be a senior-level capacity or essentially a segment of operations.

• With ability, adaptability, limit and innovation, it's about the capacity to react to any circumstance. We take a gander at the limit buffering or adaptability inside the segments of the store network so that if there's a surge popular, the inventory network can use its frameworks and innovation to take care of the demand. Similarly, if there's a postponement in a section's creation most of the way around the globe, or if there's a provider quality control issue, is the inventory network ready to change to a go down or interchange provider to keep up responsiveness and client certainty and accessibility?

• Systems and procedures can represent the deciding moment in a production network. They should offer high permeability into the inventory network's everyday operations to encourage responsiveness. They ought to be organized so that there are negligible touches through the production network, and they ought to be continually looked into for development.

• A well-run inventory network highlights reputability and dependability. You search for institutionalized procedures to diminish blunders, and repeatability to lessen process durations and pick up productivity. The win is expanded quality and decreased expenses.

• Finally, supply chains are at last about coordinated effort, given that they are by definition systems of linkages and connections. Viable supply chains go for trust and sharing exact and opportune data, as real request and ability to enhance the chain. This outcomes in lower stock and lower process durations for all gatherings. While you can't instantly have this association with another accomplice, the objective ought to be to head toward trust to make a more responsive store network and accomplish more noteworthy cost diminishments.

4.5 Findings and Recommendations

Tools for Improving Customer Relations

After carefully analyzing the responses given by the Director of Supply Chain and keeping in mind the nature of the industry, a few tools to improve customer relations were deduced.

These tools if used frequently, shall guarantee a positive effect on the supply chain processes of a manufacturing organization. Let us see each of these tools in detail and how they shall impact the supply chain.

- Trust

  This issue of trust has bedeviled trading partners for years. If the business pundits are correct in characterizing the future of global commerce as a battle between rival supply chains for consumers' money, then trust takes on critical

importance. Those that refuse to cooperate will find themselves losing out to companies that do.

“**Trust can only be built up on when all the companies in the supply chain share not just the rewards, but the risks too**”

In today’s scenario, supply chain managers are constantly wrestling with the idea of surviving the hard hitting competition across the global network. One of the main instruments to building up a sturdy supply chain network is trust. And this trust works both the ways. The supplier and the customer both need to develop trust on each other.

Despite the best of intentions, supply chain managers are not able to foster trust in their partnerships. Little do they realise that sharing of crucial information plays a big role in fostering long term relationships with their customers.

“**Information sharing is a prerequisite for building trust between partners**”

Partnership, which is the ultimate goal of managing supply chain relationships, requires complete transparency between both the supplier and the customer.

There needs to be congruence between words and actions of the supplier in order to forge a solid relationship with the customer.

Buying firms that believe that their supplier cannot be trusted share sensitive information like price quotes to their competitor suppliers and thus giving rise to untrustworthy behavior.

“**Hence, the accuracy with which obligations are met by the suppliers are also a key factor for building trust. It gives birth to Reliability**.”

By actively working to meet a partner’s need, the relationship continues to grow, and the other party will also feel indebted.

Without trust there can be no sharing of critical information. And without sharing critical information, it's impossible for a supply chain to become borderless and win in the global economy—today and in the future.

Fig 4. Building blocks of Trust in supplier customer relationships

- Communication

This might be perhaps one of the most underrated factors in a business and still has a prime importance as far as nurturing relationships is concerned.

When it comes to cooperating with staff in other departments, many procurement professionals admit it is very difficult. And when it comes to communicating with those outside the organisation, i.e. the suppliers, communications can become even further strained.

"**Everything comes down to the straightforward actuality that with appropriate communication amongst partners and outer providers, more imaginative thoughts can be conveyed to the table, in this manner enhancing the procedure**."

If people from different points of the process are able give ideas for improvements based on firsthand experience, it stands to reason that this will made for a much

better managed process. On the off chance that correspondence is restricted, so is the capacity of the procurement department to impact the end to end obtainment prepare.

"**Both suppliers and customers need continuous monitoring, as well as collaboration to ensure supply meets demand. This collaboration can be over calls, emails or f2f meetings**."

Good communication with other stages of a supply chain often creates situations that highlight the value of coordination for both sides. Companies often do not communicate with other stages of the supply chain and are unwilling to share information. However, often all companies in the supply chain are frustrated by the lack of coordination and would be happy to share information if it helped the supply chain operate in a more effective manner. Regular communication among the parties involved facilitates change in such a setting.

The full benefit of communication is achieved only when the entire supply chain network is coordinated. It is not enough for two stages in a supply chain to coordinate.

"The most powerful party in a supply chain should make an effort to achieve coordination in the entire network."

Step to Improve Communication:

1. Prioritize your customer. Communicate with them as frequently as possible to know exactly what their requirements are.
2. Regularly meet with stakeholders and suppliers. By getting together with them on a regular basis (weekly for instance) you can highlight and tackle their concerns and worries as they occur.
3. Don't be scared to over-communicate. It is better to ask more and get everything right in the first place rather than avoiding communication and compromising with the quality.
4. Always offer options. After negotiations, produce a list of options and relevant cases that back up each. This way, you are giving the stakeholders some influence and aren't taking the decision out of their hands, making them feel they have status.

5. Be clear. This may sound like an obvious basic principle, but it’s vital to make sure the ‘narrative’ of the proposal comes across so stakeholders understand and are excited by what you are proposing. Use a brief headline to sum up the proposal and focus on the benefits the project will deliver as well as how they will be achieved.
6. Be Personal and Pragmatic. It is better to fill in the communication Gaps by attending the customer personally than on emails.

The importance of communication both with internal stakeholders and external suppliers cannot be overlooked. With the right steps taken and changes applied you can turn around poor communication and improve the procurement process.

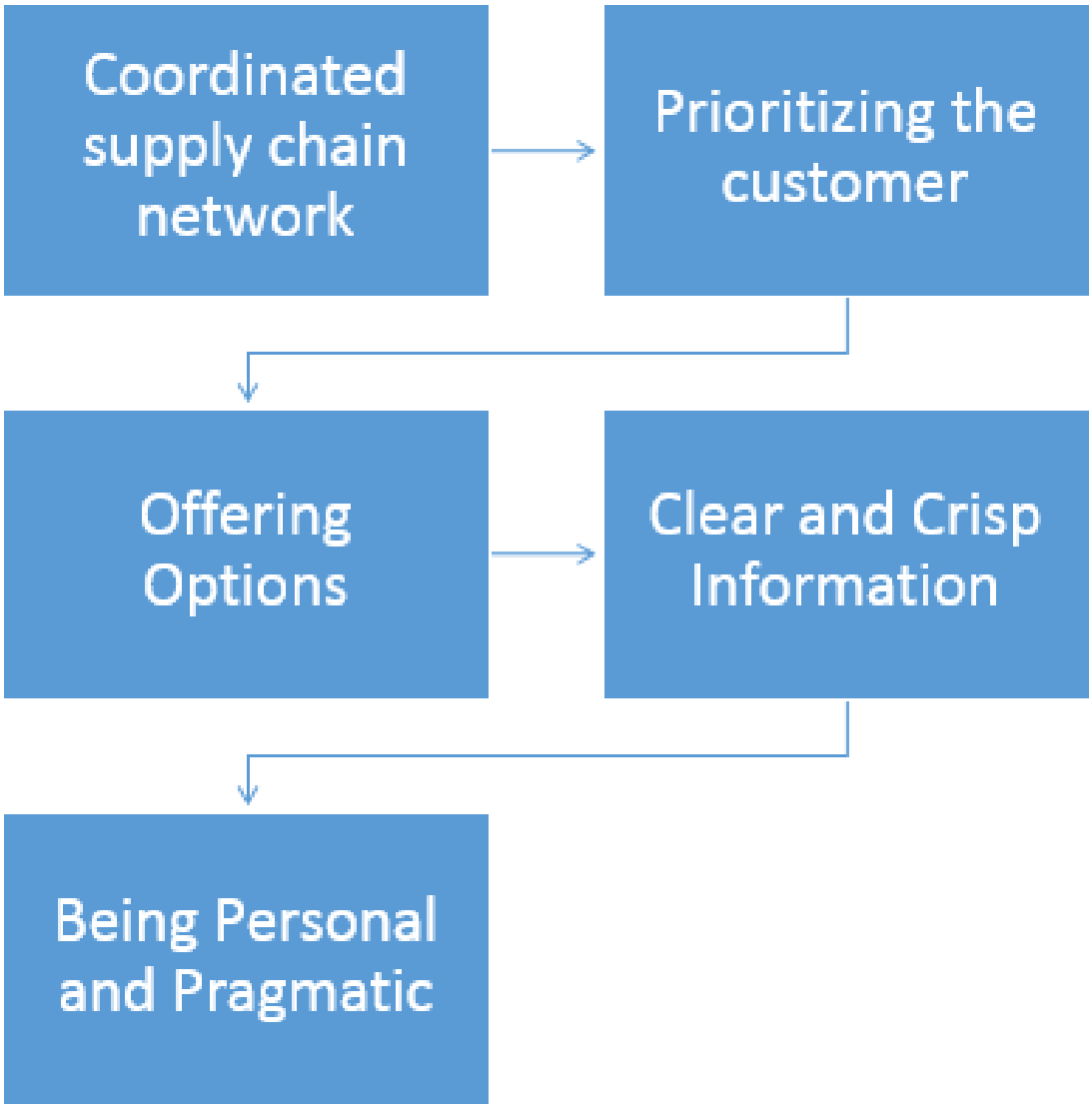

Fig 5. Factors which are important for communication improvement

- Quality

Basically, Quality department is the one which is tasked with inspecting incoming raw materials, in-process work and final product before it is shipped. If there is a way to help the Quality department get its job done faster, then, by definition, the operations process can move along faster, thus reducing time in the supply chain.

"**Quality directly impacts the supply chain management and profitability of a company. It also forms the supporting pillar of building trust with the customer.**"

If raw materials are flawed, it can make entire production lines inefficient and increase defect rates in finished goods inventory. Also, inferior materials may require extra machining or refining, which adds to employees' workloads and total manufacturing costs.

"When supply chain quality control is poor, products are more likely to break or wear out before their warranty period expires."

There are a large number of failures that can occur once a product leaves a manufacturing facility, depending on the nature of the business.

"**In a Defence industry, quality standards are extremely stringent. In fact one of the ways for a supplier to get shortlisted is quality**."

The products are certified according to certain MILITARY STANDARDS and the more the certifications, the better it is to establish relations with the customer.

"The product goes through inspections after being purchased by the customer and in case there is any failure, it ruins the brand name of the organisation which in turn the affects the trust factor between the supplier and the customer."

Quality control in the supply chain ultimately helps to protect a company's reputation. The better the control over supplier inputs, the less risk of returns and potentially hazardous product failures.

Fig 6. Factors which determine Quality of a Product or Service

- Information Technology

It is no surprise that the integration of Information technology and Information systems have indeed boosted the efficiency of Supply chains in almost every industry.

Preceding 1980s the data stream between useful ranges with in an association and between supply chain areas were paper based. The paper based exchange and correspondence is moderate. Amid this period, data was frequently over looked as a basic focused asset since its incentive to production network individuals was not unmistakably caught on.

“**IT infrastructure capabilities provides a competitive positioning of business initiatives like cycle time reduction, implementation, implementing redesigned cross-functional processes**.”

Several well know firms involved in supply chain relationship through information technology.

Two factors have strongly impacted this change in the importance of information.

1. First, satisfying in fact pleasing customer has become something of a corporate obsession. Serving the customer in the best, most efficient and effective manner has become critical.
2. Second information is a crucial factor in the managers' abilities to reduce inventory and human resource requirement to a competitive level. Information flows plays a crucial role in strategic planning.

IT forms a strong backbone as far as communication with the customer is concerned. With multiple electronic tools like ERP, MRP, BAR CODING, SCANNING etc. it has now become extremely easy to provide timely information to the customer. Where the product is, how the product is moving and what’s the demand of the product are important factors that a company should be aware of in order to plan the supply chain activities accordingly. If this information is easily accessible then it can set the stage for an effective management of the supply chain. When technology comes to aid sharing, transferring and processing information, then the integration of your supply chain will be effective.

Companies today are under pressure to better manage the supply chain and to improve efficiency and logistics operations while remaining responsive to changing market conditions and customer demands. As a result, organizations need to adopt IT to support their supply chains and increase their efficiency by achieving tighter cooperation over the supply-chain. Importers and exporters need to know where their product is. Lenders need to know when and how to pay for it. Innovative companies have sprung up to harness the power of the IT, making it easier than ever for logistics managers to track and manage international shipments, and to serve their changing needs as they reach ever further across the globe to source goods.

In an industry like Defence, where keeping all of the data secure is a big concern, IT plays a big role in facilitating all of the activities of the entire supply chain.

There are various benefits of integrating IT solutions with SCM which in turn help strengthen the customer relations:

1. Increased supplier information service.
2. Reduced product lead times.
3. Improved order acknowledgement rate.
4. Reduced order error rate.
5. Enhanced operating efficiencies.
6. Creation of a value based supplier pricing model.
7. Reduced operating Risks.
8. It enables a Green supply chain- Mainly by reducing wastage to a great extent.

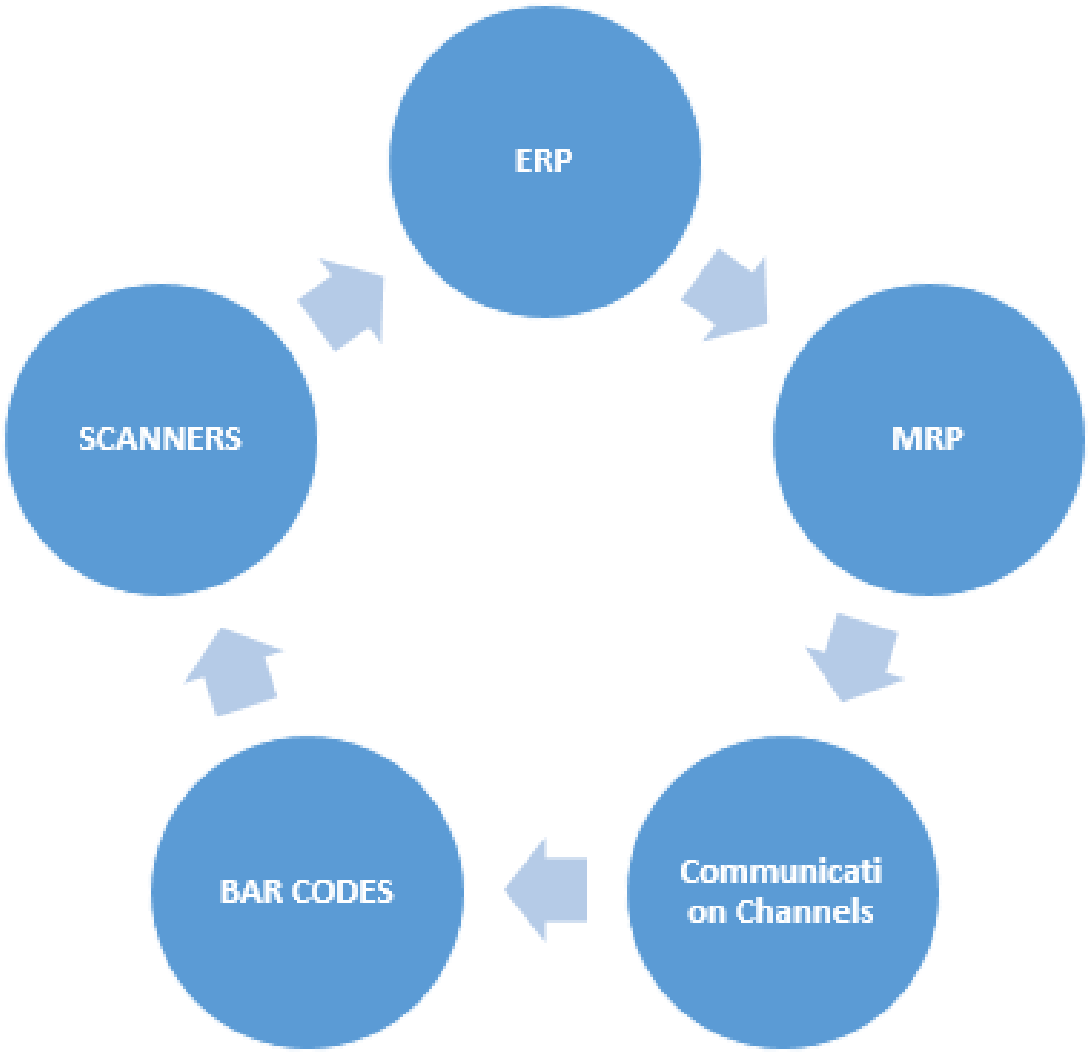

Fig 7. Information Technology Systems

How will good customer relations impact the efficiency of a supply chain?

When you stop to think about how you configure your supply chain and why, it soon becomes apparent that most roads lead back to the customer: Buyers will find the most cost effective suppliers in order to offer customers the best value; they will search for innovate partners to give consumers the best products and services; and they will endeavor to create a supply chain that is resilient to disruption and is ethically sound to ensure service quality.

- In **'How the strongest supply chains protect what customers cherish most'**, Constantine G. Vassiliadis and Glen Goldbach from PwC claimed that the importance of the customer means that businesses should look to build their supply chain resilience around them.
- Customer Feedback can be your hidden weapon to boost the supply chain efficiency and in turn increase the profits.
- The demand of the customer acts as a pull and drives the entire supply chain network.
- In the Defence industry, the main customers that one deals with are DRDO, BEL, Ministry of Defence, Indian Air Force, The Navy , The Army, HAL etc. Thus maintaining good relations with such esteemed customers becomes very important. One order from such a customer can facilitate the functioning of the supply chain for multiple years because the orders are in huge quantities.
- Also, working with such customers boosts the supplier image and helps in branding the organization in front of other esteemed clients.
- The supply chain is the instrument through which your organisation delivers its customer value proposition to the market. In this light, supply chain resilience is ultimately the ability of a supply chain to recover from — or be prepared for — a disruption or change so that it continues to deliver on the leading dimension of your customer value proposition. Success is when your highest valued customers hardly feel the after-shock of a disruption in your supply chain.

Fig 8. Impact of Good Customer relations on Supply chain efficiency

4.6 Conclusion

The client expects extraordinary service. They're giving you money to impeccably fulfill their necessities to get a product on time and in one piece. On the off chance that an issue arises, they need your organization to have the straightforwardness to show why it happened, and what will accomplish for them to settle it. Particularly in the present day atmosphere, where a client can impact your organization openly via web-based networking media your brand's reputation is more susceptible to damage from preventable supply chain mistakes than ever before.

"***Any supply chain is only as strong as its weakest link. A company can move a product from China to the United States, clear it through Customs, move it to a distribution center, and fulfill it in record time. But if it doesn't deliver the product to consumers quickly enough, they are not happy, and the company's supply chain has failed***." — Inbound Logistics Magazine

By choosing the right systems, approaches, and partners within your supply chain, you're giving your customers, the great service, transparency, and visibility they crave. You have complete control of your products' journey from conception to delivery, implementing systems to reduce errors and increase inventory efficiency. The more optimized your supply chain is, the better the customer experience, the happier they'll be, and the more likely they'll be to make a purchase from you again. No other part of your business can come close to matching the supply chain's direct impact on creating return business.

With no supply network immune to disruption, the pressure is on organizations' to safeguard their supply chains. This requires businesses to get a clear understanding of what consumers' value about them and how they differentiate themselves in the marketplace.

"On a conceptual level, information flows out of CRM and into SCM."

Global supply chains are winding up noticeably more mind boggling, with such a variety of more factors. Dangers come in many structures, from numerous bearings and effect distinctive supply chains in various ways. Which ones ought to your business organize? In today's perplexing, unpredictable situations it's improbable that you can alleviate all dangers, nor do you need to build equally strong resilience capabilities everywhere.

My view is that you start with the customer in mind.

4.7 Limitations of the Study

Like every other research, this case study too has its limitations.

- This is a case study based on ONE company in the Defence and Aerospace sector in India. Other companies might function on different principles all together.
- Though the data collection is good quality firsthand information, only one person was interviewed for the process.
- A lot of sensitive information about the company customers could not be revealed which could have made the research even more accurate.
- During the discussions the supply Chain Head shared many customer instances to explain the concepts, but they could not be revealed here.
- Secondary Data findings have not been included.

4.8 Future Scope of Study

Over the decades we have seen a growing influence of customer needs on the market worldwide. So far, one of the majorly affected areas of business was marketing. The P's of marketing were replaced by C's of marketing in the effect of the whole world being customer centric.

Recently, the customer has started crawling through the business functions and made its way into influencing the supply chain. As far as product manufacturing companies are concerned, the customer has clearly made its presence felt throughout the supply chain.

In a country like India, wherein the Modi government had made several reforms regarding its Defence situation- Increasing the Capital Budget, improvising the DPP, raising the percentage of GDP to be spent on Defence related activities or the Make in India initiative, the scope for such a study has huge potential.

When we talk about customer for a Defence company, we not only talk about the state owned firms or the private firms, but also about the Indian Army, The Indian Navy and The Indian Airforce.

Hence, it is safe to say that the future scope of the study of customer relations on improving the efficiency of the supply chain of any business is vast.

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