UNIVERSITY OF LJUBLJANA
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AND

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MASTER'S DEGREE THESIS

ROLE OF E-PROCUREMENT IN STEEL INDUSTRY WITH A CASE STUDY ON VISAKHAPATNAM STEEL PLANT (INDIA)

Samir Kumar Kar

Ljubljana, September 2008.

AUTHOR'S STATEMENT

I, Samir Kumar Kar, hereby certify to be the author of this Master's thesis that was written under mentorship of Prof. Dr. Jože Gričar and in compliance with the Act of Author's and related Rights- Para.1, Article 21. I here with agree this thesis to be published on the website pages of International Centre for Promotion of Enterprises and the Faculty of Economics.

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Samir Kumar Kar

Ljubljana, September, 2008

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LIST OF ACRONYMS

3PX	Third Party Exchange
A/T	Acceptance to Tender
B2B	Business to Business
B2B2C	Business-to-business-to consumer
B2C	Business to Consumer
B2E	Business-to-employees
BOM	Bill of material
C2B	Consumer to Business
C2C	Consumer-to-Consumer
CAG	Comptroller and Auditor General
CAGR	Compound Annual Growth Rate
C-commerce	Collaborative commerce
CD ROM	Compact Disc Read Only Memory
CISF	Central Industrial Security Force
CMD	Chairman cum Managing Director
CSR	Corporate Social Responsibility
CVC	Central Vigilance Commission
DMTU	Dry Metric Ton Unit
e	Electronic
E2E	Exchange-to-exchange
e-auction	Electronic Auction

e-business	Electronic Business
EC	Electronic Commerce
e-com	Electronic Commerce
e-Commerce	Electronic Commerce
EDI	Electronic Data Interchange
E-Government	Electronic Government
E-learning	Electronic Learning
EM	Electronic Market
Email	Electronic Mail
EMS	Environmental Management System
e-Procurement	Electronic Procurement
e-procurement	Electronic Procurement
e-readiness	Electronic Readiness
ERP	Enterprise resource Planning
Fax	Facsimile
GDP	Gross Domestic Product
HRD	Human Resources Development
ICT	Information and Communication Technology
ISM	Industry Sponsored Marketplace
ISO	International Organization for Standardization
IT	Information Technology
JFE	JFE Steel Corporation
JSWL	JSW Steel Limited
KPI	Key Performance Indicators
KwH	Kilo Watt Hour
L1 Bidder	Lowest Price Bidder
LAN	Local Area Network
l-commerce	Location-based commerce
m3	Cubic Meter
MAMS	Materiel Acquisition Management System
m-commerce	Mobile commerce
mmt	million metric ton
MOU	Memorandum of Understanding
MPR	Material Procurement Request
MRO	Maintenance, Repair and Operation
OHSMS	Occupational Health and Safety Management System
P2P	Peer-to-peer
P-card	Purchasing Card
PO	Purchase Order
PSU	Public Sector Unit
PTN	Private Trading Networks
QMS	Quality Management System
R&D	Research and Development

RFP	Request For Proposal
RFQ	Request for Quotation
RINL	Rashtriya Ispat Nigam Limited
ROA	Return On Assets
SAIL	Steel Authority of India Limited
SIM	Supplier Integration Matrix
SPC	Spare Parts Cell
SWOT	Strength Weakness Opportunities and Threat
TR	Technical Recommendation
UNESCO	United Nations Educational,Scientific and Cultural Organization
USA	United States of America
VAN	Value Added Network
VMO	Vision,Mission and Objective
VSP	Visakhapatnam Steel Plant
www	World Wide Web
XML	Extensible Markup Language

CHAPTER 1

INTRODUCTION

1.1 Introduction to steel industry

Steel plays a crucial role in the development of any nation. From the course of events of development of the human civilization, it is found that, the discovery of iron and steel has radically changed the human life. Wikipedia (n.d.) on global steel industry trends says, "The volume of steel consumed has been the barometer for measuring development and economic progress. Whether it is construction or industrial goods, steel is the basic raw material." In today's world, steel plays a critical role and the real development of any country can be measured by its per capita consumption of steel. Consumption pattern of steel in some of the countries worldwide during the year 2007 are given in Table 1.1 below.

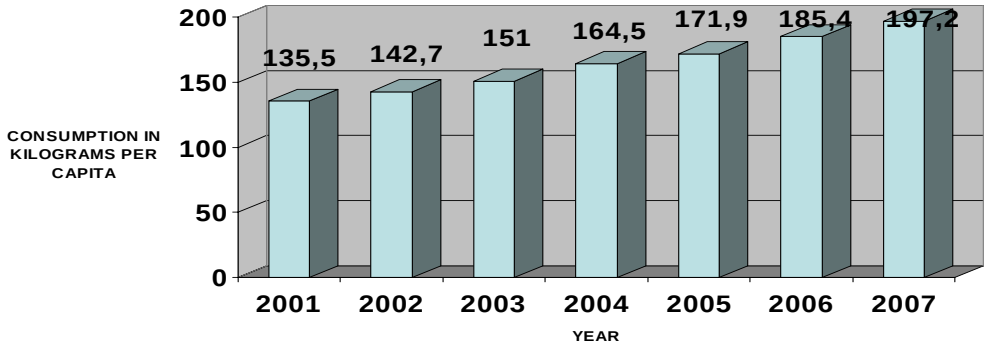
Table 1.1: Per capita consumption of crude steel (2007)

Country	**Per capita consumption of crude steel** (Unit : Kilograms per capita)
USA	353.9
China	307.3
Japan	625.9
Canada	469.3
Germany	463.4
Austria	517.1
South Korea	1135.5
Russia	279.9
Spain	556.3
India	43.4
World average	197.2

Source: International Iron and Steel Institute, (2008).

The consumption of steel is continuously growing worldwide. The reason behind the growth in consumption may be assigned to the development of infrastructure, industrial development and changing lifestyle of people. Figure1.1 shows the growth in consumption of steel worldwide. The major steel producers in the world are shown country wise and company wise in Table 1.2 and Table 1.3 respectively. Figure 1.2 shows the Indian scenario of steel production by major producers of steel in India.

Figure 1.1: Growth in consumption of steel worldwide (per capita)



Source: International Iron and Steel Institute, (2008).

Table 1.2: Top ten crude steel producing countries in the world

Country	Rank 2005	Rank 2006	Rank 2007	Production (in million metric tones)			Percentage change 07/06	Percentage change 06/05
				2007	2006	2005		
China	1	1	1	489.0	422.7	355.8	15.7	18.8
Japan	2	2	2	120.2	116.2	112.5	3.4	3.3
USA	3	3	3	97.2	98.6	94.9	-1.4	3.9
Russia	4	4	4	72.2	70.8	66.1	2.0	7.1
India	7	5	5	53.1	49.5	40.9	7.3	21.0
South Korea	5	6	6	51.4	48.5	47.8	6.0	1.5
Germany	6	7	7	48.5	47.2	44.5	2.8	6.1
Ukraine	8	8	8	42.8	40.9	38.6	4.6	6.0
Brazil	9	10	9	33.8	30.9	31.6	9.4	-2.2
Italy	10	9	10	32.0	31.6	29.4	1.3	7.5

Source: International Iron and Steel Institute, (2008).

Table 1.3, shows the top ten steel producers in 2007, in terms of crude steel production. The 2006 production figures of these companies are also given for reference.

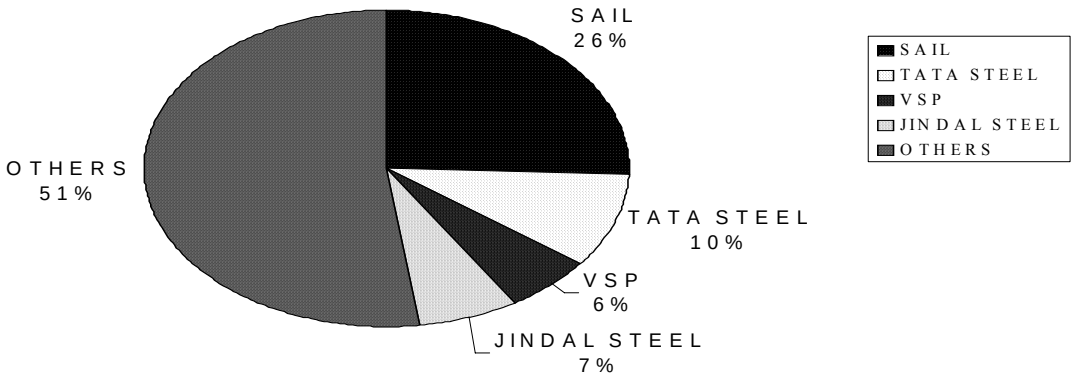
Table 1.3: Top ten steel producing companies in the world

	2007		2006	
Company	**Rank**	**Production (million metric tons)**	**Rank**	**Production (million metric tons)**
ArcelorMittal	1	116.4	1	117.2
Nippon Steel	2	35.7	2	34.7
JFE	3	34.0	3	32.0
POSCO	4	31.1	4	30.1
Baosteel	5	28.6	6	22.5
Tata Steel[1]	6	26.5	45	6.4
Anshan-Benxi	7	23.6	5	22.6
Jiangsu Shagang	8	22.9	17	14.6
Tangshan	9	22.8	9	19.1
US Steel	10	21.5	7	21.2

(1)- 2007 figure includes Corus production.

Source: International Iron and Steel Institute, (2008).

Figure 1.2: Steel production by major steel plants in India (2007-2008)



Source: IISI (2008) and annual reports 2007-08 of respective steel plants.

1.2 Brief description of Visakhapatnam Steel Plant

Visakhapatnam Steel Plant (VSP), Visakhapatnam is India's first shore based integrated steel plant incorporating state of the art technologies, under Rashtriya Ispat Nigam Limited, a government of India undertaking. It has a rated capacity of 3.4 million tons of hot metal, 3.0 million tons of liquid steel and 2.656 million tons of saleable steel. Presently the plant is operating at higher efficiency levels, surpassing the rated capacities and thus achieving 4.15 million tons of hot metal, 3.6 million tons of liquid steel and 3.2 million tons of saleable steel i.e 122%, 120% & 122% of the respective rated capacities during the year 2005-06. The government, the industry and the society, has duly recognized the efforts made by the plant collective and a number of accolades have been bestowed on it. Basic data about the plant is given in Table 1.4

Table 1.4 Basic data regarding VSP

Parameter		VSP data
Plant location		Visakhapatnam, India
Capacity		3 million tons of liquid steel per annum
Sales turnover (2006-07)		Euro 1634 millions
Net profit (2006-07)		Euro 255 millions
Product profile	Major	Re-bars, wire rods, angles, channels, beams, rounds and billets
	Minor (by-products)	Pig iron, granulated slag and coal chemicals
No. of employees		17,000

Source: VSP internal data, (2008).

In line with the vision in India's national steel policy envisaging 110 million tons steel production by 2019-20, VSP has also planned to expand its capacity. Considering the buoyancy in domestic steel market for long products, which is the product mix of VSP and the high acceptance of VSP's brand image in the market, an expansion plan has been undertaken. The expansion plan of doubling the capacity of the plant has been cleared in a record time of ten months and the entire VSP collective is much geared up for completing the expansion in the stipulated thirty six months. The expansion will definitely give a strong footing for VSP's growth.

As per VSP website (www.vizagsteel.com) the envisaged expansion of the plant's capacity by 2008-09, aims to raise the hot metal capacity to 6.50 million tons per annum, liquid steel capacity to 6.30 million tons per annum and saleable steel capacity to 5.72 million tons per annum. As per VSP internal data, the project is estimated to cost Euro 1376.5 millions (Indian Rupees 82590 millions), at Base 4th Quarter, 2004.

The expansion program is progressing well as per the plans. Present focus is on the civil and structural works. In addition, thrust is also on placement of orders, material tracking and erection works for the plant and equipment. To leverage from our brand leadership in the long segment category, expansion has been cast to enhance volumes in the long product category. A seamless tube mill is also envisaged to reduce the dependence on imports in view of the huge requirement of these products by the oil and gas sector.

1.3 Vision, mission and objectives of VSP

The vision, mission and objectives of VSP / RINL are as follows (www.vizagsteel.com):

Vision

"To be a continuously growing world class company we shall
Harness our growth potential and sustain profitable growth.
Deliver high quality and cost competitive products and be the first choice of customers.
Create an inspiring work environment to unleash the creative energy of people.
Achieve excellence in enterprise management.
Be respected corporate citizen, ensure clean and green environment and develop vibrant communities around us".

Mission

"To attain 16 million ton liquid steel capacity through technological up-gradation, operational efficiency and expansion; to produce steel at international standards of cost and quality; and to meet the aspirations of the stakeholders".

Objectives

"Expand plant capacity to 6.3 Mt by 2008-09, with the mission to expand further in subsequent phases as per the corporate plan.
Sustain gross margin to turnover ratio>25%.
Be amongst top five lowest cost liquid steel producers in the world by 2009-10.
Achieve higher levels of customer satisfaction than competitors.
Instill right attitude amongst employees and facilitate them to excel in their professional, personal and social life.
Be recognized as an excellent business organization by 2008-09.
Be proactive in conserving environment, maintaining high levels of safety and addressing social concerns".

1.4 Information technology (IT) policy of VSP / RINL

The information technology policy of VSP / RINL is as follows (www.vizagsteel.com):

RINL/VSP is committed to leverage information technology as the vital enabler in improving the customer-satisfaction, organizational efficiency, productivity, decision-making, transparency and cost effectiveness, and thus adding value to the business of steel making. Towards this, RINL shall:

- Follow best practices in process automation & business processes through IT by in-house efforts / outsourcing and collaborative efforts with other organizations / expert groups / institutions of higher learning, etc, thus ensuring the quality of product and services at least cost
- Follow scientific and structured methodology in the software development processes with total user-involvement, and thus delivering integrated and quality products to the satisfaction of internal and external customers
- Install, maintain and upgrade suitable cost-effective IT hardware, software and other IT infrastructure and ensure high levels of data and information security
- Strive to spread IT culture amongst employees based on organizational need, role and responsibilities of the personnel and facilitate the objective of becoming a world-class business organization
- Enrich the skill-set and knowledge base of all related personnel at regular intervals to make employees knowledge-employees
- Periodically monitor the IT investments made and achievements accrued to review their cost effectiveness.

1.5 Definition of the problem

Down the ages, business or trading of goods or services is a prime activity for human survival and growth. With the advent and popularity of internet, there is a major change in way of doing business. E-commerce is a latest concept creating revolution in the marketplace. It has changed the face of most business functions in competitive enterprises with internet technologies seamlessly automating the interface processes between the firm and its partners (Raghavan, 2005, p.275). In the new economy business, more and more organizations are adopting e-commerce where the products and services have broken the physical barriers of boundaries.

E-Commerce or e-commerce, shortened term for electronic commerce, is conducting of business communication and transactions over computer networks and through individual computers linked to the World Wide Web. Strictly defined, e-commerce is the buying and selling of goods and services, and the transfer of funds, through digital communications. As

defined by Poon and Swatman (1999, p.1-18), electronic business (E-business) is the use of internet-based information and communication technologies (ICTs) to conduct business (including sharing information, maintaining relationships and conducting transactions) within and between organizations.

Turban, King and Lee (2004, p.7-8) suggests e-commerce may be classified into the following major categories based on the agencies involved in the business and by the nature of the transactions and interactions:

- Business to Business (B2B): E-commerce model in which all of the participants are businesses or other organizations.
- Business to Consumer (B2C): E-commerce model in which businesses sell to individual shoppers.
- Business-to-Business-to Consumer (B2B2C): E-commerce model in which a business provides some product or service to a client business that maintains its own customers.
- Consumer to Business (C2B): E-commerce model in which individuals use the internet to sell products or services to organizations or individuals who seek sellers to bid on products or services they need.
- Consumer-to-Consumer (C2C): E-commerce model in which the consumers sell directly to other consumers.
- Peer-to-Peer applications: Technology that enables networked peer computers to share data and processing with each other directly; can be used in C2C, B2B, and B2C e-commerce.
- Mobile commerce (m-commerce): E-commerce transactions and activities conducted in a wireless environment.
- Location-based commerce (l-commerce): M-commerce transactions targeted to individuals in specific locations, at specific times.
- Intrabusiness EC: E-commerce category that includes all internal organizational activities that involve the exchange of goods, services, or information among various units and individuals in an organization.
- Business-to-Employees (B2E): E-commerce model in which an organization delivers services, information, or products to its individual employees.
- Collaborative commerce(C-commerce): E-commerce model in which individuals or groups communicate or collaborate online.
- E-learning: The online delivery of information for purposes of training or education.
- Exchange-to-Exchange (E2E): E-commerce model in which electronic exchanges formally connect to one another for the purpose of exchanging information.
- E-Government: E-commerce model in which a government entity buys or provides goods, services, or information to businesses or individual citizens.
- Nonbusiness EC: An increased number of nonbusiness institutions such as academic

institutions, not-for-profit organizations, religious organizations, social organizations, and government agencies are using electronic commerce to reduce their expenses or to improve their general operations and customer service.

Based on the above classification, e-commerce activities can be divided mainly into the following areas:

- direct marketing, selling, service,
- direct procurement,
- financial services like online banking, billing,
- information service like distribution of secure information,
- value chain integration i.e. integration across suppliers, manufacturers, and distributors quite like the value chain.

Steel being an industrial product finds major applications in industries. Hence, Business-to-Business (B2B) e-procurement will be studied in this project. Present study is restricted to the process of e-procurement in the steel industry and includes a case study on the procurement process in Visakhapatnam Steel Plant, an integrated steel plant in the public sector in India. The study aims to find out the issues pertaining to the adaptation, implementation and maintenance of e-procurement system in the steel industry.

From the analysis of the vision, mission and objectives of VSP, it is clear that cost reduction and business excellence are of prime importance to the company. Procurement plays an important role towards meeting these objectives of a firm.

At present, the steel industry, a core sector industry, does most of its business through conventional business methods. In majority of plants, the procurement of materials, like bulk raw materials, spares, consumables etc, are done mostly through conventional tendering mode and is a cumbersome process consuming lot of time, labor and other resources. Some of the steel plants have entered into the arena of e-procurement recently and are practicing e-procurement for selective items.

The emergence of e-procurement and its phenomenal success in other market areas have attracted the steel industry towards e-procurement. Most of the literatures reviewed are favoring adoption of e-procurement for its fastness, cost reduction and transparency. There are lots of advantages in adopting e-procurement as found in these literatures. There are some disadvantages and risks involved, which require appropriate management practices, security measures and precautions to be adopted.

Now a days the organizations worldwide are focusing on a variety of knowledge and information technology management systems to improve productivity (Meyer 2001, Drayer and Wright 2002; Shankar and O'Driscoll 2002). Wide use of the internet to support business-to-business (B2B) transactions is demanding higher efficiencies in procurement

processes in industries.(Segev, Gebauer and Färber, 1999; Kaplan and Sawhney, 2000). The use of e-procurement is increasing worldwide as the organizations have understood the need for it and also due to growing infrastructrural, governmental and business partner support.

1.6 Purpose of the thesis

E-procurement with its various emerging solutions is having a great impact on the way of doing business. With globalization and opening up of the market, rapid changes in technology, strategic alliances and collaborations among firms, there is an increasing need to change the process of procurement in an organization to cope up with the business trend. The changing role of procurement from a mere simple function of purchasing needed materials to a strategic function to meet the organizational objectives and goals , in a world of fast developing information and communication technologies, makes the subject of e-procurement interesting for study. Ellram and Zsidisin (2002, p.279) says " With the rapid evolution of IT and its applications, unlimited opportunities exist for studying the impact of the actual use of IT on purchasing and supply management and for studying the impact of purchasing and supply management activities on technology use."

An organization requires different types of materials, each with varying importance and criticality, for its operations. The role of materials management is to procure them to meet the requirements of the internal customers in terms of quality, quantity, reliability, timing and cost. Minimization of total cost of purchase is a basic objective, which requires employment of modern techniques of materials management in purchasing process. The cost of materials can be sub-divided into the following:

- the cost of materials by the price paid,
- cost of procurement involved,
- inventory carrying cost,
- cost of replacement or rectification.

In addition to fulfilling the present requirement, there are future requirements for the organization. Materials management has to cater the future requirements by cultivating and developing the sources for future procurements. Sufficiency and reliability of suppliers are of critical importance. Collaboration with the suppliers for mutual development, benefit and long term strategic relationship is the need of the day.

The purpose of this thesis is to find out the improvements ' e ' can bring out in the field of procurement and the issues related to e-procurement implementation in VSP such as the suitability of e-procurement, readiness of the firm and its partners and appropriate roadmap for implementation. E-procurement must match with VSP's sourcing strategy and help it in fulfilling its corporate objectives. The study also aims at finding out the recent trends in e-procurement in the steel industry in India.

The results of the research will be useful to VSP in improving its present procurement process and to develop an integrated e-procurement system, integrated to existing organizational information systems. Study of procurement practices in other steel plants will be helpful in getting an over view of current industry practices in the field of e-procurement. Further, the study aims to find out the readiness of suppliers to VSP and the expected benefits to VSP from adoption of e-procurement.

1.7 Objectives of the thesis

The following are the objectives of the present research:

- to perform industry analysis,
- to find out the growth rate of e-procurement in the steel industry,
- to find out readiness of the firm and its partners for e-procurement,
- to estimate the benefits and improvements through e-procurement.

1.8 Methodology of study

The research project utilizes the inductive approach i.e. first data is collected and then on observation of empirical data, theory is developed. Both primary and secondary data are collected. For studying, the state of the affairs in steel industry secondary data is collected from different source like web pages of steel plants, industry groups and other published data. This is then analyzed using quantitative and qualitative techniques for finding out the answers to research objectives. However, it is found that there is a scarcity of published data regarding e-procurement practices in steel plants of India.

There are different research strategies available to conduct the research, but for this research project, exploratory study and case study are selected. Exploratory study is selected, as it is useful to get new insight into the phenomena, to ask questions and to assess the phenomena in a new light. The case study strategy calls for an empirical investigation of a particular phenomenon within its real-life context, using multiple source of evidence and gives a rich understanding of the environment and processes. Use of multi-method is beneficial as it provides confidence that most important issues are addressed and enables triangulation to take place.

Primary data, for the case study on e-procurement, is collected through two questionnaires, one from VSP officials and the other from suppliers to VSP, to get the present state of affairs in procurement, readiness of the firm and its suppliers for implementing full-fledged e-procurement system and other related issues. The data regarding the e-procurement in VSP, being specific in nature is collected from people working in related commercial departments in VSP like purchase department, finance department etc. In addition, data is collected from personnel of information technology department and user departments like operations,

maintenance and services departments. The respondents are from higher and middle management levels responsible for decision-making and implementation of e-procurement.

The questionnaires designed to collect data, focuses on the research questions and the research objectives of this research i.e. why the organizations are adopting e-procurement, what is the growth rate of e-procurement, to find out different issues related with e-procurement and what will be the best strategy to implement e-procurement to increase profitability and growth.

Analysis is then made to find out solutions for research objectives, to find out relationship between the variables involved and to find out the trends and the state of the affairs in e-procurement particular to the steel industry. The following analyses are made for the steel industry in India: 1) analysis of present business scenario 2) analysis of prevailing purchase process, and 3) analysis of e-procurement issues. A through search of literature from primary, secondary and tertiary sources have been undertaken to find out the trends, research done in relevant field and scope for further research, data sources etc.

1.9 Structure of the thesis

Chapter 1 provides an introduction to the present research work. It begins with a general introduction to the steel industry, importance of steel in development of nations, global production and consumption pattern of steel. It then moves on to give a brief profile of the organization under study i.e. VSP, Visakhapatnam, India.

A reference of the vision, mission and objectives and the IT policy of VSP are provided, which constitutes the very basis of implementation of e-procurement activities in the plant. The chapter also provides a brief overview about e-business within the context of application, technology and the nature of transactions and interactions. The chapter also provides an overview of the total research work in terms of definition of the problem, purpose of the thesis, objectives of the thesis and the methodology adopted.

Chapter 2 outlines the process of procurement in industries with procurement practices in government industries. VSP, being a government industry in India, is regulated by the rules for procurement in government organizations. The concept of e-procurement is discussed with respect to business-to-business e-procurement. The emerging trends in procurement are discussed.

Chapter 3 presents the environmental analysis for e-procurement, especially with respect to VSP and steel industry in India. It provides a detailed study of present procurement system, Materiel Acquisition Management System (MAMS), being used in VSP, the study of the internal environment, and the study of the external environment. A Strength, Weakness, Opportunities and Threat (SWOT) analysis is carried out for the Indian steel industry. The

importance and contribution of procurement in value chain and industry attractiveness are analyzed. The trends and development in e-procurement are also discussed.

Research methodology is discussed in Chapter 4, which gives the details of study design, data collection methods employed, and the procedure for analysis of data.

Chapter 5 deals with the data analysis and interpretation. The primary and secondary data are analyzed and interpretations made.

Chapter 6 provides the roadmap for implementation of e-procurement in VSP. It discusses the various related issues and checklist for successful implementation.

Chapter 7 provides the ultimate result of the research work i.e. the conclusion of the study.

Chapter 8 provides the bibliography and sources, which have given a great insight into the subject matter.

At the end of the research work, an appendix is given which contains relevant documents that will be a source of ready reference.

CHAPTER 2

PROCUREMENT PROCESS IN INDUSTRIES

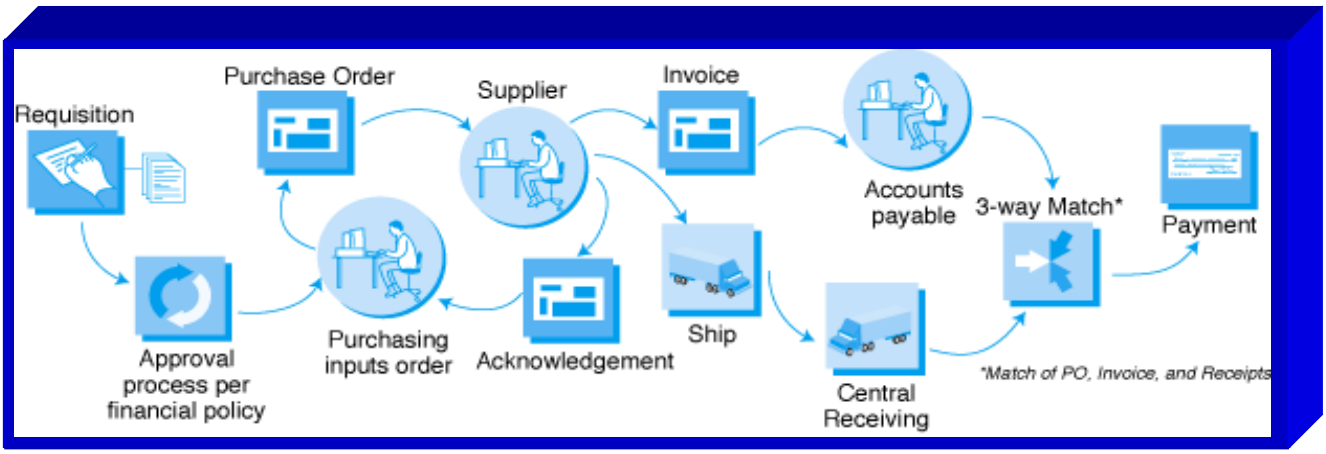
2.1 Process of procurement

Industrial procurement process is a systematic procedure of arranging materials and /or services required for the organization, in such a way that to meet the objectives of the organization. The procurement policy should originate from the organizational strategic plan and must strive to fulfill organizational objectives.

Procurement is the acquisition of goods and/or services at the best possible total cost of ownership, in the right quantity, quality, at the right time, in the right place to meet the internal demand as per organizational requirements. Knudsen (2003, p.100) defines procurement as a process "to satisfy internal demand with external sources which adhere to the objectives set at the strategic level".

Procurement management, as defined by Turban, King and Lee (2004, p.231), refers to "the coordination of all the activities pertaining to the purchasing of the goods and services necessary to accomplish the mission of an enterprise". Purchasing is a strategic contributor to the firm, and that the selection and retention of external suppliers is a fundamental and strategic purchasing task that manifests the function's competitive priorities. Researchers and practitioner managers increasingly view the operations and purchasing functions as intimately linked, and as playing important roles in supply chain management. Ultimately, the performance of the operations management system, measured in terms of quality, cost, delivery and flexibility, depends on inputs secured by the purchasing function from the firm's suppliers. A flow diagram of traditional procurement system is depicted in Figure 2.1.

Figure 2.1: Process flow diagram of a traditional procurement process



Source: Rotchanakitumnuai (2005, p.6).

2.2 Procurement practices in government industries

Worldwide, the procurement practices in government bodies or in government industries are regulated by rules that demands cost reduction, fairness in dealings and transparency. Further, the processes are subject to auditing by government agencies, which require certain mandatory practices and documentation.

In India, procurement process in government industries (called public sector units or PSUs) are governed by the General Financial Rules, issued by the Ministry of Finance, Government of India. It lays down the principles for general financial management and broad rules and procedures for the procurement of goods and services and for contract management. The rules were revised in 2005 to provide greater flexibility while ensuring accountability in government transactions. The General Financial Rules, 2005 (2005, p.56) clearly states the fundamental principles of public buying in India under rule 137, which says as follows:

"Every authority delegated with the financial powers of procuring goods in public interest shall have the responsibility and accountability to bring efficiency, economy, and transparency in matters relating to public procurement and for fair and equitable treatment of suppliers and promotion of competition in public procurement. The procedure to be followed in making public procurement must conform to the following yardsticks:

(i) the specifications in terms of quality, type etc., as also quantity of goods to be procured, should be clearly spelt out keeping in view the specific needs of the procuring organizations. The specifications so worked out should meet the basic needs of the organization without including superfluous and non-essential features, which may result in unwarranted expenditure. Care should also be taken to avoid purchasing quantities in excess of requirement to avoid inventory carrying costs;

(ii) offers should be invited following a fair, transparent and reasonable procedure;

(iii) the procuring authority should be satisfied that the selected offer adequately meets the requirement in all respects;

(iv) the procuring authority should satisfy itself that the price of the selected offer is reasonable and consistent with the quality required;

(v) at each stage of procurement the concerned procuring authority must place on record, in precise terms, the considerations which weighed with it while taking the procurement decision".

A manual on policies and procedures for purchase of goods has been published to assist the procurement entities and their officers in procurement. To supplement these regulations, a number of amendments, instructions are issued by the Central Vigilance Commission (CVC). Most of the public sector units have a published purchase or procurement manual based on these principles and guidelines.

As the CVC (n.d., p.1-2) defines the public procurement as "the procurement of goods, works and services by all Government Ministries, Departments, Agencies, Statutory Corporations and Public Sector Undertakings in the Centre and the States, Municipal Corporations and other local bodies and even by private Public Sector Undertakings providing public services on monopoly basis. Public procurement is only an extension of the personal procurement by two key words i.e. transparency and fairness. When we take up any construction work for ourselves or make personal purchases or hire of any services, we always try to ensure that we get the value for money, good quality product and timely delivery."

CVC (n.d., p.2) also suggests the following guidelines "In case of public procurement we have to go a little further i.e. in addition ensure that procurement is done in a transparent fair and equitable manner. The cannon of Public Procurement is to procure work, material, services of the specified quality within the specified time at the most competitive prices in a fair, just and transparent manner. In brief, the watchwords in this context are

- transparency,
- fairness,
- value for money,
- quality,
- time.

Adhering to the canons of public procurement is in fact a tight ropewalk involving a balance between transparent and fair action on one side and achieving timely delivery of quality goods at competitive rates on the other side. It is indeed going to be more demanding to perform the task with the implementation of the Right to Information Act 2005. Now all our actions and decisions are open for scrutiny by public at large."

Certain control and oversight functions are carried out by central authorities such as the Comptroller and Auditor General (CAG) and the CVC. The Right to Information Act 2005, which covers procurement procedures, is a complementary measure. It gives citizens access to information about procurement decisions within a defined period. Internal and external audits of procuring agencies and offices are other instruments in place to curb and detect corruption in public procurement. Reports of external audits are publicly available. Procuring agencies must record the reasons for all procurement decisions to facilitate meaningful judicial review and audit. The records are kept for later consultation and audit.

The Central Vigilance Commission (CVC, 2003, p.1-2), an organization promulgated to monitor transparency in the functioning of government, clarified the lack of uniform policy

regarding the implementation of e-procurement or e-auction through a office order, which states that "departments/organizations may themselves decide on e-procurement/ reverse auction for purchases or sales" provided transparency in the process is ensured.

The legislative support for e-procurement is obtained from the IT Act passed in the year 2000. The IT Act aims to provide legal recognition to transactions that are electronically carried out, which are commonly referred to as e-commerce. As well, the rules in the Act specify the manner in which information has to be authenticated by means of digital signatures, the creation and verification of digital signature, licensing of certification authorities and the terms of the proposed licenses to issue digital signatures.

Aherwar (2004) suggests some good practices for public procurement "Not withstanding the above, the salient features as indicated below, need to be properly noted and if strictly followed, shall lead to cost effective purchases. The concepts below even though may appear to be elementary, but are essential, and deemed as good practices:

- The terms and conditions that are to govern the purchases, should be readily assessable, be simple so that they are easily and uniformly understood by one and all.
- A brief knowledge of the applicable laws of the land - like the sale of goods act, the contract act, the various tax laws, the interest on delayed payments act, the limitation act and the Arbitration and Conciliation Act etc. The detailed acts should be readily available for reference as and when required.
- The tender specifications have to be clear, supported by the relevant drawings and the specification. In case of items of general nature, the relevant BIS specification should be found and incorporated. If for some reasons the same is not possible, then the available reputed brands have to be short-listed. All of these have to be processed as far as possibly directly from the manufacturers, or their authorized outlets, so as to avoid duplication/fraudulent purchases.
- The basis or the manner in which the tender (s) would be settled should be laid down in the tender itself. The settlement has to be done within the original validity and within the reasonable time.
- The sanctity of the tendering system has to be maintained. Avoid re-invitation of Tenders.
- Post tender correspondence should be generally avoided, as it generally leads to delays, and at times results in changing of the inter-see position due to tax structures or discounts.
- There should be no unusual conditions, like approval of sample before bulk supply, or modification to the specification midway, which has implications on the price structure & are do not lead to legally enforceable contracts."

2.3 Concept of e-procurement

Knudsen (2003, p.100) defines e-procurement as "the use of IT (and the Internet) for procurement purposes, including both the technology-mediated exchanges between parties and the electronically based intra- or inter-organizational activities facilitating such exchanges". Deshmukh (2006, p.193) puts it, "e-procurement refers to the use of internet in procurement of direct or indirect materials". Applegate et al., (1996, p.32) defined e-procurement as ''using Internet technology in the purchasing process; it involves using network communications technology to engage in a wide range of activities up and down the value-added chain both within and outside the organization''.

An Australian government case sudy (2005, p.3) on e-procurement says "E-procurement has been identified as an instrument in public sector reform. It enables government to monitor the efficiency and effectiveness of procurement and provides more transparency and accountability".

Organizations procure direct materials and indirect materials to support their activities. Indirect materials are the materials, purchases and supplies used in the operation of the business, not directly associated with production and are part of operating expenses. They are also called MRO (maintenance, repair and operation) items. Direct materials are the raw materials and other purchases that become a part of the units produced and incur expenditures that are easily traced to the units of output and included in the cost of goods sold. The differences in supply management environment between direct and indirect materials or services are shown in Table 2.1. (Cavinato et al., 2006, p.717).

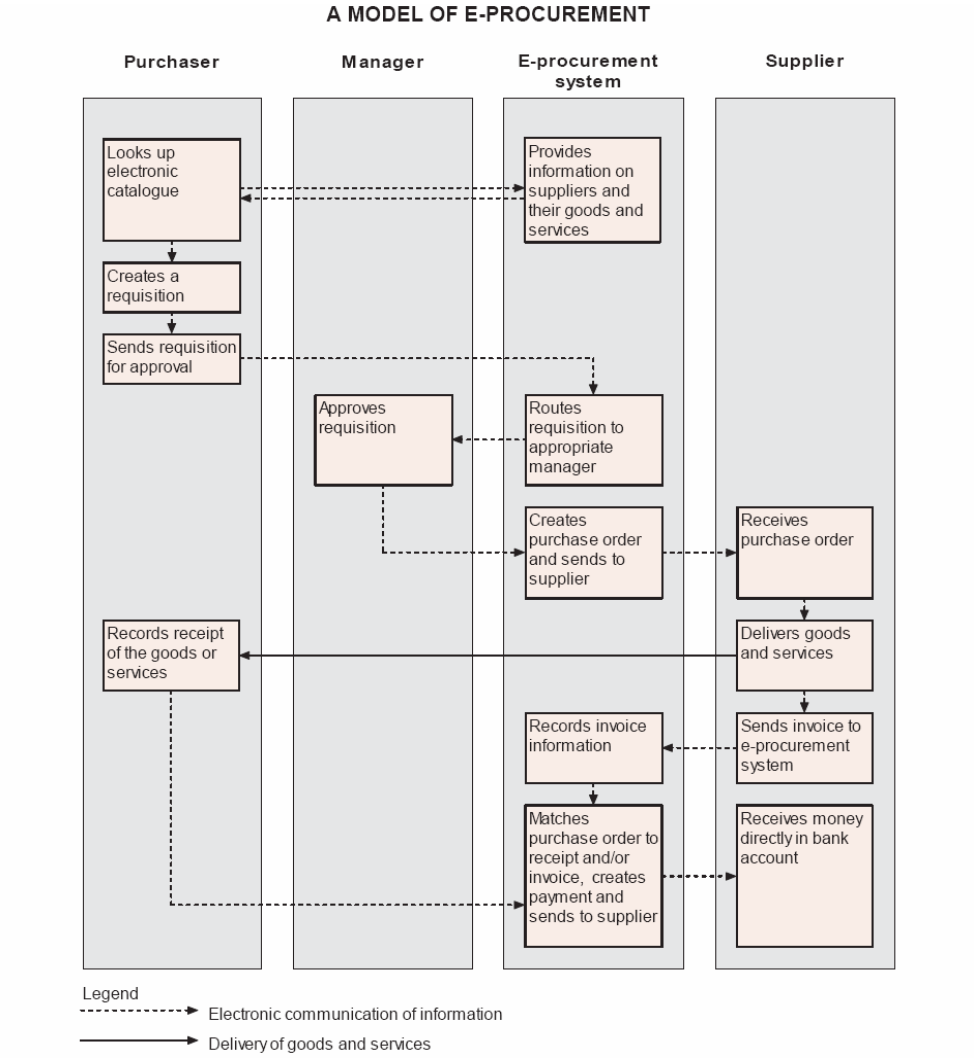
Table 2.1: Key differences in supply management environments between direct and indirect materials or services

Characteristics	**Direct materials**	**Indirect materials and services**
Supplier base	Small, controlled	Larger, somewhat less controlled
Purchase decision	Dependent, automated	Independent, sometimes ad hoc
Ordering process	Relatively simple, auto generated, no order-by-order approval	More complex requisition, purchase order(PO), order-by-order approval required
Product / price Information	Bill of material(BOM), Contract pricing	Sourcing, request for quotation (RFQ), individual PO
Involved in process	Supply and primary users	Supply and many users

Source: Cavinato et al., (2006, p.717).

Figure 2.2 gives a picture of model of e-procurement system, which shows the interactions between purchaser, manager, e-procurement system and supplier.

Figure 2.2: A model of e-procurement System



Source: Cameron (2003, p.16).

2.3.1 Types of e-procurement systems

There are various types of e-procurement systems based on types of activity performed, devices and technology used, business models etc. Boer De et al. (2002, p.25-33) proposes six different forms of e-procurement :

- web-based ERP : A software based system based on internet and networking technologies for generating material or service requisitions, approving, placing purchase orders, receiving and other related services.
- e-MRO (maintenance, repair, and operating) : A software based system based on internet and networking technologies for procurement of MRO items.

- e-sourcing : Use of internet technologies for finding new suppliers of materials or services.
- e-tendering : The process of using for sending request for information and price of material or services to suppliers and getting response for the same.
- e-reverse auctioning : Use of Internet technologies for procurement of goods or services from suppliers.
- e-informing : Exchange of procurement related information among inter and external parties using Internet technologies.

The process of e-procurement incorporates several sub-processes like supplier registration, purchase or contract finalization, order placement, delivery and contract management, and analysis. The main steps of e-procurement, depending on the complexity of the procurement and organizational policies, consists of an order (requisition or purchase order), an invoice (which might be one with the receipt), and payment. The development and deploying of e-procurement involves many issues, of which the following are major issues: cost, value, security, leveraging existing systems and interoperability.

2.3.2 Evolution of e-procurement models

E-procurement started with electronic data interchange (EDI), for exchanging business data between suppliers and buyers. Enterprise resource planning (ERP) systems are also used for e-procurement. However, main disadvantages of these systems were that they were having limited capability, inflexibility, and poor maintainability and were connecting buyers with suppliers in a bilateral way with proprietary network protocols. The cost of implementation and operation of these proprietary networks were very high. Globalization of business caused a considerable increase in partners, suppliers and customers base at diverse geographical locations, using a variety of different communication networks, which forced the EDI-based designs increasingly, fail. Under this situation, the internet-enabled capabilities came as a boon and e-procurement through internet picked up fast. E-procurement was initially aimed at indirect materials and services only. Slowly it extended to procurement of direct materials also.

At present, there are various e-procurement solutions available in the market to suit the needs of different customers. The e-procurement solutions available are mainly three types:

- Standard e-procurement solutions from various vendors like Ariba, BasWare, Oracle iProcurement(Oracle). Oracle PeopleSoft Enterprise eProcurement, SAP, Fieldglass, IQNavigator, ePlus, IBX, cc-hubwoo Ketera Technologies, Perfect Commerce, Quadrem etc.
- e-procurement solutions built in-house
- e-procurement solutions by third party vendors, who generally integrate the offerings of various manufacturers.

Kalakota and Robinson (2001, p.310) provides a comparison in characteristics of various e-procurement models available today which is given in Table 2.2 below.

Table 2.2: Comparison of various e-procurement models

Trading model	Characteristics
EDI networks	• Handful of trading partners and customers • Simple transactional capabilities • Batch processing • Reactive and costly value-added network(VAN) charges
Business-to-employee(B2E) requisitioning applications	• Make buying fast and hassle-free for a company's employees • Automated approval routing and standardization of requisition procedures • Provide supplier management tools for the professional buyer
Corporate procurement portals	• Provide better control over the procurement process and let a company's business rules be implemented with more consistency • Custom, negotiated prices posted in a multi-supplier catalog • Spending analysis and multi-supplier catalog management
First -generation trading exchanges: community, catalog, and storefronts	• Industry content, job postings, and news • Storefronts: new sales channel for distributors and manufacturers • Product content and catalog aggregation services
Second -generation trading exchanges: transaction-oriented trading exchanges	• Automated requisition process and purchase order transactions • Supplier, price, and product/service availability discovery • Catalog and credit management
Third -generation trading exchanges: collaborative supply chains	• Enable partners to closely synchronize operations and enable real-time fulfillment • Process transparency resulting in restructuring of demand and supply chain • Substitute information for inventory
Industry consortiums: Buyer and supplier led	• The next step in the evolution of corporate procurement portals

Source: Kalakota and Robinson (2001, p.310)

Truong (2008, p.112-130) has classified the electronic marketplaces into three distinct market types with little overlap, into third-party exchanges (3PX), industry-sponsored marketplaces (ISM), and private trading networks (PTNs). Referencing various authors, Truong has

summarized the characteristics, advantages, and disadvantages of those three types of electronic marketplaces, which is presented in Table 2.3.

Table 2.3: Characteristics, advantages, and disadvantages of EM (electronic market) types

EM type	Characteristic	Advantages	Disadvantages	Example	Reference
3PX	• Many-to-many relationship • Centric EM Owned by independent organizations • Horizontal marketplace	• Low fixed cost requirement • Low technical or IT infrastructure requirement • Low membership or transactional fee • Easy to use	• Very limited functionalities • Fail to leverage existing business relationships • Poor supply chain integration • Dealing with unknown business partners • Low security for confidential information	FreeMarkets, MRO.com, eWorkExchange, RetailExchange, and ChemConnect	Daniel(2004, pp. 277-290), Le(2005, pp. 1-40), UNCTAD (2001)
ISM	• Many to many relationship • Owned by a consortium formed by leading companies in an industry • Vertical marketplace	• Significant market functionalities • Strong supplier-buyer relationship • Larger supplier- buyer database • Larger trading volume • Facilitating the development of uniform standards • Significant business process integration	• High technical requirement • High fixed cost requirement • High membership and transactional fee • Failed to provide a neutral trading environment • Risk of sharing information	Covisint, Excostar, Star Alliance, E2Open, PlasticsNet, and Transplace	Le(2005, pp. 1-40), UNCTAD (2001),Brown(2000, pp. 6-14)
PTN	• One-to-many relationship • Operated by one big company • Buyer side or seller side • Vertical marketplace	• Strong collaboration with business partners • More adaptive to specific supply chain configurations and unique functionalities • Work with known trusted partners • High security for confidential information	• High fixed cost requirement • High technical requirement • Large trading volume requirement	Wal-Mart's ReatilLink, Cisco	Le(2005, pp. 1-40), King(2000, pp. 12-19), Ferreira et al (2001), Spiegel (2001)

Source: Truong (2008, p.115).

2.3.3 The drivers for e-procurement

Today, more and more organizations are going for automation in their procurement systems, using various e-procurement systems and models. The sellers also recognize the benefits of e-procurement and getting e-enabled. Neef (2001, p.3) opines that in e-business arena, e-procurement have far greater potential for cost savings and business improvements than enterprise resource planning system or online retailing. Organizations are focussing on transaction efficiencies and are using B2B electronic markets for transaction cost economics, highlighting the ability of such markets to reduce various search and monitoring costs for participating firms (Bakos, 1997; Bakos, 1998; Segev et al., 1999; Steinfield, Chan and Kraut, 2000). Pani and Agrahari (2004, p.107) reports that metaljunction, a joint venture company between two steel makers in India, obtained a savings of 7.02% in 2002-03 through e-procurement route. The main drivers for implementation of e-procurement in the organizations are as follows:

- e-procurement is a cost-cutting tool (cost of goods, inventory reduction, transaction costs),
- improved customer (Internal) service,
- improved buyer-supplier relationships,
- pressure from government, regulatory bodies, suppliers and competitors,
- improved cash flow due to e-billing and e-payments,
- reduced cycle time,
- the opportunity for real-time bidding and response,
- transparent auction process,
- increased geographical outreach,
- allows vendors to bid anonymously,
- safe storing and transportation of bid documents,
- demand aggregation,
- supplier consolidation and improvement of supplier,
- standardization of systems and processes,
- avoidance of cartel formation by suppliers,
- report generation and data storage.

2.3.4 Barriers to e-procurement

E-procurement needs e-readiness of the organizations. It should fit with the e-business strategy of the organization and harmonize with the business processes within the organization. Further e-procurement needs a careful watch on the environment and quicker decisions. Even though the use of e-procurement has grown rapidly in recent years, there are some challenges associated with it. Especially in emerging economies like India, there are more impediments to e-procurement, like financial, legal and infrastructural impediments, compared to developed economies.

Hempel and Kwong (2001) argued that there is a fundamental difficulty in applying the western best practices in e-commerce to asian and developing economies because of differences in business and cultural assumptions.

There are various barriers to e-procurement implementation. These barriers are especially dominant in the developing and the underdeveloped countries.

Wyld (2002, p.22-53) identifies the following barriers to e-procurement:

- inadequate technological infrastructure;
- lack of skilled personnel;
- inadequate technical infrastructure of partners;
- lack of integration with business partners;
- implementation costs;
- company culture;
- inadequate business processes to support e-procurement;
- regulatory and legal controls;
- security;
- co-operation of business partners;
- inadequate e-procurement solutions; and
- upper management support.

To reduce the barriers to e-procurement, organizations first have to understand that e-procurement is critical to their success in present world dominated by technology, especially the information and communication technologies (ICTs). The same message is to be made understood to all the people in the organization. Adoption of technology and leveraging its benefits should become a part of organizational culture. However, the business environment prevailing in the region, availability of infrastructure for e-procurement, readiness of partners for e-procurement, governmental, legal and regulatory supports play vital role. Adoption of e-procurement is to be taken as adoption of new technological tool to get competitive advantage over the competitors.

Davila, Gupta and Palmer (2002, p.33) puts three most frequently identified barriers to four e-procurement technologies as shown in Table 2.4.

Table 2.4: Three most frequently identified barriers to various e-procurement technologies utilization

E-procurement technology	Three most identified barriers
E-procurement software	• Problems integrating with existing systems. • Lack of common standards for e-commerce software development. • Lack of suppliers accessible through the organization's e-procurement system and/or lack of supplier investment in catalog development.
Internet exchanges	• Not enough suppliers to create a liquid marketplace. • Suppliers reticent to participate in selling environments where preeminent focus is on price. • Suppliers reticent to participate because control is lost over the presentation of brand name and product features
E-auctions	• Organizational discomfort with auctions, as opposed to honoring commitments to supplier partnering and consolidation. • Downward price pressure on vendors resulting in diminished customer service or quality. • Inability to identify potential items for auction.
Purchasing consortia	• Pricing that is not significantly better than available without consortia. • Getting a sufficient number of vendors into the process. • Ensuring conformance to state laws and regulations that require a bidding process.

Source: Davila, Gupta and Palmer (2002, p.33).

2.4 Emerging trends in procurement

Procurement has emerged from being sets of functional skills to procure materials and services to being recognized as a driving corporate business philosophy, a profit creation centre, rather than simply a cost saving function. Procurement has evolved from a support function to a strategic weapon in the competitive arsenal of the organizations.

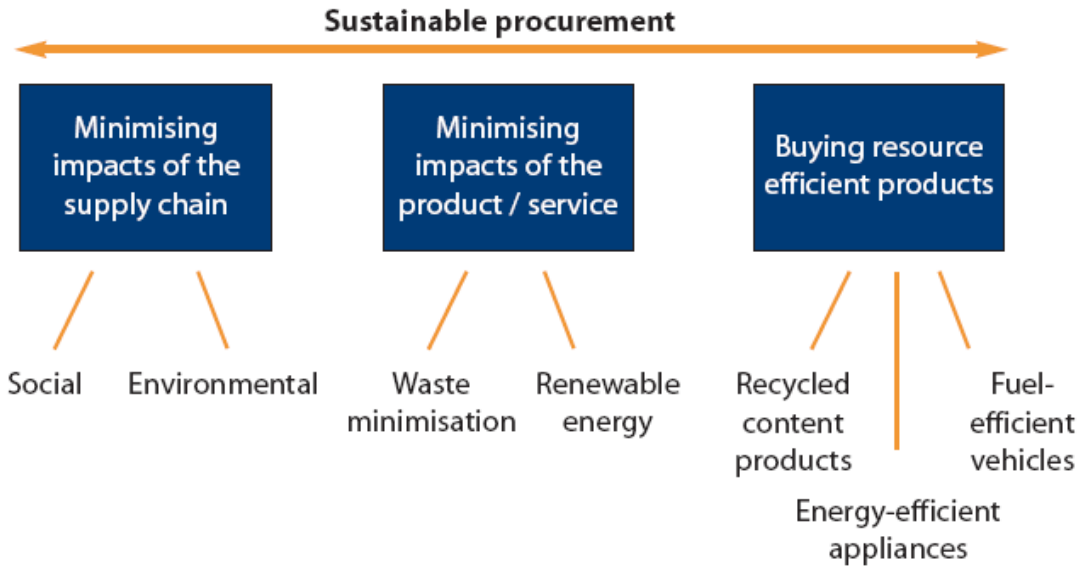
Sirkin (2008, p.1-4) says 'Procurement has taken on greater strategic importance in multinational companies in recent years -- and it will assume even greater significance in the years to come'

Narayana (2004) puts forward 'The Internet has brought about a lot of changes in business, economics, information and entertainment. Also transfer of information has no geographical and time barrier. Virtually all the manufacturers, suppliers, distributors, customers all across the world are now connected to each other through World Wide Web (WWW). Activities and transactions related to buying, selling, etc. can now be brought under the realm of internet. The pressure on each business enterprise now is to plan transformation to e-com paradigm, to what extent, in how many stages and at what speed. In the Internet based system, not only transparency can be ensured but everything is also on record'.

E-business technologies focusing on effective integration between various components of a supply chain to transfer knowledge and information have been receiving significant importance.

The concepts of strategic procurement and spend analysis are getting more and more attention. A new concept of sustainable procurement is emerging now. The sustainable procurement task force of United Kingdom government, in their document, Procuring the Future (2006, p.10), defines sustainable procurement as a process whereby organisations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only to the organisation, but also to society and the economy, whilst minimising damage to the environment. The process of sustainable procurement is shown in figure 2.3

Figure 2.3 . Sustainable procurement process



Source: Society of local authority Chief Executives and Senior Managers, UK (2003, p.5).

CHAPTER 3

ENVIRONMENT ANALYSIS FOR E-PROCUREMENT

3.1 Study of present procurement system in VSP

The procurement system in VSP has evolved over the years. It started with a total manual system, passed through different phases and now an Oracle based Materiel Acquisition Management System (MAMS) package is being used for materials and services procurement. The System is based on company wide LAN (Local Area Network) and is accessible to employees responsible for procurement, through a password protection. Further, the company has developed an in-house e-procurement system, which is under implementation. At present e-procurement is started in a small way with the e-procurement package developed in-house by information technology department. E-procurement practices are being followed for selective procurement, only on the price part, i.e the reverse auction where in after the usual tendering process and after the technical evaluation, all the technically acceptable (TA) parties would be bidding their lowest prices on a stipulated date and time, till the lowest bidder (L1 bidder) is established for each item. Other conditions of procurement apply on this as usual.

Now the in-house software package is under rigorous testing, and is planned for full-fledged implementation later. Meanwhile the Enterprise Resource Planning (ERP) system is also under implementation in VSP.

Present Material Acquisition Management System (MAMS):

Objective: The objective of the present MAMS used for procurement of materials/services is to arrange materials, spares and services for various customer departments at right price, right time, right quantity, and right quality and from right source to meet the organizational requirements.

Procurement cycle: The procurement cycle for materials and services in VSP, normally consists of the following steps:

- requirement generation,
- approval,
- indent for procurement,
- identify the source,
- evaluate the offers,
- award contract,
- review progress,
- inspect,
- receive,
- make payment,
- analyze,
- take action based on analysis.

Purchasing involves market research for materials and sources of materials, follow up to ensure proper delivery, inspection to ensure quality and compliance to specification, development of systems and procedures, co-ordination with connected departments, co-ordination with other agencies, planning, execution and analysis of system performance.

The purchasing procedure is a set of documented guidelines to be followed in purchase function to carry out day-to-day activities. In MAMS, the purchasing procedure is divided in seven modules covering various activities of purchase function. These modules are*:*

- indenting module,
- tendering module,
- placement of acceptance to tender(a/t) & allied matters module,
- stores module,
- vendor registration and ratings module,
- quality complaints and sample approval module,
- reports and analysis module.

Indenting module: The indenting module is meant for indenters from various departments, to raise material procurement requests (MPR). Based on the planned production of the next year, every department prepares a departmental budget for planned consumption of materials

and services. In addition to these, for common items like stationary, automatic replenishment items, etc a consumption projection is sent to central stores department, who compiles the total requirement for the plant. For rationalized spare parts, projections from the departments are sent to the Spare Parts Cell (SPC), who compiles the rationalized spare parts requirements for all the maintenance and services departments. A high-level committee approves the budget for procurement, department wise. As per the approved budget, the authorized personnel of planning section of various departments raise Material Procurement Request (MPR) online through the indenting module. The MPR is processed for approval at appropriate level(s) and after approval reaches to materials management department on-line through the company wide local area network (LAN).

The indenting module provides different data about the item to be procured viz. online stock position, last three years consumption rate, last procurement price, approved vendor list etc.

Tendering module: The tendering module is aimed at procurement of stores, goods or materials with a view to obtain quality goods at competitive prices from parties. The emphasis is on reliable suppliers who will supply in reasonable lead-time. Tendering has also been designed to minimize processing as much as possible to reduce cost of operations. Tendering module receives the indent for further processing. At present material or service, requests for quote are normally sent to the supplier/suppliers by postal mail or fax.

There are various modes of purchase and the following are the modes of tendering supported by the module:

- advertised tender,
- limited tender,
- single tender,
- Director General of Supplies and Disposal (DGS & D) rate contracts,
- long term contracts, annual contracts and rate contracts,
- proprietary purchase,
- emergency purchase,
- repeat order.

Placement of a/t & allied matters module: After offers are received from the suppliers, the same is sent to the indenting department for technical recommendation (TR). After the TR is received at materials management department, the technical acceptable parties are evaluated on price and commercial terms and conditions. This process is done manually. Negotiation with the suppliers is done manually and sometimes-through uses of correspondence like e-mail or fax. After the supplier is finalized, the system generates the purchase order (PO), which is sent to the supplier by post or by fax.

Stores module: This module provides information of receipt of the material at VSP stores and its acceptance status. Once material is accepted, the stocks are updated online and

available for issue to users against on-line requisition. This module also shows the item's value, purchase order details, indenter details, type of item (fast-moving, slow-moving, non-moving, insurance item), date and quantity of each issue etc.

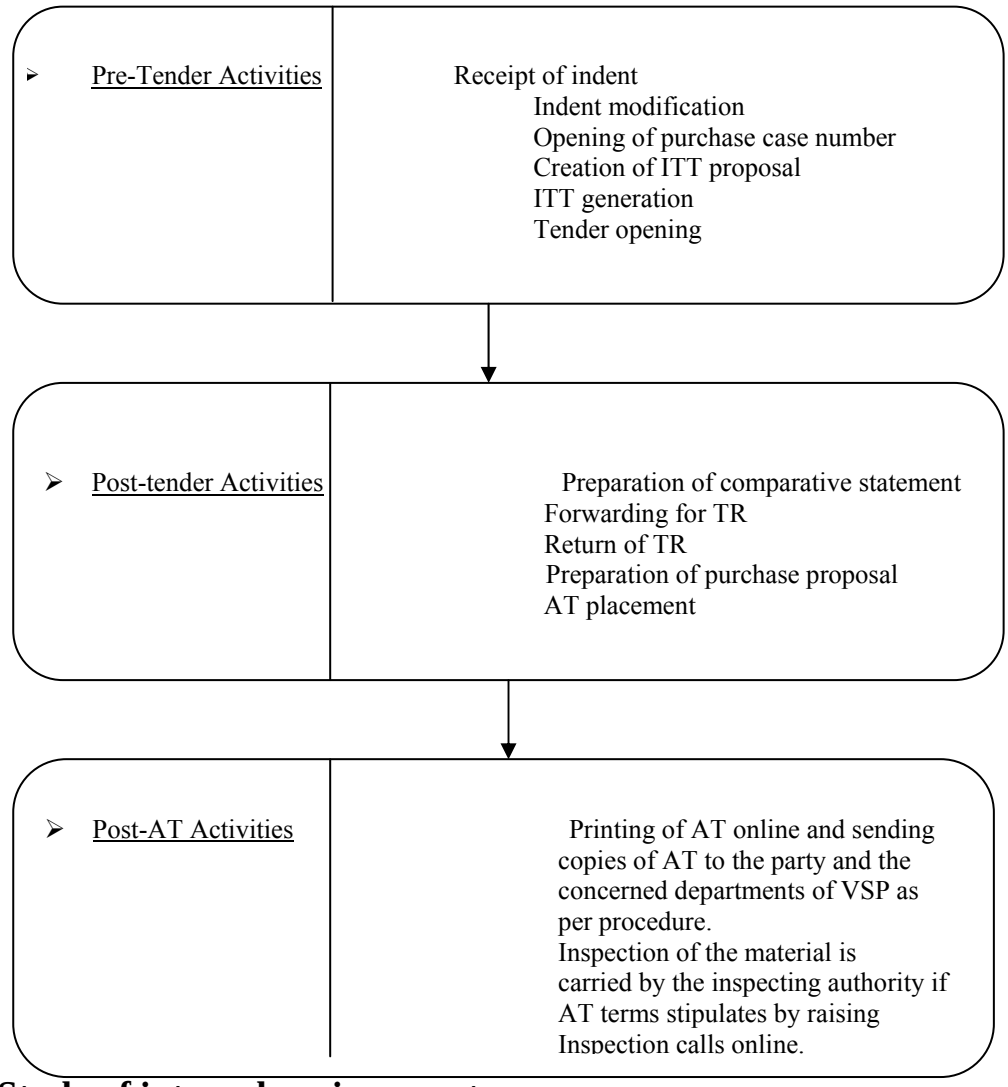
Vendor registration and ratings module: This module is used for registration of new vendors, up gradation or removal of existing vendors, and for rating of vendors on various criteria. Now VSP has launched a system of on-line vendor registration through its web portal.

Quality complaints and sample approval module: The quality complaints and sample approval module is used for two purpose. First quality complaints regarding unsatisfactory performance of material/service can be raised on line by the user. After approval by appropriate authorities, it reaches to material management department. Material management department takes up the matter with the supplier for liquidation of defects/or replacement of the items, through e-mail or letter to supplier. Secondly, the module provides for submission of sample test report by the indenter on-line. Sample test report is required for procurements that have sample approval clause in the contract. The sample test report is approved online by appropriate authorities and reaches materials management department for further action at their end.

Reports and analysis module: The reports and analysis module provides different reports and analysis for managerial decisions. Major reports are department-wise monthly consumption report , annual consumption of various items for last three years, type of items in store like non-moving, slow-moving or fast-moving items, status of material indents, payment position of materials, status of material under procurement, vendor reports etc which are used for managerial decisions.

The activities involved in procurement process involve mainly three steps i.e pre-tender activities, post-tender activities, and post-at activities. ITT refers to invitation to tender process. AT refers to acceptance to tender. TR refers to technical recommendation on materials or services. The activities involved in procurement at VSP can be depicted as shown in Figure 3.1.

Figure 3.1: Procurement activities breakup in VSP



3.2 Study of internal environment

Availability of iron ore and coal: India is having abundant deposits of iron ore and coal. However, majority of coking coal found in India is not suitable for steel making. VSP is not having any captive ore and coal mines. Hence, it is vulnerable to market fluctuations for its major raw materials.

Low labour cost: Labour cost in India is relatively cheap. It is an advantage to Indian steel plants.

Abundance of quality manpower: India is having a huge pool of skilled manpower. In addition to that, VSP being a relatively new steel plant the average age of its workforce is low compared to other integrated steel plants in India.

Mature production base: Steel making in India started long back and India is ranked number five in world steel production. Steel making in India is having a mature production base which helps in collaboration among the industry.

Low quality of coking coal: Steel manufacturers in India, especially VSP is, mainly dependent on imported coking coal, as the quality of majority Indian coking coal is not suitable for steel making.

Low R&D investments: Research and development investments in India, especially in the steel sector, are lower than other developed countries**.**

High cost of capital: The cost of capital in India is higher than the world average.

Inadequate infrastructure and poor logistics: Infrastructure and logistics in India are poor compared to developed nations.

Dependence on imports for steel manufacturing equipments & technology: The critical equipments required for steel plants are still not totally manufactured in India. As R&D investment is low, the newer technologies are bought at very high price.

3.3 Study of external environment

Cost of input material: Increasing cost of raw material is a major concern for steel industry. The major raw materials required for the integrated steel plants are iron ore, coking coal, steel scrap, limestone and different additives like ferroalloys and alloying elements like, molybdenum, nickel, copper, niobium etc. In addition to this, it requires energy in the form of natural gas, electricity, coal, oil and steam. The prices of these raw materials and energy are going on increasing, over the years. Table 3.1 presents a view of the rising cost of raw materials and energy for steel making.

Table 3.1: Steelmaking raw materials and input costs

Year/ Month	Thermal coal ($/tonne)	Coking coal ($/tonne)	Iron ore (Cents/ Dry metric tonne unit)	Natural Gas ($/1000m3)	Steel Scrap ($/tonne)	Electricity (Cents/ Kilo watts hour)
2006 M1	46.3	90.2	77.35	275.8	185-190	5.78
2006 M2	51.1		77.35	275.8	215-220	5.98
2006 M3	53.3		77.35	275.8	210-215	5.88
2006 M4	56.7	94.2	77.35	293.0	220-225	5.93
2006 M5	56.4		77.35	293.0	240-250	6.00
2006 M6	56.1		77.35	293.0	255-260	6.41
2006 M7	56.5	93.5	77.35	302.4	250-255	6.61
2006 M8	54.6		77.35	302.4	245-250	6.65

2006 M9	50.5		77.35	302.4	230-235	6.37
2006 M10	47.2	95.4	77.35	311.4	230-245	6.16
2006 M11	49.3		77.35	311.4	230-245	6.04
2006 M12	53.3		77.35	311.4	245-250	6.00
2007 M1	55.0	94.3	84.7	302.0	264-270	6.09
2007 M2	56.7		84.7	302.0	280-285	6.18
2007 M3	59.3		84.7	302.0	295-310	6.16
2007 M4	60.1	94.6	84.7	281.9	315-320	6.19
2007 M5	60.0		84.7	281.9	295-305	6.20
2007 M6	66.0		84.7	281.9	295-300	6.51
2007 M7	72.1	95.1	84.7	280.4	280-290	6.61
2007 M8	74.3		84.7	280.4	275-285	6.83
2007 M9	73.3		84.7	280.4	280-290	6.55
2007 M10	80.2	97.8	84.7	308.2	275-280	6.44
2007 M11	90.6		84.7	308.2	280-290	6.22
2007 M12	97.5		84.7	308.2	295-310	6.25
2008 M1	98.3	106.1	140.6	369.7	385-400	6.27
2008 M2	141.4		140.6	369.7	390-405	6.38
2008 M3	126.7		140.6	369.7	490-510	6.51
2008 M4	131.8	n/a	140.6	428.4	510-530	n/a
2008 M5	142.7		140.6	428.4	570-580	n/a
2008 M6	171.2		140.6	428.4	650-660e	n/a

Source: www.steelonthenet.com (2008).

In India, administrated price of input raw materials like coal, fuel, electricity and freight puts Indian steel manufacturers in a further disadvantageous position. Mitra Mazumder and Ghoshal (2003, p.67) puts the problem as "High administered price of essential inputs like electricity puts Indian steel industry at a disadvantage; about 45% of the input costs can be attributed to the administered costs of coal, fuel and electricity, e.g. cost of electricity is 3 cents in the USA as compared to 10 cents in India; and freight cost from Jamshedpur to Mumbai is $50/tonne compared to only $34 from Rotterdam to Mumbai".

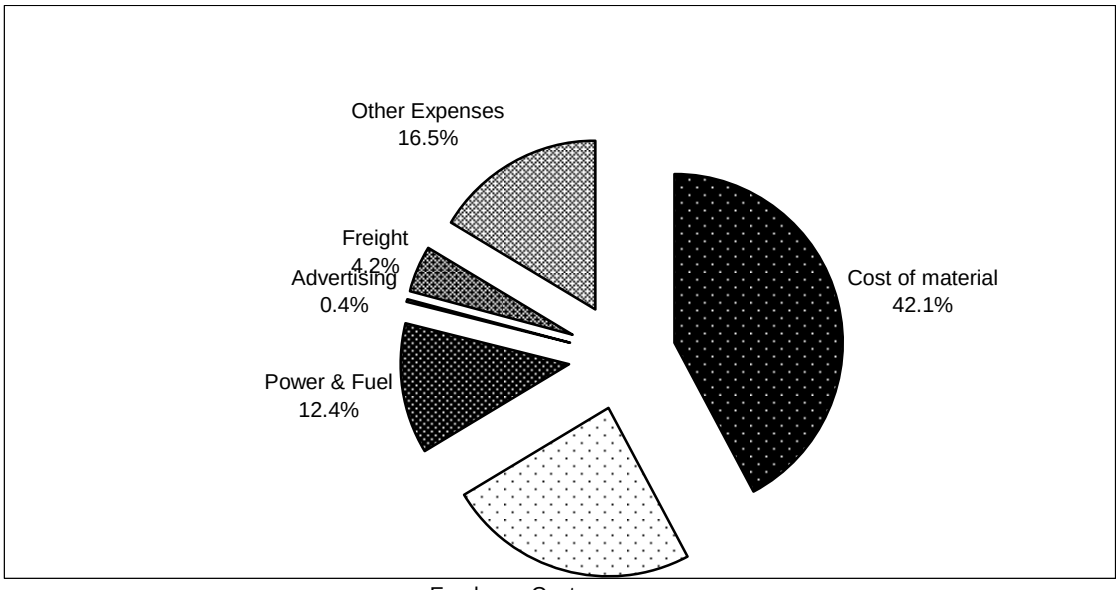
Further, the quality of raw materials, coking and non-coking coal and other inputs plays a major role in procurement. Sinha, Bagchi and Mukherjee (2004, p.19) gives a cost break-up of major steel units in the world, which is shown in Table3.2. Cost incurred in steel making for a typical integrated steel plant in India is shown in Figure.3.2

Table 3.2: Cost break-up of major steel units in the world, in percentage

Components	India	Japan	UK	USA	Australia	South Korea
Materials and Energy	75	75	73	73	65	76
Labour	15	13	21	21	26	7
Depreciation	6	10	5	5	7	11
Interest	4	2	1	1	2	6
Total	100	100	100	100	100	100

Source: Sinha, Bagchi and Mukherjee (2004, p.19).

Figure 3.2: Typical cost of sales for an integrated steel plant



Source: Sinha, Bagchi and Mukherjee (2004, p.19)

Growing domestic demand: Recent years have seen high growth rate of domestic steel demand. This is due to rapid development in infrastructure building, expansion of various industry base and growth of per capita consumption of steel. Present per capita steel consumption in India is 43.4 Kg compared to 353.9 Kg that in USA. The national steel policy predicts per capita per annum steel consumption in urban India will grow to 165 Kg by the year 2019-2020. This massive growth of domestic demand of steel is a great opportunity for steel sector.

Good export opportunities: Indian steel prices are competitive. With demand of steel growing worldwide, there is a good export opportunity for steel.

Rapidly growing IT market: Strong IT development in India and its application in Industry for technological development and business process improvement will definitely help the steel industry.

Consolidation: Consolidation in industry will add more power and capability to plants.

Market fluctuations and China's export possibilities: The demand for steel follows a cycle and fluctuates over a period. For last few years, China has become a net importer as it is developing its infrastructure, especially for Beijing Olympics, 2008. However, once it is completed, the demand of steel may come down.

Protectionism in various countries: Governments of various steel producing countries may try to protect their industry and reduce imports.

Global slowdown: In case of a global slowdown, demand of steel may come down.

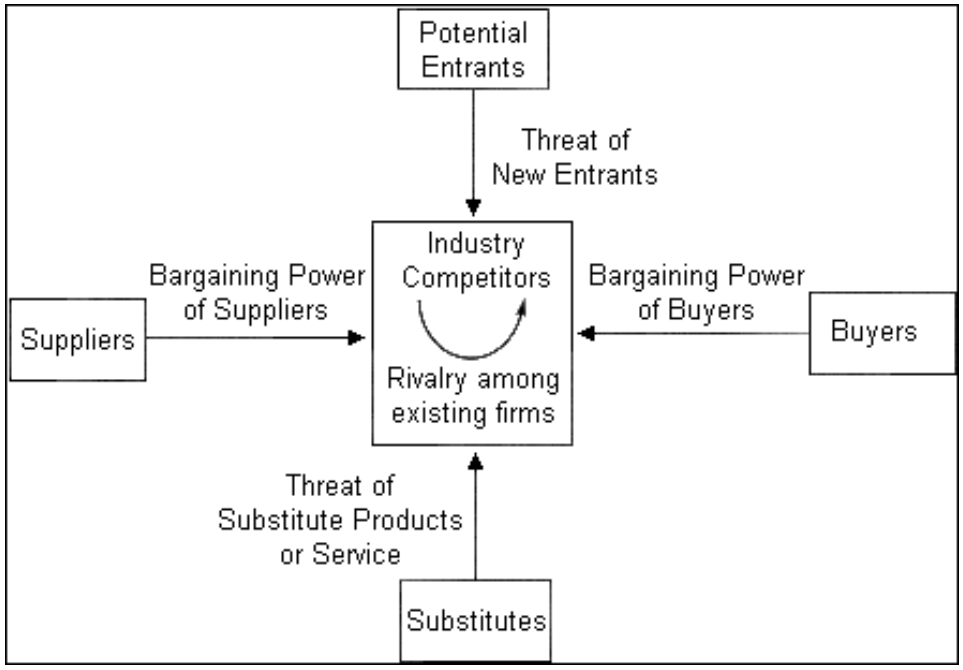
Unstable economic policies: India is a democratic country with multi party system in politics. As the ideologies of political parties varies, the economic policy of government changes with change of political party in government.

3.4 Industry analysis

3.4.1 Porter's five forces model

Michel Porter's (1980, p.3-8) famous five force model, suggests that attractiveness of any industry depends on five dominant forces. The five forces, i.e. the bargaining power of suppliers, the bargaining power of buyers, the threat of new entrants, the threat of substitute products or services and the rivalry among existing firms , decides the industry attractiveness. The objective of corporate strategy should be to modify these competitive forces in a way that improves the position of the organization. Some authors like Wheelen and Hunger (2006, p. 82) suggest one more competitive force from other stakeholders should be considered i.e. the relative power of unions, governments, special interest groups, etc. The two forces, the bargaining power of suppliers and the bargaining power of buyers, make the process of purchasing critical for the success of any organization. The power of the suppliers depends on concentration of the suppliers, profitability of the suppliers, switching cost, chance of forward integration by suppliers, role of quality and service, branding, importance of buyer etc. The power of buyers depends on concentration of buyers, product differentiation, role of quality and service, switching cost, threat of backward integration by buyers, profitability of buyers etc. Porter's competitive force model is probably one of the most often-used business strategy tools and has proven its usefulness on numerous occasions. Together, the strength of the five forces determines the profit potential in an industry by influencing the prices, costs, and required investments of businesses—the elements of return on investment.

Figure 3.3: Michael Porter's competitive force model



Source: Porter (1980, p.4)

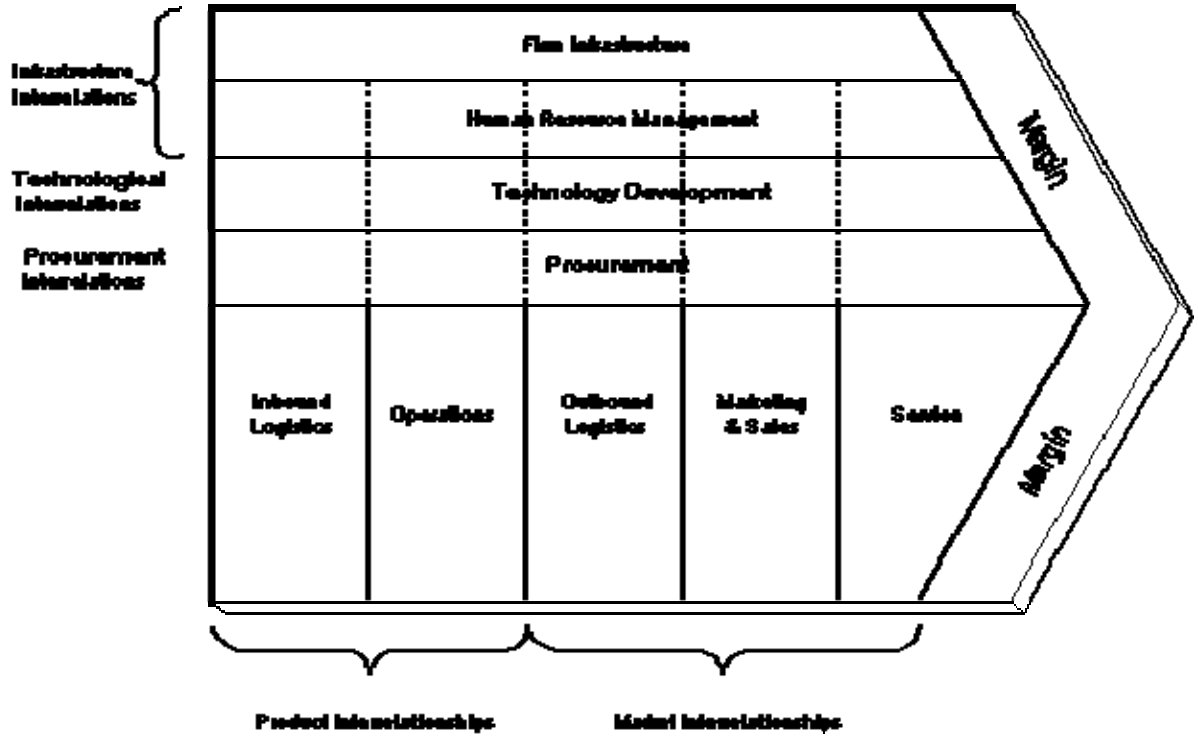
Bargaining power of suppliers: the costs of inputs like raw materials, consumables, spares have a significant effect on the organization's profitability. Whether the strength of suppliers represents a weak or a strong force hinges on the amount of bargaining power they can exert and, ultimately, on how they can influence the terms and conditions of transactions in their favor. Given a free hand, the suppliers will try to maximize their prices or give the minimum service possible. If the supplier forces are weak, the buyer can negotiate to get a favorable business deal and vice versa. Best solution for the long term is mutual collaboration between supplier and buyer, for mutual benefit and growth. E-procurement can help an organization to reduce the bargaining power of the suppliers and to create a mutual collaborative relationship between the buyer and the seller.

3.4.2 Value chain analysis

Michael Porter (1985, p.33-59) introduced, the concept of the value chain in his book "Competitive Advantage: Creating and Sustaining Superior Performance". He suggested that activities within the organization add value to the service and products that the organization produces, and all these activities should be run at optimum level if the organization has to gain any real competitive advantage. If they are run efficiently, the value obtained should exceed the costs of running them i.e. customers should return to the organization and transact freely and willingly. Michael Porter suggested that the organization's activities could be split into 'primary activities' and 'support activities'. The value chain encompasses the whole organization and looks at how primary and support activities can work together effectively and efficiently to help gain the organization a superior competitive advantage.

Figure 3.4 Generic value chain in an organization

Chain of value activities in an organization



Source: Adapted from Kotler (2000, p.44)

Procurement department supports all the departments in the value chain. It must source raw materials for the organization and obtain the best price for doing so. For the price, they must obtain the best possible quality. No other business model highlights the need for tight integration across suppliers, manufacturers, and distributors quite like the value chain. Delays in inventory tracking and management can ripple from the cash register all the way back to raw material production, creating inventory shortages at any stage of the value chain. The resulting out-of-stock events can mean lost business. The internet promises to increase business efficiency by reducing reporting delays and increasing reporting accuracy. Speed is clearly the business imperative for the value chain.

3.4.3 SWOT analysis of steel industry in India

The strengths, weaknesses, opportunities and threats for the Indian steel industry have been discussed under the internal and external environment study of steel sector in India are tabulated as a Strength, Weakness, Opportunities and Threat (SWOT) matrix in Table 3.3.

Table 3.3: SWOT analysis of steel industry in India

Strengths	Weaknesses
1. Availability of iron ore and coal 2. Low labour cost 3. Abundance of quality manpower 4. Mature production base	1. Low quality of coking coal. Coking coal import dependence 2. High cost of capital in India 3. Inadequate infrastructure. Poor logistics. 4. Dependence on imports for steel manufacturing equipments & technology
Opportunities	**Threats**
1. Growing domestic demand 2. Good export opportunities 3. Rapidly growing IT market 4. Consolidation	1. Market fluctuations and China's export possibilities 2. Protectionism in various countries 3. Global slowdown 4. Increasing cost of raw materials 5. Unstable economic policies.

The national steel policy (2005, p.3) of Indian government has adopted the following strategy for development of steel sector 'A multi-pronged strategy would be adopted to move towards the long-term policy goal. On the demand side, the strategy would be to create incremental demand through promotional efforts, creation of awareness and strengthening the delivery chain, particularly in rural areas. On the supply side, the strategy would be to facilitate creation of additional capacity, remove procedural and policy bottlenecks in the availability of inputs such as iron ore and coal, make higher investments in R&D and HRD and encourage the creation of infrastructure such as roads, railways, and ports'.

VSP should take the leverage of its strengths to maximize the utilization of the opportunities and try to reduce its weaknesses and minimize the effects of the threats. Based on the above SWOT analysis and national steel policy of India, the following measures may be taken by VSP in the procurement front to get competitive advantage:

- enhanced and easy access to critical inputs – iron ore & coking coal,
- cost reduction of materials/services,
- strategic sourcing,
- collaboration with suppliers,
- appropriate automation of procurement process,

- continual training and development of manpower,
- constant vigil on changing market situation.

3.4 Trend and future scenario

An interim report on a 2008 study on e-business activity in steel industry by European commission (2008), says, "Procurement management is a fundamentally important activity in the steel industry, as in most manufacturing industries, because upstream supply chains tend to be complex and fragmented. Electronic sourcing platforms can make procurement processes more efficient and reduce procurement cost. The case of ThyssenKrupp shows that such platforms may not only be beneficial for the procuring company but also for the suppliers because their tendering procedures can become more streamlined, too. However, iron and steel companies are likely to continue to procure raw materials in long-term offline relationships, due to an oligopolistic market structure in iron ore supply and due to the necessity to fulfill high quality standards for input raw material".

A study of major steel producers worldwide shows that all of them have adopted e-procurement in some way or other.

Indian Scenario: In India, the major integrated steel plants are Tata Steel, Steel Authority of India Limited (SAIL), RINL, Jindal Vijayanagar Steel Limited (JVSL) under Jindal Iron and Steel, Essar Steel and Ispat Industries.

At present, six specialized steel trading sites are functioning in the country. There are other e-trading sites but they deal with other industries and/or products also. The six steel trading sites are metaljunction.com promoted jointly by SAIL and Tata Steel, clickforsteel.com promoted by Essar Steel, steelrx.com promoted by a group of professionals and Ferro Alloys Corporation, steelmart.com promoted by Jindal Iron and Steel (JISCO), steelnext.com promoted by Reliance and steelexchangeofindia.com promoted by a group of steel traders. Ispat industries have their dedicated buyer centric e-commerce site.

World Scenario:

The top ten steel producers in the world in 2007 are ArcelorMittal, Nippon Steel, JFE, POSCO, Baosteel, Tata Steel, Anshan-Benxi, Jiangsu Shagang, Tangshan and US steel. All of them are using e-procurement through buyer-centric dedicated system or through public portal.

Hence, we can conclude that, worldwide, the largest manufacturers of steel are already using e-procurement system, in some form or other, to achieve competitive advantage.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 Introduction

Research methodology forms the backbone of entire research process and is crucial for the correctness of research results. Kumar (2005, p.4) rightly puts ‘As a matter of fact, the

validity of your findings, entirely depends upon the soundness of the research methodology adopted'. It is a clear planning of how to conduct the research so that the objectives of the research are achieved.

4.2 Study design

The objective of this study is to find out the status and future of e-procurement in steel industry and to make a case study of e-procurement status in VSP. For designing the study, literature survey was done to find out the research methodology used in earlier research on e-procurement case studies. Further, the matter was discussed with my mentor and some of the officials responsible for e-procurement in VSP. After due deliberations on study design for the present research, it was decided that for getting the environmental data regarding status of e-procurement, secondary data needs to be collected from the web, published data in reports or articles and data from the VSP. Getting data from VSP should not be a problem, as the individual doing the thesis is an executive of the organization and the organization has sponsored him for the course for which the study is being conducted. Further, the study will be useful for full-fledged implementation of e-procurement system, in the organization, which the company is going for.

The study on e-procurement scenario in VSP, primary data needed to be collected, as no secondary data was available on the subject, specific to VSP. After discussions and due deliberations it was decided to conduct two questionnaire surveys, which will be apt and useful for the study. First questionnaire is planned to get the information about the procurement practices, e-procurement adoption or use and about the impact of e-procurement on procurement performance measures. The e-procurement process includes active involvement of our suppliers also, and the e-readiness of the suppliers is a critical success factor for any e-procurement system. It is the active collaboration between the buyers and the suppliers, which makes e-procurement successful, and the participants flourishing. Hence, it is decided to conduct a questionnaire survey on the suppliers to VSP for their views and readiness for e-business with VSP.

Hence, the study design consists of collection of secondary data from various sources and two-questionnaire surveys-one for the company executives and one for the suppliers to the company to get a realistic view of the situation.

4.3 Design of the survey

Design of survey is critical for getting correct response. The clarity, usability, accessibility and consistency of the survey affect the response rate and the quality of data obtained. A detailed survey of literature in the field of e-procurement in specific and e-business in general was carried out. The literature survey revealed the status and the future trends of e-procurement worldwide. The status of e-procurement in steel industry worldwide and India in particular was obtained. The study revealed various types of e-procurement solutions are

available from various vendors in the market. Various experts in the field are having different views about the implementation of e-procurement systems in industry and in general suggest that a particular organization has to choose an e-procurement platform based on its specific business model, core capabilities, environment, and capabilities of its suppliers.

Based on the information gathered from the literature survey and discussions with the experts in the field two questionnaires were designed to collect data. There were many questionnaires available on the subject from previous studies by various researchers. Due to paucity of time for the validation of questionnaire, the present questionnaires were adapted from some tested and proven questionnaires used for a similar research, with some modifications to suit the e-procurement perspective in VSP. (Vaidya 2006, Kent 2004, eProcurement Scotl@nd n.d.)

4.3.1 Questionnaire-1

The first questionnaire is aimed at to collect primary data about the procurement practices and e-procurement adoption/use in VSP, and about the impact on procurement performance measures through e-procurement. The questionnaire consists of four parts and 17 main questions. Similar questions are arranged under one main question to make the questionnaire consistent and user friendly. Altogether, there are 63 questions in the questionnaire. The questions asked are of two types:

Open-ended questions: In this questionnaire, open-ended questions are used to capture the free views of the survey participants. The data regarding the length of experience of the participant, there views; priorities and suggestions regarding e-procurement are captured through open-ended questions.

Closed-ended questions: Closed ended questions, used in the questionnaire, ask the respondents from a pre-existing set of dichotomous answers. The answers for the questions are captured using yes/no option or by ranking scale response options like the Likert scale

questions. The Likert scale answers used in the questionnaires are of five or seven points range scale.

First part of the questionnaire is about the participant details. It consists of three questions regarding the field of experience, length of experience and present position in the organization.

The second part of the questionnaire is about the present scenario of existing procurement practices and e-procurement adoption/use in VSP. This part is again sub-divided into four sub sections i.e. sub-sections with questions based on organizational perspective, transactional perspective, technological perspective and environmental perspective**s.** It contains 31 closed ended questions and two open ended question. The open-ended questions are about their open

comments on the present procurement system in VSP and the estimated growth rate of e-procurement in steel industry in India.

The third part of the questionnaire is about the impact of e-procurement on procurement performance measures. It contains 28 questions. It contains three open ended questions to gets the views of the participants about the critical issues for implementation of an e-procurement system in VSP, in the purchasing and supply chain area and to suggest further performance measures or provide additional comments on the antecedents of e-procurement initiatives and impact on performance measures.

The questionnaire was circulated to 150 officers of VSP from various departments like materials management department, information technology department, finance and accounts department and end user departments like production, maintenance, and services who use some modules of materials management package for procurement of materials/services for their needs. The questionnaires were sent to them by email. The responses received from them by e-mail. A total of 53 usable responses were received.

4.3.2 Questionnaire -2

The second questionnaire aims at collecting data e-procurement readiness from the suppliers to VSP. The questionnaire is divided into three parts and consists of 35 questions in total. The first part of the questionnaire deals with the vendor organizational details and its e-readiness assessment.

The second part of the questionnaire is meant for assessment of the vendors view about impacts of e-procurement to the buyer (VSP) and to the supplier.

The third part collects the contact information of the vendor. For this questionnaire, both open-ended and close-ended questions were administered to get the responses. For close-ended questions, the Likert scale was used. The questionnaire was sent to 50 vendors and 11 usable responses were received. The questionnaires were sent to vendors by email. The responses received from them by e-mail.

4.4 Data collection

Data required for the thesis was collected through various means. The secondary data was collected from journals, periodicals, magazines, research papers on research done on similar subjects and the web. Further data regarding VSP was collected from executives of various departments of VSP. The primary data for this study was collected from two questionnaire surveys. The first questionnaire survey was used to collect primary data about the procurement practices in VSP, the extent of use of e-procurement functions, the benefits obtained/foreseen and view about future of e-procurement. The second questionnaire collects

data from the suppliers to VSP about their e-readiness for e-procurement system of VSP and their observations / views about the benefits from e-procurement to VSP and to the suppliers.

4.4 Analysis of data

Analysis of various data was done to come to obtain results from the surveys and to reach to the conclusions. Various statistical parameters like mean, mode, median, etc were calculated by preparing a database based on SPSS for Windows 16.0.

Gap Analysis was used to map out the attributes to find out the differences in perceptions between VSP executives and vendors. The results of the findings are displayed in a clear fashion for an easy understanding and co-relation between the surveys and the analysis.

4.5 Summary

Research methodology is critical for getting realistic output from the research work. The criticality of the methodology increases in case the research incorporates primary data collection. In this research, due attention is paid to decide the research methodology by adopting the earlier tested questionnaire, seeking expert guidance from the academics, mentor, senior executives of materials management department in VSP and brainstorming and pilot testing with colleagues of Master of Business Administration program in International Center for Promotion of Enterprises.

CHAPTER 5

DATA ANALYSIS AND RESULT INTERPRETATION

5.1 Analysis of primary data

Primary data was collected through two questionnaire surveys. The first questionnaire survey (Questionnaire Survey 1) was aimed at to get the inside's view and facts regarding e-procurement, from the concerned officers of VSP. The second questionnaire survey was administered to get the views of the suppliers, so that the e-readiness of the suppliers for e-

procurement system in VSP can be ascertained. An effective functioning of e-procurement system requires presence of four factors. They are buyer's e-readiness, supplier's e-readiness, enabling environment and an organizational urge to go for e-procurement. The responses received were analyzed using SPSS for Windows 16.0, as the package is user friendly, reliable, universally available and solves the purpose of present analysis.

5.2 Analysis of secondary data

The relevant secondary data was collected from various sources like periodicals, earlier researches done on relevant subject matter, surveys done by others, web and through literature-review on the subject matter. The data was analyzed and conclusions arrived.

5.3 Data interpretation of responses from questionnaire survey 1

A detailed analysis of responses from questionnaire survey 1 is done through SPSS for Windows 16.0 package.

5.3.1 Part A: About the respondents

The first part of the questionnaire survey, collects the data regarding the respondent's profile. The questionnaire was sent to executives from different departments of VSP, to get a wide cross-sectional view about the various facets of e-procurement introduction and implementation in VSP. The respondents are from materials management department (41.5%), finance department (5.7%), end user departments like production, maintenance and services departments (37.7%), information technology department (13.2%) and other departments (1.9%). The positions of the respondents are senior manager (41.5%) and middle level manager (58.5%). The respondent's functional areas and the managerial positions are shown in figure5.1 and figure 5.2 respectively.

Figure 5.1: Functional areas of respondents

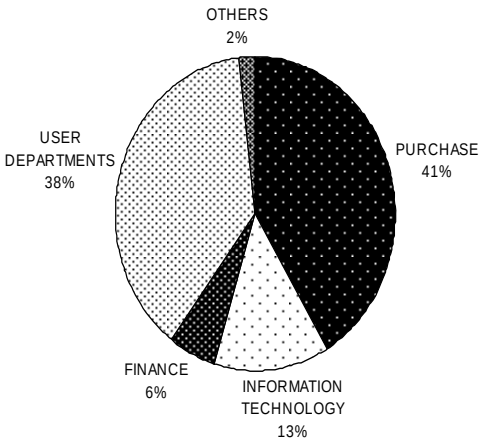
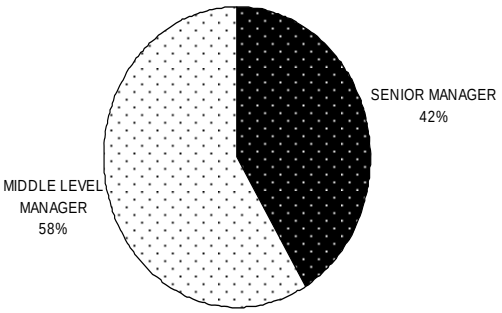


Figure 5.2: Managerial positions of the respondents



5.3.2 Part B: About procurement practices and e-procurement adoption and use in VSP

This part of the questionnaire consists of four parts:

a) Organizational perspective,
b) Transactional perspective,
c) Technological perspective,
d) Environmental perspective.

5.3.2.1 Organizational perspective

This subsection is meant for capturing the opinions of the executives regarding the organizational assessment for e-procurement readiness. The responses regarding the organizational perspective of e-procurement are captured through:

1) Question numbers 5.1 through question number 5.7 regarding general organizational perspective,
2) Question number 6.1 through question number 6.9 regarding the present MAMS package

for purchasing material and services,

3) Question number 7.1 through question number 7.4 regarding suppliers e-readiness.

General organizational perspective

- The commitment and support of top management is crucial for successful implementation of any new system, especially if it is a crucial business decision. From the analysis of the data for the question regarding commitment and support from senior management in implementation of e-procurement in VSP, we find the mean, median, mode, standard deviation and frequency as given in Table 5.1. We find that 88.7% of executives of the company are of the view that the top management is very much committed and supports the implementation of e-procurement in VSP. From mean, it can be concluded majority of executives feel that top management is greatly committed and supportive.

- Regarding the internal customer, as is evident from responses to question no.5.2, they are mentally prepared to accept e-procurement. This may be due to the spread of success stories regarding the adoption of e-procurement by various organizations in public and private sectors in India. We find that 94.3% of executives are of the view that the internal customers are not much disturbed about uncertainty about e-procurement implementation. From mean, it can be concluded majority of executives feel comfortable about e-procurement implementation.

- From the analysis of responses to question number 5.3 and 5.4, we find that there is a great need of training in e-procurement area, all over the company, especially in materials management department. Analysis shows 86.7% of respondents expressed a need of training in e-procurement areas. E-procurement being a new area for VSP, an extensive training and development need exists. The need may be fulfilled by providing various kinds of training by experts in the field and study of e-procurement practices in similar organizations.

- Legal framework plays a vital role in any business system. Government of India is taking steps to popularize e-procurement in India. The IT Act, 2000 is a step towards it. Still lot of work needs to be done to promote e-procurement in India. Our analysis reflects the same, as 7.5% of respondents disagree, 52.8% of respondents are neutral about the support of the existing legal framework to the use of e-procurement and 39.6% of respondents agree that existing legal framework supports e-procurement.

- About the security and privacy issue of e-procurement, 17% of respondents feel comfortable, 73.6% of respondents are neutral and 9.4% of respondents are not comfortable. This asks for training, through study of e-procurement system in various organization and hands on experience.

There is a divergence of opinion about which e-procurement solution will be better for VSP: an in-house developed e-procurement solution or buying an e-procurement package from

reputed suppliers in this field. This is a global question, and all the organizations venturing into the field of e-procurement is facing the same question, in-house development or buying proven systems? Entering into e-procurement is a vital business decision and hence choosing an appropriate solution is vital for the performance of the company. The chosen solution should give the company a competitive advantage in supply chain management. There are various technicalities involved. Analyses for sub-questions, under question number 5, regarding the views of VSP executives about use of e-procurement, are shown in Table 5.1.

Table 5.1: Statistical analysis data for responses for sub parts of question number 5

Question Number	Attribute	Mean	Median	Mode	Standard Deviation
5.1	Our senior management is very much committed and participative in implementation of e-procurement.	4.34	4	4	0.732
5.2	Our internal customers are concerned about uncertainty because of e-procurement.	2.53	2	2	0.639
5.3	In our organization, an good understanding of B2B e-procurement is available amongst the people responsible for procurement	2.89	3	3	0.934
5.4	I feel that, in our organization, there is a huge requirement of training for B2B e-procurement amongst the people responsible for e-procurement	4.28	5	5	0.968
5.5	The existing legal framework is technology-neutral and supports the use of e-procurement	3.32	3	3	0.613
5.6	Our internal customers feel comfortable regarding security and privacy when using e-procurement.	3.09	3	3	0.564
5.7	An in house developed e-procurement system will be more suitable for the organization than buying e-procurement solutions from software vendors (like Ariba, SAP, Oracle, Peoplesoft etc.)	3.08	3	2	1.222

Performance and features of existing Material Acquisition Management System (MAMS) package for material procurement

Existing MAMS package for material procurement is an Oracle based application, developed in-house with the help of outside consultants. This package is available throughout the plant through company wide LAN, based on optical fiber network. It provides for raising of material procurement request, on-line approvals, aggregation of demand for common items procurements like rationalized spare parts (RSP), automatic replenishment items (AR items), hoses and lubricants etc, forwarding of approved material indents to materials management department, indent position tracking, delivery, stock, consumption pattern. It also provides facilities like quality complaint regarding the material/service, its tracking and closure. In addition to these, it generates various reports regarding the indents, material position, cost, estimated price etc. The responses regarding the existing MAMS system is captured through question no 6.1 to question no.6.9. The analysis of responses to question numbers 6.1 through 6.8 are given in table 5.2.

- From the analysis of responses, it is found that 86.8% of the users find that the present MAMS package is user friendly, where as 3.8% are neutral and 9.4% of users disagree to the statement.

- Reduction of paper work is considerable, as 73.6% of respondents feel there is a reduction in paper work. However, full implementation of e-procurement may give further reduction in paperwork.

- Facilitation of follow-up with suppliers for timely delivery gives a mixed response as 52.9% of the respondents agrees to this, 24.5% of respondents are neutral and 22.6% of respondents disagree to this. Follow up with suppliers requires further improvement and needs attention.

- Various reports generated by present system are useful, as 81.2% of respondents agree to this. Off course, there is a scope of further improvement.

- One of the main objectives of procurement management is to reduce lead-time of procurement. It gives multiple benefits like availability of materials in time to avoid production loss, reduction in inventory carrying cost, proper production planning etc. Respondents feel that there is a reduction in lead-time of procurement, as 69.8% of respondents feel in affirmative. However, it keeps room for further improvement, as 7.5% of respondents disagree and 22.6% of respondents are neutral in this issue.

- Vendor rating is a continuous process, designed to measure, analyze and improve the performances of the suppliers. It helps the organizations to make informed future sourcing decisions and to benchmark a supplier performance against the performance of similar suppliers to the company. We find 58.5% of respondents agrees, 32.1% are neutral and 9.4% respondents disagree to the easiness of vendor rating process done by MAMS package. Hence, it requires further improvement.

- The support from IT department for MAMS package maintenance is highly rated by respondents, as 83% of respondents are happy with the support. Balance 17% is neutral and nobody is unhappy with the issue.

- Finally, the overall performance of the MAMS package gets a good rating, as 83% of respondents say that they find the present system satisfactory. The full-fledged implementation of e-procurement system will definitely increase the satisfaction level further with its improved features, benefits and user friendliness.

Table 5.2: Analysis of responses regarding present MAMS package functioning

Question Number	Attribute	Mean	Median	Mode	Standard Deviation
6.1	The present MAMS system is user friendly.	3.91	4	4	0.741
6.2	Paper work has reduced with implementation of MAMS package.	3.89	4	4	0.934
6.3	Follow-up with the suppliers is facilitated by MAMS	3.47	4	4	1.085
6.4	The reports generated by MAMS are very useful	3.96	4	4	0.759
6.5	With introduction of MAMS package, lead time of procurement has reduced	3.79	4	4	0.817
6.6	Vendor rating is done easily with MAMS package	3.6	4	4	0.817
6.7	Timely support from IT department is received in case of any problem	4.15	4	4	0.690
6.8	Overall, the performance of MAMS package is satisfactory.	3.92	4	4	0.756

Analysis of responses regarding the e-readiness of the suppliers

E-readiness of supplier is crucial factor in deciding about e-procurement. E-procurement is about collaboration between supplier(s) and the buyer(s). Supplier readiness for e-procurement differs from company to company and from industry to industry. The analysis of responses show a difference in opinion about the e-readiness of the suppliers exists, which is shown by higher standard deviation of the responses. However, if we see the mode and median we find that most of the respondents are of the view that suppliers are ready for e-procurement. The responses regarding e-readiness of the suppliers are captured in question number 7.1 through question number 7.4. Table 5.3 shows the analysis of responses regarding e-readiness of suppliers.

- Regarding the availability of internet based system with the suppliers to engage in e-procurement, 80.8 %respondents says more than 40 to 55% of suppliers are having such systems. With rapid growth of e-procurement, infrastructure needed for it and legalization of e-procurement is driving more and more organizations to e-commerce. The responses for number of our suppliers who feel comfortable towards e-procurement also show that 74.5% of respondents feel that more than 40 to 55% of our suppliers are comfortable with e-procurement.

- Sharing of information and integration with supplier e-commerce system are crucial factors for successful e-procurement implementation. Around 80% of respondents are of the view that our suppliers are willing for information sharing with VSP.

- The crucial thing about any system is the motivation and thinking about the system. Without total commitment, systems fail. The responses shows 86.5% of respondents feel that more than half of our suppliers consider e-business is important for their growth.

Table 5.3: Analysis of responses regarding e-readiness of suppliers

Question Number	Attribute	Mean	Median	Mode	Standard Deviation
7.1	How many of our suppliers/trading partners have Internet-based systems to engage in e-procurement. (in %)	4.50	5	5	1.260
7.2	How many of our suppliers/trading partners feel comfortable (regarding security, privacy etc.) engaging in e-procurement.	4.27	5	5	1.297
7.3	How many of our suppliers/trading partners are willing to share information electronically with our organization.	4.29	4	4	1.194
7.4	How many of our suppliers/trading partners consider it important to engage in electronic business.	4.67	5	5	1.004

5.3.2.2 Transactional perspective

The responses regarding the transactional perspective of e-procurement is captured in question numbers 8.1 through question number 8.4. Table 5.4 gives analysis of responses regarding transactional perspective.

- Today procurement is not merely buying materials and services; it is a strategic tool to fulfill the corporate objectives. Fit between company's procurement practices and business processes are very important, so that the procurement function can fulfill its strategic objectives. Regarding the fit between the organization's procurement practices and the business processes, 66% of the respondents agree that such a fit exists very much.

- Materials or services bought out should meet the requirements of the end users. End users should not be in trouble to match his or her needs as per the material and services bought, or to adapt the bought out items as per his or her needs. Majority of respondents (64.3%) say that most of the products/services purchased using e-procurement need to be tailored specifically to the needs of the end user.

- Regarding the product or services purchased using e-procurement, majority (66.7%)of responses are neutral about its frequency, where as 27.5 % respondents agree that these involve frequent purchases and 5.8% respondents disagree to the statement.

- The supplier switching cost is the real or perceived costs that are incurred when changing a supplier, which are not incurred by remaining with the present supplier. Majority of the respondents (98%) say that supplier switching cost should not be much in e-procurement.

Table 5.4: Analysis of responses regarding transactional perspectives

Question Number	Attribute	Mean	Median	Mode	Standard Deviation
8.1	Our organization's procurement practices are tailored to fit the nature of our business operations (processes).	3.74	4	4	0.836
8.2	A majority of the products/services purchased using e-procurement need to be tailored specifically to our needs.	3.52	3.5	3	0.804
8.3	A majority of the products/services purchased using e-procurement involve frequent purchases.	3.23	3	3	0.586
8.4	For a majority of the products/services purchased through e-procurement, it will be costly to switch to a different supplier.	2.39	2	2	0.635

5.3.2.3 Technological perspective

The responses regarding the technological perspective of e-procurement is captured through question numbers 9.1 to question numbers 9.3

- Response to question no. 9.1 suggests that the awareness of financial benefits from e-procurement is apparent. 69.3% of the respondents agree to this fact, 5.7% disagree and 25% are neutral.

- Focusing on strategic procurement activities is critical for fulfillment of organizational goals. Collaboration with strategic suppliers is the need of the day. 67.3% of the respondents agree that e-procurement helps to focus on strategic sourcing.

- Information sharing and integration of procurement system with other existing information systems in the organization is important. Duplication, redundancy or unavailability of current data in information systems lead to wrong decisions and costly mistakes. Standalone systems have lost their strategic value. Majority of respondents (90.4%) feel that e-procurement facilitates information sharing among various existing information system in the organization.

Table 5.5 shows the analysis of responses regarding technological perspective.

Table 5.5: Analysis of responses regarding technological perspectives

Question number	Attribute	Mean	Median	Mode	Standard Deviation
9.1	The financial benefits (e.g. ROI) of using e-procurement are apparent to our organization.	3.75	4	4	0.813
9.2	Using e-procurement has allowed our organization to focus on our strategic procurement activities (e.g. strategic sourcing).	3.65	4	4	0.590
9.3	Using e-procurement facilitates the information sharing among various existing information systems (e.g. Finance, Accounting).	4.21	4	4	0.605

5.3.2.4 Environmental perspective

The questions in this subsection relate to the e-procurement environment prevailing in India. The answers are collected through question numbers 10.1 through question numbers 10.4.

- Major steel plants in India have implemented e-procurement and are reaping its benefits. The same view is reflected in the responses with 79.3% of respondents agree on the fact that VSP's main competitors/trading partners that have adopted and used e-procurement have benefited greatly.

- The need and importance of e-procurement is now clear and 94.3% of respondents agree to this fact.

- Suppliers have also realized the need for long-term collaboration and are ready for e-procurement and strategic partnership. 69.3 % of respondents agree to the fact, 7.6% respondents disagree; where as 23.1% of respondents are neutral.

- Infrastructure plays a vital role in spread of e-procurement. Internet availability, legal support, education, training etc are critical for development of e-procurement. 58.5% of respondents think sufficient infrastructure for e-procurement is available in the country. Government has to act in this direction for further improvement of infrastructure. Government of India has already taken various measures in this regard. Table 5.6 shows the analysis of responses regarding environmental perspective

Table 5.6: Analysis of responses regarding environmental perspective

Question Number	Attribute	Mean	Median	Mode	Standard Deviation
10.1	Our main competitors/trading partners that have adopted and used e-procurement have benefited greatly.	4.09	4.00	4	0.815
10.2	E-procurement is crucial for our industry.	4.51	5.00	5	0.608
10.3	Many of our suppliers that are currently using the internet-based systems are asking us to use e-procurement.	3.67	4.00	4	0.706
10.4	Infrastructure for e-procurement is sufficiently available in the country and with our suppliers.	3.40	4.00	4	1.062

5.3.2.5 Growth of e-procurement in steel industry in India

The responses regarding the expected growth rate of e-procurement in steel industry in India is captured through question number 11. There is a divergence in opinion about the estimated growth rate for e-procurement in the steel industry. The analysis of responses is shown in Table 5.7. The divergence is indicated by very high standard deviation and variance of the data. Higher standard deviation reflects the fact that the spread of the data about the mean value is high. Hence, the growth rate of e-procurement in steel industry in India cannot be predicted accurately by the data collected. Nevertheless, if we see the median and mean values of the responses we can estimate that the growth rate may be around 50%. The mode i.e. the most frequent occurring value in the data set in this case is 60. In this case, the median i.e. the number separating the higher half of a sample, from the lower half, is 50.00.

If we take the case of Steel Authority of India Limited (SAIL), a similar integrated steel company, under government of India, which started e-procurement in the year 2001-02, the e-procurement volumes are growing fast. As per the analysis of secondary data collected and discussed under section 5.6, we find that the growth of e-procurement between the years 2006-07 and 2007-08 is 88.26%. Hence, we can estimate that the growth of e-procurement in steel sector in India will follow a similar trend.

Table 5.7: Estimation for growth of e-procurement in steel industry in India

Question Number	Attribute	Mean	Median	Mode	Standard Deviation
11	As per your estimate, the growth rate for e-procurement in Indian steel industry in next five years shall be around (%). Please Indicate _____%	50.34	50.00	60.00	23.667

5.3.3 PART C: About impact of e-procurement on procurement performance

E-procurement has several advantages over conventional procurement practices. The questions in this section are meant to capture the views of the respondents on various advantages offered by the e-procurement system. The responses are collected through question number 12.1 to question number 12.12, question number 13.1 to question number 13.7 and question number 14.1 to question number 14.6. Further, the respondent's views regarding issues regarding implementation, priorities in purchasing and supply chain management and suggestions and comments are collected through question number 15, 16 and 17 respectively.

5.3.3.1 Analysis of impact of e-procurement on procurement performance measures

The analysis of these responses shows a high value for standard deviation, i.e. there is divergence in opinion about the degree of advantages offered by the e-procurement system. However, one thing is clear that all the respondents agree that e-procurement implementation is advantageous, but differences lie in the degree of advantage offered by e-procurement. The responses regarding impact of e-procurement on procurement performance measures are captured through question number 12.1 to question number 12.12. Table.5. 8 shows the analysis of impact of e-procurement on procurement performance measures.

- Regarding reduction in purchasing cycle time, majority of respondents (36%) says that the reduction of cycle time will be 40 to 55% due to e-procurement adoption. If we see all the responses, we find that 64% of respondents are of the view that e-procurement implementation will give a reduction of cycle time by 40% or more.

- Based on the responses, majority (43.1%) respondents think that increase in throughput will be around 25 to 40%. Total 90.2% of respondents feel that there will be an increase of 25% or more in throughput.

- The issue of reduction of staff in materials management department, differences in opinion is very high, which is reflected by high standard deviation. This may be due to peculiar position of public sector in India, where retrenchment of employee is very difficult and is normally not practiced. Public sector organizations are viewed as meant for public good. Even though job volume may come down, under the present environment in India, retrenchment of employee is just next to impossible. Hence, from the responses we get a modal value of one, representing less than 10% reduction in requirement of staff in materials management department.

- Total 68.6% of respondents feel that there will be a decrease of 40% or more in matching costs.

- Total 76% of respondents feel that there will be a decrease of 40% or more in overall search costs.

- Total 76.9% of respondents feel that there will be a decrease of 40% or more in communication costs.

- Total 76.7% of respondents feel that there will be a decrease of 40% or more in information processing costs.

- Total 71.2% of respondents feel that there will be a decrease of 40% or more in negotiation costs.
- Total 63.5 % of respondents feel that there will be a decrease of 40% or more in monitoring costs.

- Total 58.2% of respondents feel that there will be a decrease of 40% or more in maverick purchasing.

- Total 66.7% of respondents feel that there will be a decrease of 25% or more in the number of suppliers.

- Total 52% of respondents feel that there will be a decrease of 25% or more in the purchase price of goods and services.

Table.5.8: Analysis of impact of e-procurement on procurement performance measures

Question Number	Attribute	Mean	Median	Mode	Standard Deviation
12.1	Reduction in purchasing cycle time	3.84	4.00	4	1.131
12.2	Increase in throughput (number of transactions during the given time period)	3.63	3.00	3	1.216
12.3	Reduction in requirement staff in purchasing department	2.73	2.00	1	1.856
12.4	Reduction in matching (e.g. invoice, inventory) costs	4.12	4.00	4	1.645
12.5	Reduction in overall search (e.g. goods/services, supplier) costs	4.24	4.00	4	1.393
12.6	Reduction in communications costs	4.40	4.00	4	1.600
12.7	Reduction in information processing costs	4.37	4.00	4	1.521
12.8	Reduction in negotiation costs	3.96	4.00	4	1.644
12.9	Reduction in monitoring (or enforcement) costs	4.06	4.00	3	1.420
12.10	Reduction in maverick (off-contract) purchasing	3.78	4.00	4	1.553
12.11	Reduction in the number of suppliers	2.98	3.00	3	1.304
12.12	Reduction in the purchase price of goods and services (e.g. because of supplier competition and volume aggregation)	2.94	3.00	2	1.376

5.3.3.2 Analysis of effects of e-procurement on procurement

The analysis of these responses show a high value for standard deviation, i.e. there is divergence in opinion about the degree of advantages offered by the e-procurement system. However, one thing is clear that all the respondents agree that e-procurement implementation is advantageous, but differences lie in degree of advantages offered by e-procurement. The responses regarding how e-procurement affects the procurement functions are collected through question number 13.1 to question number 13.7.

- From the analysis of responses, we find that 92.2% of respondents are of the opinion that there will be 25% or more reduction in errors and mismatches resulting from the automation of procurement system through e-procurement.

- Reduction in administrative tasks (paperwork and manual filing etc.) is assessed at 25% or more by 84.3% of the respondents.

- Improvement in the quality of products/services is assessed at 25% or more by 70.6% of the respondents.

- Improvement in delivery reliability is assessed at 25% or more by 62.7% of the respondents.

- Improvement in information sharing with internal customers and suppliers is assessed at 25% or more by 92.2% of the respondents.

- Increase in reliability of management information and analysis is assessed at 25% or more by 88.9% of the respondents.

- Increase in flexibility to user / buyer's changing needs is assessed at 25% or more by 71.8% of the respondents.

Analysis of impact of e-procurement on procurement performance measures is shown in Table 5.9

Table 5.9: Analysis of impact of e-procurement on procurement

Question Number	Attribute	Mean	Median	Mode	Standard Deviation
13.1	Reduction in errors and mismatches (re-keying and duplications)	3.88	4.00	3	1.321
13.2	Reduction in administrative tasks (paperwork and manual filing etc.)	3.90	4.00	4	1.345
13.3	Improvement in the quality of products/services	3.33	3.00	3	1.366
13.4	Improvement in delivery reliability	3.22	3.00	3	1.553
13.5	Improvement in information sharing with internal customers and suppliers	3.88	4.00	3	1.291
13.6	Increase in reliability of management information and analysis (e.g. spend profile) capabilities	3.78	4.00	3	1.238
13.7	Increase in flexibility to user/buyer's changing needs (e.g. customization and volume of product/service)	3.49	3.00	3	1.189

5.3.3.3 Impact of e-procurement on public information, audit and compliance

Government, Central Vigilance Commission and other agencies are demanding a transparent, fair and corruption-free public procurement system. The impact of e-procurement on auditing process, visibility, compliance with rules etc. are captured through question number 14.1 to question number 14.6 of this section and the analysis is shown in Table 5.10.

- Majority of the respondents (84.3%) say that there will a positive impact on increase in availability of public information on bids/offers and their depth.

- Majority of the respondents (92.2%) say that there will a positive impact on increase in transmission of timely public information on contract awards on price, volume and execution time.

- Majority of the respondents (86%) say that there will be a positive impact on increase in availability of audit trial information.

- Majority of the respondents (90%) say that there will be a positive impact on increase in visibility of management reporting processes and overall procurement performance.

- Majority of the respondents (88.2%) say that there will be an increase in ability to identify responsibilities and duties for significant purchases.

- Majority of the respondents (84.3%) say that there will be an increase in compliance with relevant delegations in procurement.

Table 5.10: Analysis of impact of e-procurement on public information, audit and compliance

Question Number	Attribute	Mean	Median	Mode	Standard Deviation
14.1	Increase in availability of public information on bids/offers and their depth	3.29	3.00	3	0.855
14.2	Increase in transmission of timely public information on contract awards on price, volume and execution time	3.39	3.00	3	0.695
14.3	Increase in availability of audit trial information	3.20	3.00	3	0.728
14.4	Increase in visibility of management reporting processes and overall procurement performance	3.40	3.00	3	0.756
14.5	Increase in ability to identify responsibilities and duties for significant purchases	3.20	3.00	3	0.693
14.6	Increase in compliance with relevant delegations in procurement	3.35	3.00	4	0.770

5.3.4. Top Issues for implementation of e-procurement

Implementation of e-procurement is a vital task for an organization. There are various critical issues in e-procurement implementation.
From the analysis of responses it is found, that majority of respondents have ranked reliability of system as the top issue for e-procurement implementation in VSP. The issues and their rankings are depicted in Table 5.11.

Table 5.11: Top Issues for implementation of e-procurement

Issue	Rank
Reliability of system	1
Authenticity	2
Integrity	3
Blocking of intrusion	4
Privacy	5

5.3.5. Priorities in purchasing

Priorities identification is an important task that guides the managers in their decision-making. Priorities give a focus to the organization and helps in proper utilization of scarce resources. From the analysis of responses it is found, that majority of respondents have given the issue of lowering cost as the first priority in purchasing in VSP. Table 5.12 shows the priorities for procurement and their relative ranking based on the responses received.

Table 5.12: Priorities in purchasing

Issue	Rank
Lowering cost	1
e-procurement	2
Integration of supply chain	3
Global sourcing	4

5.4 Data interpretation of responses from questionnaire survey 2

This questionnaire is meant to capture the e-readiness of the suppliers to VSP. A detailed analysis of responses is done through SPSS 16.0 for Windows package.

5.4.1 Part A: About the suppliers and their organization

5.4.1.1. Analysis for responses regarding strategic practices of suppliers

Question numbers 5.1 through question number 5.8 are used to capture the responses regarding strategic practices of suppliers.

- E-business policy gives a direction to the employees of the firm for decision making regarding e-business that links the formulation of strategy with its implementation. From the analysis of the data for question no.5.1, we find that among the present suppliers 54.5% have an e-business policy in place. Balance 45.5% of suppliers do not have e-business policy right now.

- Regarding the availability of infrastructure to engage into e-procurement system, 100% of the suppliers have sufficient infrastructure to engage into e-procurement system with VSP. With the high level of growth of infrastructure in India, most of the organizations are now having basic infrastructure for e-procurement.

- Regarding experience in e-procurement, 81.8% of the suppliers have experience in e-procurement and have participated in e-procurement process with some organization.

- Majority of the suppliers (90.9%) feel that it is important to engage in electronic business to get competitive advantage. It is a good sign and shows that modern procurement practices are penetrating into Indian suppliers, particularly to steel plant suppliers.

- Regarding the feeling of the suppliers in engaging into e-procurement, majority of the suppliers (90.9%) feel comfortable. Security, privacy or other e-procurement related issues does not create panic to them.

- Information sharing with the buyers is not a major issue to suppliers. They understand the importance and need of mutual collaboration. We find 90.9% of the suppliers are willing to share information with VSP.

- Availability of e-commerce site with the suppliers is a positive point in e-procurement. It helps in on-line catalog browsing and sharing of on-line information. On analysis of the responses, we find that only 18.2% of the respondents have an e-commerce site at present. This is an area that requires development.

- Regarding availability of an electronic catalogue (such as e-procurement hosted catalogue, transactional customer facing website, CD Rom catalogue) the situation is that 63.6% of the suppliers have electronic catalogues for buyers, balance 36.4% of suppliers do not have catalogue in electronic form. However, CD ROM catalogue may be generated easily as a fast solution to this problem.

Table 5.13 shows e-readiness of suppliers.

Table 5.13: Supplier's e-readiness

Question Number	Attribute	Percentage response	
		Yes	No
5.1	Does your company has a e-business policy	54.5	45.5
5.2	Do you have infrastructure to engage in e-procurement system of buyers?	100	0
5.3	Have you ever participated in e-procurement process of any company ?	81.8	18.2
5.4	Do you consider it important to engage in electronic business to get competitive advantage	90.9	9.1
5.5	Do you feel comfortable (regarding security, privacy etc.) engaging in e-procurement	90.9	9.1
5.6	Are you willing to share procurement related information electronically with Buyers?	90.9	9.1
5.7	Does your company have an e-commerce site?	18.2	81.8
5.8	Do you have an electronic catalog for buyers?	63.6	36.4

5.4.1.2 Analysis for responses regarding transactional practices of suppliers

Three questions have been used to get a picture about the transactional practices followed by the suppliers at present. Question number 6 finds out the forms in which the supplier receives orders at present. From the analysis of the forms of receiving orders, it is observed that most of the suppliers are still getting orders by post. An average (mean) of 58.18% of orders are delivered through post, 11.54% by fax, 21.36% by e-mail, 3% by telephone and 5.9% by e-procurement process (EDI plus reverse auction process). Table 5.14 shows the ways in which the suppliers receive the orders at present.

Table 5.14: Supplier's way of receiving purchase orders from buyers

Attribute	Mean	Median	Mode	Standard Deviation
Percentage of orders received by				
Fax	11.54	10.00	20.00	7.82
Email	21.36	10.00	10.00	26.84
Post	58.18	65.00	80.00	24.52
Telephone	3.00	0	0	3.74
XML	0	0	0	0
EDI	5.00	0	0	10.24
Other means (Reverse Auction)	0.90	0	0	2.02

Question number 7 finds out the forms in which the suppliers send the invoice for the sold items. As far as sending of invoice is concerned, majority of invoices are being sent by post (89.54%). Balance invoices are sent by Fax (4.09%), e-mail (5.45%) and other methods like by hand and courier (0.9%). Table 5.15 shows the ways in which the suppliers send the invoices at present.

Table 5.15: Supplier's way of sending invoices to buyers

Attribute	Mean	Median	Mode	Standard Deviation
Percentage of Invoices sent by				
Fax	4.09	5	0	4.36
Email	5.45	0	0	9.07
Post	89.54	95.00	100.00	12.54
Telephone	0	0	0	0
XML	0	0	0	0
EDI	0	0	0	0
Other means (by hand/courier)	0.90	0	0	3.01

Question number 8 finds out the modes in which the supplier receives the payments at present. Majority of payments are received by cheque or demand draft (72.54%). Other payment methods are through electronic fund transfer (24.72%), cash (2.54%) and credit card (0.18%). Table 5.16 shows the ways in which the suppliers are receiving payments at present.

Table 5.16: Supplier's modes of receiving payments from buyers

Attribute	Mean	Median	Mode	Standard Deviation
Percentage of payments received by				
Cash	2.54	2.00	0	2.84
Cheque / Demand draft	72.54	80.00	80.00	25.50
Electronic Fund Transfer	24.72	15.00	15.00	26.226
P-card	0	0	0	0
Others (Credit Card)	0.18	0	0	0.603

5.4.2 PART B: About the impact on procurement performance measures.

5.4.2.1 Responses to the questions regarding the benefits to VSP from e-procurement

Question numbers 9.1 through question number 9.7 are used to capture data regarding the estimate of benefits to VSP through implementation of e-procurement process. Table 5.17 shows supplier's opinion about the benefits to VSP through e-procurement.

- Analysis of question number 9.1 shows that 81.8% of the respondents feel that e-procurement reduces purchasing cycle time, where as balance 18.2% are neutral in this aspect. The amount of reduction of purchasing cycle time depends on how well the e-procurement system is implemented and managed.

- Regarding the increase in throughput, 63.6%, respondents think that throughput will increase due to implementation of e-procurement.

- All of the respondents (100%) are of the opinion that the communication costs will come down due to implementation of e-procurement.

- Majority of the suppliers (81.8%) feel that the there will be reduction of negotiation cost. The time and effort in negotiations also comes down due to e-procurement adoption.

- Almost half of the suppliers (54.5%) are neutral about reduction in maverick buying, balance 45.5% agree that maverick purchases come down.

- From the analysis of question number 9.6, we can conclude that the purchase price of goods and services (e.g. because of supplier competition and volume aggregation) reduces, as 90.9% of suppliers say this. Balance 9.1% of suppliers remains neutral on this subject.

- Regarding increase in improvements in delivery reliability due to e-procurement implementation 81.8% of suppliers agree to it, 9.1% remains neutral and 9.1% suppliers disagree. Delivery reliability depends on a lot of matter like transportation reliability, prompt clearances from government authorities etc., which are not that reliable, at present under Indian conditions.

Table 5.17: Supplier's opinion about the benefits to VSP through e-procurement

Question Number	Attribute	Mean	Median	Mode	Standard Deviation
9.1	Purchasing cycle time reduces	4.27	4.00	5.0	0.786
9.2	Throughput increases	3.81	4.00	5.00	1.167
9.3	Communications costs reduces	4.36	4.00	4.00	0.504
9.4	Negotiation costs reduces	4.18	4.00	4.00	0.750
9.5	Maverick (off-contract) purchasing reduces	3.54	3.00	3.00	0.687
9.6	Purchase price of goods and services (e.g. because of supplier competition and volume aggregation) reduces	4.90	4.00	4.00	0.539
9.7	Improvement in delivery reliability	3.90	4.00	4.00	0.83

5.4.2.2 Benefits to suppliers and mutual benefits from e-procurement

Question numbers 10.1 through question number 10.6 are used to capture data regarding the estimate of benefits to suppliers and mutual benefits through implementation of e-procurement process. From the analysis, we find that most of the suppliers agree to the benefits to the supplier through e-procurement. Most of the suppliers agree that e-procurement will create collaborative partnership, increase in transparency of procurement process, reduction in time and effort in preparation of offer, ensure faster payments and reduce cycle time of business. Table 5.18 shows supplier's opinion about supplier's and mutual benefit through e-procurement.

Table 5.18: Supplier's opinion about suppliers and mutual benefit through e-procurement

Question Number	Attribute	Percentage response	
		Yes	No
10.1	Increased collaborative partnership	100	0
10.2	Increase in transparency of procurement process	100	0
10.3	Reduction in time in preparation of offer	100	0
10.4	Reduction in effort in preparation of offer	71.4	28.6
10.5	Faster payments	100	0
10.6	Reduced cycle time of business	100	0

5.4.2.3 Suppliers estimate about growth of e-procurement

This response is captured through question number 11. Regarding the estimate of growth of e-procurement in Indian steel industry there is a wide divergence of response, as seen by high standard deviation of the responses. However, majority of the suppliers (63.6 %) are of the opinion that the growth rate for e-procurement will be 50% or more in steel industry in India in next five years. Table 5.19 shows suppliers estimate about growth of e-procurement in steel industry in India.

Table 5.19: Suppliers estimate about growth of e-procurement in steel industry in India

Question Number	Attribute	Mean	Median	Mode	Standard Deviation
11	Estimate about growth of e-procurement	58.81	50.00	100	32.316

5.5 Gap analysis

It is important to find out the differences in perceptions between the executives of VSP and the suppliers about e-procurement dimensions, as mutual collaboration is very critical in present day environment. Suppliers are our partners in progress and less the difference in

perceptions between the buyer and the seller, it is better for mutual growth and development. Effort is made to do a qualitative analysis based on the mean values, even though the scales for the questionnaire for the VSP executives and the scale for the questionnaire for the suppliers are different. The scale for questionnaire for VSP executives consists of a seven-point scale and the scale for questionnaire for suppliers consists of a five-point scale, for the questions regarding the benefits of e-procurement. Table 5.20 gives a comparison of perceptions regarding e-procurement between VSP executives and the suppliers. From the table we can find that in majority of the issues differences are low. Only on one issue, there is a considerable difference in opinions i.e. in purchase price of goods and services, due to implementation of e-procurement. The Vendors thinks of a higher price reduction in prices of goods and services than that perceived by VSP executives. Further, it is to mention that the responses to questionnaire-1 meant for VSP executives has 53 valid respondents, whereas the questionnaire-2 meant for collecting supplier's data has 11 valid respondents.

Table 5.20: Comparison of perceptions regarding e-procurement between VSP executives and the suppliers

Attributes	**VSP executives perception**		**Vendors perception**		**Difference**
	Mean		Mean		
Purchasing cycle time reduces	3.84	64% of respondents say a reduction of 40% or more.	4.27	81.8% of the respondents say reduction, where as balance 18.2% are neutral.	Low
Throughput (number of transactions during the given time period) l increases	3.63	90.2% of respondents feel an increase of 25% or more.	3.81	63.6% respondents think that throughput will increase, where as 18.2% are neutral	Low
Communications costs reduces	4.40	76.9% of respondents feel a decrease of 40% or more	4.36	All of the respondents(100%) feel that the communication cost reduces	Low
Negotiation costs reduces	3.96	71.2% of respondents feel a decrease of 40% or more	4.18	81.8% feel that the there will be reduction of negotiation cost	Low

Continuation of Table 5.20

Maverick (off-contract) purchasing reduces	3.78	58.2% of respondents feel a decrease of 40% or more	3.54	54.5% are neutral about reduction in maverick buying, balance45.5% supports it.	Low
Purchase price of goods and services	2.94	52% of respondents feel decrease of 25% or more	4.90	90.9% of suppliers say this. 9.1% of suppliers remain neutral	Moderate
Improvement in delivery reliability increases	3.22	62.7% of the respondents say improvement of 25% or more	3.90	81.8% of suppliers agree to it, 9.1% remains neutral and 9.1% suppliers disagree.	Low
Growth rate for e-procurement in Indian steel industry in next five years	50.34%		58.81%		Low

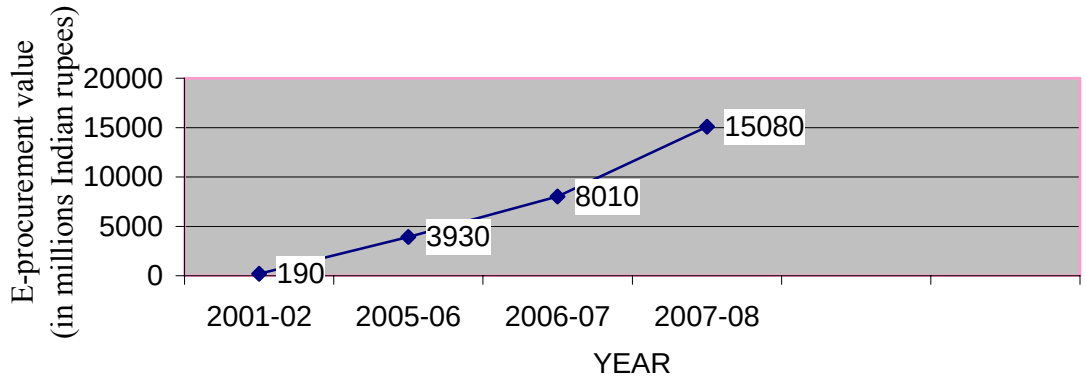
5.6 Analysis and interpretation of secondary data

5.6.1 Growth of e-procurement similar steel plants in India.

To have an estimation of growth of e-procurement in steel industry, we have to estimate the growth of e-procurement in all the steel plants of India. There are many steel plants in India. The e-procurement data from all the steel plants of India could not be gathered and the author could not get authentic source to get specific data about Indian steel plants. From the ministry of steel, government of India web site, data of e-procurement about the largest steel manufacturer in India, Steel Authority of India Limited (SAIL), could be obtained.

If we take the case of Steel Authority of India Limited (SAIL), an integrated steel company, under government of India, which started e-procurement in the year 2001-02, the e-procurement volumes are growing fast. The e-procurement volumes of SAIL are shown in Figure 5.3 and we find that the growth of e-procurement during 2006-07 and 2007-08 is 88.26%. Hence, we can estimate that the growth of e-procurement in steel sector in India will follow a similar trend.

Figure 5.3: Growth of e-procurement in Steel Authority of India Limited, India



Source: Annual Reports 2004-05, 2006-07, 2007-08, Ministry of Steel, Government of India.

5.6.2 Data regarding the e-procurement in VSP

In VSP, the process of e-procurement has just started as a trial of in-house developed software package for reverse auction, and hence the amount of materials or services procured through reverse auction is very low compared to the items procured through conventional procurement process. Table 5.21 gives a view of procurement situation and the present use of e-procurement in VSP.

Table 5.21: Present status of e-procurement in VSP

Year	**Total procurement value (in million Euros*)**	**Procurement though reverse auction (in million Euros*)**	**Percentage of procurement through reverse auction**	**Type of materials procured**
2007-08	603	0.32	0.053%	Refractory materials (Indirect material)

* Note: Approximate value in million Euros. Currency conversion rate is taken as Euro 1 = Indian Rupees 63.

Source: VSP internal data.

5.6.3 Other relevant secondary data regarding e-procurement

Aberdeen group, in 2006, conducted a survey and benchmarked the e-procurement strategies, experiences, and intentions of nearly 170 enterprises across multiple industries and geographies. The key findings of the The E-Procurement Benchmark Report, 2006 on the impact of e-procurement on performance of the firms is shown in Table 5.22.

Table 5.22: Average impact of e-procurement initiative on performance

Performance Area	Before	After	Improvement (in%)
Spend under management	40%	55%	37.5%
Requisition-to-order costs	$63.20	$33.28	47.34%
Requisition-to-order cycles	12.4 days	3.2 days	74.19%
Percentage of maverick (off-contract) spend	40%	25%	37.5%

Source: Bartolini and Checketts, Aberdeen group (2006, p.5).

5.7 Comparison between primary data and secondary data

The results obtained from Aberdeen group 2006 benchmark survey on e-procurement impact on performance of the firms and the analysis of data from questionnaire no-1(responses from VSP executives about e-procurement impacts) of author's own survey are analyzed and the findings are shown in Table 5.23.

Table 5.23: Comparison of data analysis from questionnaire no. 1 and Aberdeen group data

Sl. No.	Performance area	Aberdeen group data	VSP executive survey data (From questionnaire no-1)	Difference
1	Reduction in requisition-to-order cycle	74.19%	40-55%	Medium
2	Reduction in maverick spend	37.5%	25-40%	Low
3	Reduction in requisition-to-order cost	47.34%	Reduction in various costs accessed separately. The cost reduction in various sub-processes vary from 25 % to 55%	Low

Source: Bartolini and Checketts, Aberdeen group (2006, p.5).

CHAPTER 6

RECOMMENDATIONS AND ROADMAP TO IMPLEMENTATION

6.1 Various practices in VSP

6.1.1 General management practices

General management practices prevailing in an organization plays an important role in functioning and performance of the organization. The vision, mission and objectives are not fruitful if the management of the organization does not practice it. To be able to energize employees to work towards the corporate objectives, visions and missions should not be a mere sign on the wall, the managers should live them, and constantly communicate them to their employees, so that every one in the organization follows them by heart. A common saying goes like this - vision without action is a daydream and action without vision is a nightmare.

The management, through its plans and actions strives to attain business excellence. The concept of excellence in VSP is revealed through the following actions of management:

1. Result orientation: Urge for excellence in achieving results that delight all the stakeholders. Example: Exceeding the memorandum of understanding (MOU) targets set along with government.

2. Customer focus: Strive for attaining excellence to create sustainable customer value. Example: Various value added service provided to customers to have enduring relationships. Having and propagating a documented customer policy.

3. Leadership and constancy of purpose: Managing the organization through a set of interdependent and interrelated systems, processes, and facts. Leadership is visible through actions, creation of strategic alignment in the whole organization and ensuring appropriate design of hard systems (policies, procedures, processes, systems, performances etc.) and soft systems (values, commitment, motivation, loyalty, communication etc.) to pursue progress towards the vision. Example: Documented policies and procedures are available and followed.

4. People development and involvement: Strive to maximize the contribution of employees through their development and involvement. Example: Company's training objective of providing minimum training of four (4) man-days per annum per employee. Employee

involvement is visible through active participation of employees in quality circle program, suggestion scheme, quality improvement projects etc.

5. Continuous learning, innovation, and improvement: Action directed to challenging the status quo and effecting change by using learning to create innovation and improvement opportunities. Example: knowledge management, on- the- job training, development programs, training, and tour to various institutes of repute, industry visits etc

6. Partnership development: Immense importance is attached to the process of developing and maintaining value added partnerships. Example: Joint venture with Steel Authority of India Limited (Steel maker), Active collaboration with institutes of repute, Development of items in collaboration with suppliers and customers, etc

7. Corporate social responsibility (CSR): Exceeding the minimum regulatory framework, in which organization operates, to understand and respond to the expectations of the stakeholders in the society. Example: Various development programs undertaken for improvement of society.

The core values of the organization, which are imbibed in its employees over the time, are:

- commitment,
- customer focus,
- creativity and innovation,
- continual improvement,
- Concern for environment.

Further, the adoption of various excellent industry practices and systems like 5S, Quality Management System ISO 9001 (QMS), Environmental Management System ISO 14001 (EMS) and Occupational Health and Safety Management System ISO 18000 (OHSMS) have helped the employees to analyze and perform the tasks in a systematic way, to have customer focus, to innovate and to improve continually.

6.1.2 E-procurement management

E-procurement is relatively new in VSP. Company has followed a strategy of 'wait and see' in this field. Further, the nature of materials involved in steel making, availability of infrastructure in the surroundings, political and legal issues, and the supplier's e-readiness plays an important role in implementation of e-procurement. Further, the crash of dot com companies might have significant impact on decision-making. The company seems to have waited to see the reality and then decide to act. Realizing the need and importance of e-procurement, company has now ventured into e-procurement in a small way.

The material management department takes care of the procurement process with active involvement of IT department, finance, approving authorities and the end-users like the operations, maintenance and services departments. The management of e-procurement

process is guided by transparency, fairness, value for money, quality of materials and services and procurement time. In compliance with the directives of the Central Vigilance Commission on the e-governance, actions on the implementation of the following have been taken by the departments concerned in order to achieve transparency, reduced tendering and negotiation time, reduced administrative and processing costs:

- e-payment,
- e-auction,
- e-procurement.

An in-house e-procurement package is developed by the IT department in association with the materials management department. The same package is put on trial for a limited number of cases. At present, the package is being used only for reverse auction process. A whitepaper by SAP (2006, pp.6) on reverse auction best practices, suggests that only reverse auction should be used as e-sourcing strategy when the spend characteristic is generic. Table 6.1 shows the right e-sourcing strategy at different conditions.

Table 6.1: Determining the right e-sourcing strategy

	E-sourcing strategy		
	Use of RFP Process Only	Use of RFP Process and Reverse Auction	Use of Reverse Auction Only
Spend Characteristic	Complex	Custom	Generic
Specifications	Developed jointly by supplier and buyer (may be patented)	Created by buyer (may be patented)	Defined by industry standard
Market driver	Value only	Value and price	Mostly price/volume
Industry	Not very competitive (monopoly/oligopoly)	Competitive	Very competitive (commoditized)
Supplier availability	Single or few	Many	Very many (large pool)
Riskiness of switching suppliers	Very high	Medium	Low
Supplier relationship	Strategic	Limited	Transactional
Switching cost	Very high	Medium/low	Negligible
Level of detail for supplier qualification	High	Medium	Low
Supply lead time	Long	Medium	Short/immediate
Spend examples	Patented carbon block filter; patented drug delivery system	Plastic enclosures; circuit boards; machined parts	Non-custom packaging; bulk chemicals; lab supplies

Source: SAP (2006, p.6)

In VSP, to start with the e-procurement is being done for the indirect materials. After the package is proven and required expertise is gained, it is proposed to go for full-fledged implementation of e-procurement system.

The process of e-procurement in VSP is regulated by the following:

1. The documented purchase manual,
2. General Financial Rules, 2005, issued by the Ministry of Finance, Government of India,
3. Guidelines and instructions issued by the Central Vigilance Commission (CVC),
4. Company policies and guidelines,

6.1.3 Information technology management

Kumar et al (2007, p.1) says, 'Information technology management (or IT management) is a combination of two branches of study, information technology and management. This aims at achieving the goals and objectives of an organization through computers. Strictly speaking, there are two incarnations to this definition. One implies the management of a collection of systems, infrastructure, and information that resides on them. Another implies the management of information technologies as a business function'.

The management of IT is guided by the IT policy of VSP. A study of the IT policy suggests that the IT policy in VSP is supportive of implementing business and process applications as demanded by company's business needs. It has sufficient infrastructure to support present business needs and is capable to meet future demands, as and when required. The department aims at leveraging information technology as the vital enabler in improving the customer-satisfaction, organizational efficiency, productivity, decision-making, transparency and cost-effectiveness, and thus adding value to VSP's business of steel making.

Some of the IT systems in vogue in RINL are: Attendance Recording, Marketing System, CISF Gate Pass System, Contract Billing, Costing, Financial Accounting, Human Resource Information System, Internet and Intranet Website, Maintenance Management, Materials Management, Pay-Roll, Production Planning and Control, Raw Material Management, Repair Shop Scheduling and Wagon Information and Tracking.

E-commerce is being introduced in VSP phasewise**.** As per the annual report 2007-08 of minstry of steel, (2008, p.23) the following e-commerce activities have already been introduced in VSP:

(i) The process for fixing up a service provider for e-auction has been initiated,
(ii) All open tenders are being kept on the website for free download,
(iii) Surplus/scrap items are being disposed off through physical auction, tenders as well as eauction. During 2007-08, three e-auctions were conducted and material worth Rs. 94.78 lakh has been sold through e-auctions,

(iv) 100% of tender sales are made through e-auction mode,
(v) During 2007-08, the process of finalization of road transportation contracts was changed to eauction mode from the practice of obtaining sealed price bids in open tenders,
(vi) During 2005, e-auction was implemented for sale of coal chemicals like tar products and benzol products, which are by-products from coke ovens. However, due to inadequate response from the customers at that time, the same could not be continued. During this year, it is proposed to implement e-auction for sale of by-products from December 2007. Open advertisements in all India news papers are planned to be given for wide publicity,
(vii) At present about 33% of all payments are released through electronic mode,
(viii) Tenders/ expression of interests etc. are placed on the website as also the details of the tenders/ contracts awarded. These are being updated regularly by the concerned departments. In addition, details such as general conditions of contracts, terms and conditions of contracts, application forms / proformas in a downloadable form, status of bill payments of contractors, online receipt of applications in the case of recruitment to the post of management trainees selection of which are being made on all India basis are being posted on website,
(ix) QMS documentation as per ISO 9001:2000 is made available to all users on the company's portal,
(x) Online complaint handling system has been developed and made available on the website,
(xi) Enterprise Resource Planning (ERP) department has been set up in with the objectives inter alia to improve RINL's ability to conduct e-business with its vendors and customers etc,
(xii) Chairman online scheme has been introduced in order to meet the needs of the employees to have a forum where they could interact directly with chairman cum managing director.

Computerization in VSP has evolved through various stages, which is shown in Table 6.2.

Table 6.2: Stages of VSP's Computerization

Year	Computerization Level
1983	Project Phase: Personal Computers, IBM/ PDP11 System
1991	Main Frame Marketing Network Phase-1
1995	Marketing Network Phase-2
1999	Marketing Network Phase-3
2002	Client Server Network
2003	Virtual Private Network(VPN)
2006	VPN Expansion
2008	Enterprise Resource Planning(ERP)

Source: VSP internal data

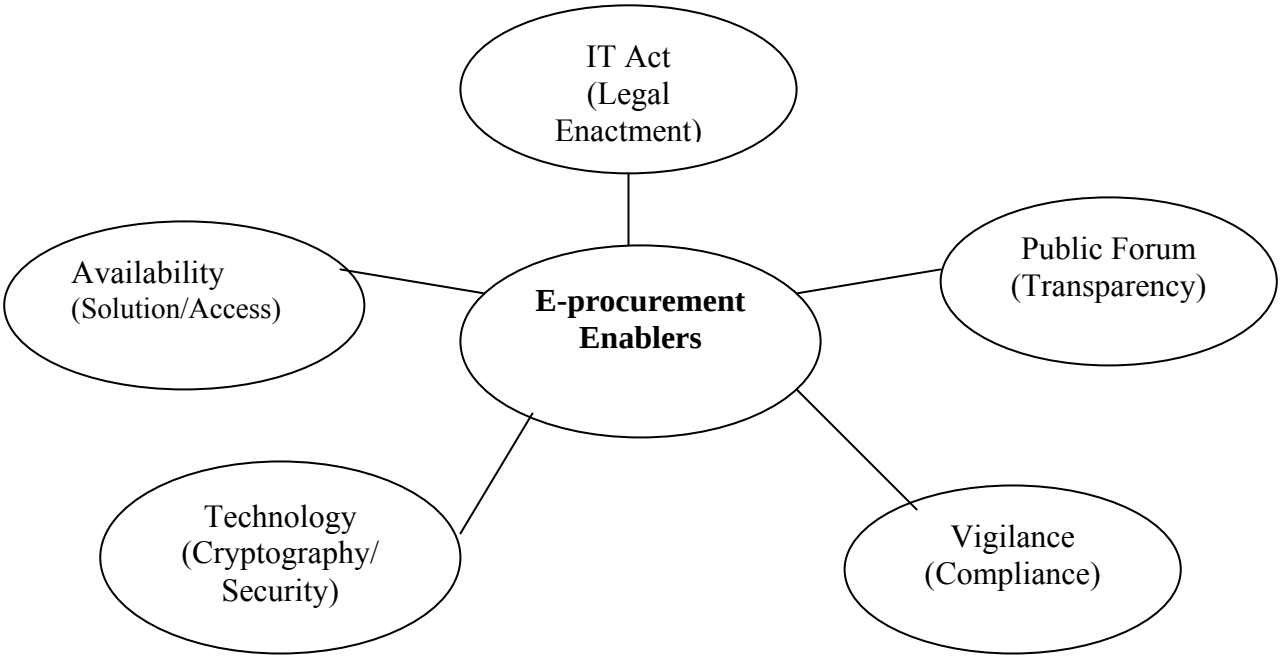
6.2 E-procurement practices in India

Banduni (2006) quotes Ajila, CEO, Indiamarkets saying, "According to a recent study by eStatsIndia.com, the Indian e-commerce market (B2C and B2B combined) is about Rs 4,100 Crore. The B2B portion of this is expected to grow at a c***ompound annual growth rate*** **(**CAGR) of 52.63 percent touching Rs 13,550 Crore by 2009-end. The e-procurement sector in particular is expected to grow the fastest at a CAGR of 50.93 percent touching Rs 12,100 Crore by 2009-end."

The e-commerce market, although nascent in India, is growing very fast. Recognizing the importance of e-commerce, the industry and the government are moving fast to catch up with the developed world.

Iram (2007) finds low penetration of computers, internet connectivity, and non-acceptance to change were the major technical and cultural bottlenecks in effective implementation of e-procurement projects in India. He found that repeated workshops, trainings and visible benefits (time and cost) have been the key parameters to build confidence for acceptance and endurance of e-procurement implementation and continuance.

Figure 6.1: E-procurement enablers in India



Source: Iram (2007).

After the enactment of IT Act, 2000, e-procurement is growing steadily in government, public sector and private sector procurements. IT Act, 2000 provides a legal recognition to transactions carried out by electronic means, commonly referred as 'electronic commerce'. It has helped in creating a trust in electronic environment and established a framework for digital signature.

6.3 Government and law makers in India

Government and the lawmakers play an important role in business. Business is regulated by various laws and guidelines of the government. In India, absence of legitimization of e-procurement was hindering its growth.

Realizing the importance of e-commerce, the government came out with the IT Act, 2000 to legalize the e-commerce in India. Basic features of the IT Act, 2000 are as follows:

- It provides a basic legal framework for e-commerce in India.
- It creates a conducive environment for promoting e-commerce in the country, through the following:

    - acceptance of electronic documents as evidence in a court of law,
    - acceptance of digital signatures at par with handwritten signatures,
    - acceptance of electronic documents by the government,
    - defines digital signatures based on asymmetric public key cryptography,
    - provides for the creation of certifying authorities to issue public key certificates – digital certificates for electronic authentication of users in electronic commerce,
    - provides for controller under the IT Act to license the certifying authorities, and to ensure that none of the provisions of the act are violated,
    - provides for dealing with offences in the cyber space,
    - provides for the establishment of Cyber Appellate Tribunal (CAT) to try cases under this act,
    - provides for appropriate changes in the Bankers Act and the Indian Evidence Act.

Not only rule was framed, government has taken up e-governance with priority. E-procurement was introduced in government procurements. Central as well as majority of state governments have adopted e-procurement for their procurement activities. Government has made a national strategy for e-procurement under the name e-GP program and is implementing it dynamically. Ministry of Finance, through a notice dated January 10, 2007 has asked all governmental agencies to go for mandatory e-procurement. Directorate General of Supplies and Disposal (DGS&D), a central purchase & quality assurance organisation of Government of India, has gone for compulsory e-procurement from April 1, 2006.
Abbasi (2006, p.1) puts Indian government procurement at INR 450,000 Crore. In India, the government is the largest organization to implement e-procurement.

In addition to this, the guidelines on procurement practices issued by CVC also give legal and governmental support to the organizations.

6.4 Training and education in India

India is having a large pool of quality manpower, both technical and managerial. There are numerous institutes of repute imparting knowledge in various fields of study.

As per UNESCO statistics (UNESCO, 2006) while India is rated amongst the highest in terms of gross domestic product per capita (GDP per capita) spending per pupil on tertiary education (beating developed economies like United Kingdom, United States and Japan), it is ranked in the lower spectrum for GDP per capita spending per pupil on primary education. In India, 10.7% of government spending goes to education.

Participation of private sector in education and training is increasing. With globalization and double digit economic growth demanding a sustained supply of knowledge workers, the universities and institutes are designing new courses to meet the demand. The government is accepting the corporate as a key partner in education. Growth is higher in emerging fields like nanotechnology, biotechnology, software, management, medicine etc.

6.5 Recommendation for e-procurement adoption

E-procurement adoption is a strategic decision. The question is not that whether to go for e-procurement or not, but how to go about it. Automation of any process gives benefits, but the amount of benefit reaped depends on how the system is managed towards fulfillment of the organizational objectives.

After the study of the role of e-procurement in steel industries in India with a case study of VSP, the following are the recommendations for VSP towards the adoption of e-procurement:

1. Formulation of an e-business policy incorporating e-procurement for the organization

2. Early adoption of e-procurement: Considering the steel industry scenario in India, an early adoption of e-procurement will be beneficial to the company. Most of the profit making integrated steel plants have already embraced e-procurement and are reaping its benefits. The major steel plants in India like Tata Steel, SAIL, Jindal steel, Essar Steel, Ispat Industries are having their e-procurement sites. SAIL and TISCO, the two major steel manufacturers in India, are the pioneers in the field and started e-procurement through a 50:50 joint venture company named metal junction way back in 2003.

The analysis of our survey on e-procurement reveals that both VSP executives and the suppliers are convinced of the advantages of e-procurement and its high growth in steel sector. Bartolini and Checketts, Aberdeen group (2006, p.ii) suggests the following strategies for the best results in all types of organizations:

- Block all channels that bypass your e-procurement system (e.g., check requests, after-the-fact PO's, unmatched invoices),
- Pursue a self-service supplier enablement strategy that shares all or part of catalog responsibility with your suppliers,
- Expand the footprint of your current e-procurement system with closely coupled contract compliance and/or invoice reconciliation and payment solutions,
- Add system, people and/or process capabilities to manage complex items or services,
- Promote your program's successes to gain the support from executives to place more spend under management and increase end user adoption.

Hence, to reap the advantages of e-procurement VSP should adopt e-procurement early.

3. For VSP especially adoption of e-procurement has become critical for managing its sourcing needs effectively. SAIL and TISCO are having their own captive iron ore and coal mines. Hence, they are less affected by the wide fluctuation in the steel plant raw materials market. VSP is not having its captive coal or iron ore mines; hence, it is dependent on open market fluctuations. To manage the situation VSP has to go for strategic alliance with its coal and ore suppliers and needs to collaborate with them. Adoption of e-procurement will definitely help in this regard.

4. CVC through its circular has asked all public sector companies to go for e-procurement to have greater transparency in procurement process. Hence, it is a legal binding on VSP to go for e-procurement.

5. Selection of e-procurement system is crucial for an organization. There are various types of systems available in the market. Further, an e-procurement system is developed in-house which is under testing. However, as adopting e-procurement is a critical decision, the decision on selection of an e-procurement solution has to be taken carefully after weighing the pros and cons of each system. In our survey, also, we find that the respondents have divergent opinion about what will be a better solution, a bought out system or in-house developed system. Buyer centric e-procurement system will be suitable for VSP. The system must be reliable, secure, expandable, manageable, ensure privacy, integrity and blocking of intrusion and should have lower total cost of ownership. Most of these features are reflected in our survey results.

6. The e-procurement system should be integrated to other enterprise information systems to take full advantage of all systems. It must be integrated to the proposed ERP system in VSP.

7. The e-procurement system should not be used as a mere procuring system, but to reap its advantages it must be used for spend management, strategic sourcing, and other procurement management concepts.

8. The e-procurement system should be introduced in phases and not at once. First, it should start as a pilot project for testing. Through this, problems will be found out, concerned people will gain expertise, confidence and in case of any mistake, loss will be marginal.

9. The development needs of suppliers, especially the strategic ones, should be taken care. The suppliers are to be looked as our partner for development and growth. The connectivity with the vendors system should be taken care of.

10. Adequate awareness and training to all concerned have to be provided.

11. The concept of paperless office should be established, to reap the full advantage.

In essence, the e-procurement system should be carefully planned, implemented with commitment, managed tactfully and adopted early.

6.6 Roadmap for implementation of e-procurement

Appropriate implementation is the key to success of any strategy or system. Without proper implementation, the payoffs from the strategy will be insignificant. A study of the literature and the web, suggests that proper implementation is critical for any business process including e-procurement and suggest that the implementation should be given utmost importance. There are several implementation models for e-procurement system, suggested by various researchers and experts in the subject. Becker (2008, pp.1090) says e-procurement requires a long-term approach on the client's side, a clear definition of organizational processes, dedicated resources, and corporate commitment.

Tavi (2008, p.24-29) puts forwards the following strategies for effective implementation of e-procurement practices in an organization:

1. focus on your processes first,
2. create a successful user experience,
3. automate to the max,
4. continuous improvement should be your mantra,
5. think big, start small,
6. take a holistic approach,
7. value networks,
8. fraud protection.

Tavi suggests first focus should be on the organization's processes. Taking a process-oriented approach is key to establish a successful e-procurement practice. Effective processes are flexible, customizable, and easy to implement. Work should be done on process improvement and on ways to streamline them by measuring organization's baseline performance, setting

goals, and using ***Key Performance Indicators (***KPIs) to measure how the organization is doing.

To create a successful user experience, he suggests that users should be involved from the design stage and system should be made flexible to the user's requirements. From the feedback of the users and having a visibility on the purchasing process, the e-procurement solution can be improved to reflect the needs of the users.

Tavi recommends selecting a solution that gives high degree of automation of business rules and policies. This will make the system user friendly, encourage participation, and help in capturing the useful information.

Continuous improvement by continuous learning is important. Fixing target and making a path to reach there should be practiced. The top key performance indicators are to be identified and ways for innovation to be found to achieve higher and higher targets on existing goals or new goals are to be selected.

Tavi suggests that even though the blueprint for the grand plan may be made, the implementation should be done in steps, to avoid disruption in the total procurement process.

The e-procurement solution should have a holistic approach and aim to streamline both procurement and invoicing operations into an intertwined business flow that automates the entire process from identification of a need, to planning and budgeting, to procurement and payment. This will give efficiency, visibility, and benefit throughout e-procurement process.

Regarding value networks, Tavi is of the opinion that a strong supplier should be seen as a valued partner to the organization. The organization should collaborate with the suppliers for mutual benefit and growth, through creation of a value network.

The e-procurement system must be a dependable one. Advanced e-procurement solutions have a high degree of visibility and control. Built-in approval and business rules processes serve as a preventive tool and provide real-time monitoring, control and auditing facilities.

Bilčíková (n.d., p.11) puts the following as critical success factors for e-procurement implementation:

1. support of top management,
2. cross-functional organization,
3. project related activity (timetable, milestones, and deliverables),
4. trainings & coaching,
5. well defined specification & preparation,
6. good and robust instrument,
7. regular strict monitoring and follow-up of ' projects',
8. internal and external communication.

Kalakota and Robinson (2001, p.338-346), suggests seven steps for systematic implementation of e- procurement system. The steps are:

1. clarify your goals,
2. construct a process audit,
3. create a business case for e-procurement,
4. develop a supplier integration matrix,
5. select an e-procurement application,
6. remember-integration is everything,
7. educate, educate and educate.

Based on the literature survey and our assessment of the internal environment, external environment, questionnaire surveys and vendor e-readiness, the following roadmap for implementation of e-procurement is suggested:

1. Fitting e-procurement into the company EC strategy: E-procurement is not a stand-alone system. To get the full benefit out of an e-procurement system, it must fit to the company e-commerce strategy and must integrate to other information systems existing in the company. E-procurement is not a technical process; it is a business process and hence requires smooth integration to other business processes of the company. The goals to be achieved by the e-procurement system must be arrived at, before moving further. According to Kalakota and Robinson (2001, p.338) the typical goals of e-procurement include:

- automating the selection and purchase of goods,
- cutting costs significantly throughout the organization,
- quickly and accurately reporting company-wide purchasing patterns,
- eliminating purchasing by unauthorized employees.

A study of RINL vision, mission and objective suggests that cost cutting is of prime importance to the company. The vision of the company says in its vision that it aims at 'deliver high quality, cost competitive products, and be the first choice of customers'. The mission of the company is 'to produce steel at international standards of cost and quality'. In addition, the objective of the company aims at to 'be amongst top five lowest cost liquid steel producers in the world by 2009-10'.
The IT policy of VSP is committed to ' Follow best practices in Process Automation & Business Processes through IT by in-house efforts / outsourcing and collaborative efforts with other organizations / expert groups / institutions of higher learning, etc, thus ensuring the quality of product and services at least cost'. The policies of the company stress on cutting cost throughout the organization and to follow the best practices in business processes with the use of IT.

It is suggested that in line with the published company vision, mission, objective and IT

policy, VSP should come out with an EC strategy, fitting e-procurement into it. This will help in providing unity of direction to all concerned.

2. Performing a procurement process audit: A detailed audit of the current procurement process is to be done to find out the ground realities and the factors affecting, impeding, and interacting with it. A modeling of the workflows in procurement process is to be done. Further analysis is to be conducted to ensure that the current processes are consistent with the organization's current mission, vision, goals, and objectives.

3. Selection of a dedicated, capable, and innovative team to complete the mission: Implementation of e-procurement is teamwork, requiring cross-departmental collaboration. Hence, proper implementation of e-procurement largely depends on the quality, dedication, and synergy of the teamwork.

4. Creating a business case for e-procurement: To systematically analyze the system a business case for e-procurement, based on return on assets (ROA) should be undertaken. Return on asset (ROA) can be calculated by the formula, ROA= (revenues – expenses) / assets. From this, we find decreasing expenses by removing inefficiencies and losses in procurement chain, the company gets better return on assets i.e. better profits.

5. Consolidation of suppliers: Commitment and involvement of supplier is critical for e-procurement implementation. A supplier integration matrix (SIM) helps to evaluate and differentiate the suppliers based on their contribution to the success of the company, so that best type of relationship can be maintained with individual suppliers. There can be four types of suppliers:

- Strategic-collaborative: The supplier offering a unique or scarce product or service e.g. MRO suppliers,
- Strategic-cooperative: A supplier that offers a strategic products-but not a unique or scarce product e.g. computer suppliers,
- Non-strategic-limited: A supplier that provides products or services that are not strategic and are limited in supply e.g. administrative services and temporary agency services,
- Nonstrategic-commodity: A supplier offering a nonstrategic product that is in plentiful supplies e.g. office and book suppliers.

6. Selection of an e-procurement application: A suitable e-procurement application, which supports the company's procurement process, leverage company's other application investments, works seamlessly with other applications, and is extendable to meet future requirements, should be selected.

7. Integration: Integration with other back-office systems and applications is vital for successful functioning of e-procurement system. Interfacing e-procurement with enterprise information system is vital for organizational success.

8. Minimizing the barriers to implementation: Barriers to implementation must be reduced.

9. Training people: Training eliminates the fear of the unknown and brings support and commitment to new system

10. Integration with supplier information system: Proper integration with suppliers, especially with the strategic partners is crucial for e-procurement implementation.

11. Review the implementation and take action: Periodic review of the situation and taking action accordingly is essential for proper implementation.

6.7 Limitations of the study

The present study has been undertaken to find out the role of e-procurement in steel industry in India with a case study of VSP, India. The area of study is limited to B2B e-procurement in steel industries of India. The study is based on questionnaire surveys to the executives of VSP and its suppliers and collection of secondary data. Views of other steel manufacturers and their suppliers are not collected. Mainly internet search has been used to collect the secondary data. The availability of e-procurement data regarding Indian steel industry in internet medium is low. Responses for the questionnaire survey are collected through e-mails. The response to e-mail surveys is low. Hence, the perceptions and views of many other executives of VSP could not be collected, which might have been a good practice. Similarly, the response from the suppliers is also low. The fact is that, contacting and getting response from persons or firms in India, while doing the research in Slovenia, generates low response to questionnaire surveys. Paucity of time and reach to resources are also a constraint.

6.8 Scope for further research

E-procurement is a vast area and there are lot of scope of further research in different aspects and facets of e-procurement. Further research may focus on a comprehensive study of all the steel plants in India and abroad and compare the differences in the e-procurement practices followed by them. Various processes and practices involved in e-procurement like reverse auction, payment through electronic media, supplier integration etc can be studied into further details. Technical issues, legal issues, commercial issues and risks involved in e-procurement may form the topics of further research in this field.

CHAPTER 7

CONCLUSION

Adoption of technology has always given competitive advantage to the organizations. E-procurement emerged as a cost management tool and has evolved into the areas of spend management, strategic procurement and supply chain management. The model of e-procurement is still considered at its developmental stage and a dominant design is still unavailable. The multiplicity of the solutions may further delay its movement to the growth stage in its life cycle.

In the present study, an endeavor has been made to find the role of e-procurement in B2B scenario in steel industry with a case study of Visakhapatnam Steel Plant. It is found that e-procurement is not a technological hype, it is an application of information and communication technology (ICT) into the field of procurement management, and is bouncing back after a brief consolidation phase. It is not the question whether to go for e-procurement or not, but it is about how to manage it to achieve the fulfillment of strategic goals of the organization. If managed decisively, its advantages are enormous and the pay back period of the investment made is very low.

Diffusion of e-procurement concept to India is delayed. The reasons may be many like the prevailing business environment, non-availability of adequate infrastructure, lack of conducive legal and governmental framework, country specific social and cultural perspectives, etc. Now e-procurement is picking up with more and more organizations entering into the field. This is due to change of organizational view towards e-procurement, availability of infrastructure and conducive legal framework and governmental support.

The present work is having four objectives. The objectives are to perform industry analysis, to find out the growth rate of e-procurement in the steel industry, to find out readiness of the firm and its partners for e-procurement and to estimate the benefits and improvements through e-procurement. From the analysis of industry, it is found that most of the major players in Indian steel scenario have adopted e-procurement, in some form or other. The present growth rate of e-procurement in Indian steel industry can be estimated moderately at around 50% per annum. From the case study of Visakhapatnam Steel Plant, it is found that that the firm and its partners have sufficient infrastructure and can start e-procurement. The benefits and need for adoption of e-procurement is well understood by the firm and its partners.

E-procurement is emerging and is becoming a critical element in supply chain management. To get competitive and collaborative advantages, organizations need to manage the business processes by leveraging technological developments.

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APPENDIX-I
Questionnaire-1

QUESTIONNAIRE SURVEY FOR THE STUDY OF 'ROLE OF E-PROCUREMENT IN STEEL INDUSTRY WITH A CASE STUDY ON VISAKHAPATNAM STEEL PLANT (INDIA)'

Dear Participant,

You have been identified as an experienced professional in the steel industry. As such your kind help is solicited in the interesting and important study being conducted on the role of e-procurement in steel industry with a case study on Visakhapatnam Steel Plant (India). This study is being conducted as a part of the master thesis, by the undersigned, with the International Centre for Promotion of Enterprises, Ljubljana, Slovenia and the University of Ljubljana. Your help will be of immense value in finding the trends in e-procurement trends and practices in Indian Steel Scenario and will be particularly useful for implementation of a full-fledged e-procurement system integrated to the proposed ERP system in Visakhapatnam Steel Plant(VSP) .

In this study , Electronic Procurement (e-Procurement) , refers to the use of web-based information and communication technologies (especially the Internet) in order to support the individual or all stages of the operational and strategic procurement activities, such as catalogue search, item requisition request, approval, purchase order, delivery receiving, payment, after-sale support, identifying sourcing opportunities, supplier negotiation and contract.

I will be very much thankful if you can spare some of your valuable time to complete the survey. This survey is divided into five sections, and the questionnaire has five pages. Please try to respond to all questions. The survey should take no more than 15to 20 minutes to complete. The answers may please be given based on the facts or on your best estimate.

All responses will be anonymous and strictly confidential. No individual will be identified in the questionnaire.

Kindly try to send be the completed survey to me by 15th of August, 2008, either by e-mail, fax to my contact given below.

If you have any queries regarding the completion of the questionnaire, please send me an e-mail at samirkar@yahoo.com or contact me on phone on 00386 40 382242 or by postal mail as indicated below.

As a token of appreciation, I will be pleased to send you a copy of the of our research result, as soon as all survey responses are collected and analysed.

Thank you very much for your kind assistance in this study.

Sincerely,

SAMIR KUMAR KAR
AGM (INSTRUMENTATION)
VISAKHAPATNAM STEEL PLANT
E-mail: samirkar@yahoo.com
Fax: 00 386 1 5682775
Ph.: 00 386 1 5682331

Postal Address:
Samir Kumar Kar, Room No: 806,
International centre for promotion of enterprises
Dunajska 104
1000 Ljubljana, SLOVENIA.

PART A: ABOUT YOU

Q1. Please select one of the followings. In which functional area of the organisation is your position classified?

1. Procurement
2. Information Systems
3. Finance & Accounts
4. End User department (Production/Maintenance/Services)
5. Others (Please specify). Your response_____

Q2. Please select one of the followings. Which of the following best describes your position in the company?

1. Top executive
2. Senior manager
3. Middle-level manager
4. Junior-level manager
5. Others (Please specify) Your response_____

Q 3 Number of completed years in the current function.

Please enter _____

PART B: ABOUT YOUR PROCUREMENT PRACTICES AND E-PROCUREMENT ADOPTION/USE

ORGANISATIONAL PERSPECTIVE:

Q4. Are the following transactional and strategic procurement activities/practices assisted by e-Procurement in your organisation? Please fill 'Y' for Yes or 'N' for No in your response.

Activity / Practice	**Yes (Y)**	**No (N)**
Information Search		
Requisition Request		
Approval		
Purchase Order		
Delivery Receiving (Tracking)		
Payment		
Identifying Sourcing Opportunities		
Negotiate		
Contract		
Other (Please specify)		

Q 5. With respect to the use of e-Procurement, please indicate to what extent you disagree or agree with the following statements. Please rate each item from Strongly Disagree (1) to Strongly Agree (5) by putting the appropriate choice (1-5) in the space provided against each statement.

Scale: Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)

5.1	Our senior management is very much committed and participative in implementation of e-procurement.	
5.2	Our internal customers are concerned about uncertainty because of e-Procurement.	
5.3	In our organisation, an good understanding of B2B e-procurement is	

	available amongst the people responsible for procurement	
5.4	I feel that, in our organisation, there is a huge requirement of training for B2B e-procurement amongst the people responsible for e-procurement	
5.5	The existing legal framework is technology-neutral and supports the use of e-Procurement	
5.6	Our internal customers feel comfortable regarding security and privacy when using e-Procurement.	
5.7	An in house developed e-procurement system will be more suitable for the organization than buying e-procurement solutions from software vendors (like Ariba, SAP, Oracle, Peoplesoft etc.)	

Q 6. Please offer your comments on the existing MAMS (Materiel Acquisition Management System) package for material procurement. Please rate each item from strongly disagree (1) to strongly agree (5) by putting the appropriate choice (1-5) for each statement.

Scale: Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)

6.1	The present MAMS system is user friendly.	
6.2	Paper work has reduced with implementation of MAMS package.	
6.3	Follow-up with the suppliers is facilitated by MAMS	
6.4	The reports generated by MAMS are very useful	
6.5	With introduction of MAMS package, lead time of procurement has reduced	
6.6	Vendor rating is done easily with MAMS package	
6.7	Timely support from IT department is received in case of any problem	
6.8	Overall, the performance of MAMS package is satisfactory.	

6.9 Any other comments you will like to offer regarding existing MAMS package

_____

_____

_____

Q 7. As per your estimate / data, please indicate your choice for the following questions related to our suppliers. Please indicate your choice for each statement as per the scale below. (For example kindly put your choice as '1' for <10% to '7' for >85%).

Scale: < 10 % (1) 10%~25% (2) 25%~40% (3) 40%~55% (4) 55%~70% (5) 70%~85% (6) > 85% (7)

7.1	How many of our suppliers/trading partners have Internet-based systems to engage in e-Procurement.(in %)	
7.2	How many of our suppliers/trading partners feel comfortable (regarding security, privacy etc.) engaging in e-Procurement.	
7.3	How many of our suppliers/trading partners are willing to share information electronically with our organisation.	
7.4	How many of our suppliers/trading partners consider it important to engage in electronic business.	

TRANSACTIONAL PERSPECTIVE:

Q 8. With respect to the adoption and use of e-Procurement, please indicate the extent to which you disagree or agree with the following statements. Please rate each item from Strongly Disagree (1) to Strongly Agree (5) by putting the appropriate choice (1-5) for each statement.

Scale: Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)

8.1	Our organisation's procurement practices are tailored to fit the nature of our business operations (processes).	
8.2	A majority of the products/services purchased using e-Procurement need to be tailored specifically to our needs	
8.3	A majority of the products/services purchased using e-Procurement involve frequent purchases.	
8.4	For a majority of the products/services purchased through e-Procurement, it will be costly (in terms of time and resources) to switch to a different supplier	

TECHNOLOGICAL PERSPECTIVE:

Q 9. With respect to the adoption and use of e-Procurement, please indicate the extent to which you disagree or agree with the following statements. Please rate each item from Strongly Disagree (1) to Strongly Agree (5) by putting the appropriate choice (1-5) for each statement.

Scale: Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)

9.1	The financial benefits (e.g. ROI) of using e-Procurement are apparent to our organisation.	
9.2	Using e-Procurement has allowed our organisation to focus on our strategic procurement activities (e.g. strategic sourcing).	
9.3	Using e-Procurement facilitates the information sharing among various existing information systems (e.g. Finance, Accounting).	

ENVIRONMENTAL PERSPECTIVE:

Q 10. With respect to the use of e-Procurement, please indicate to what extent you disagree or agree with the following statements. Please rate each item from Strongly Disagree (1) to Strongly Agree (5) by putting the appropriate choice (1-5) for each statement.

Scale: Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)

10.1	Our main competitors/trading partners that have adopted and used e-Procurement have benefited greatly.	
10.2	E-procurement is crucial for our industry	
10.3	Many of our suppliers that are currently using the Internet-based systems are asking us to use e-Procurement.	
10.4	Infrastructure for e-procurement is sufficiently available in the country and with our suppliers.	

Q 11. As per your estimate, the growth rate for e-procurement in Indian steel industry in next five years shall be around (%).

Please Indicate _____%

PART C: ABOUT THE IMPACT ON PROCUREMENT PERFORMANCE MEASURES

Q 12. Please indicate the benefits gained or the level of impact in the following procurement performance measures after using e-Procurement in your division. It is suggested that you refer to the baseline performance measures if available in your organisation. As per your estimate / data, please indicate your choice for the following questions for each statement as per the scale below. (For example kindly put your choice as '1' for <10% to '7' for >85%)

Scale: < 10 % (1) | 10%~25% (2) | 25%~40% (3) | 40%~55% (4) | 55%~70% (5) | 70%~85% (6) | > 85% (7)

12.1	Reduction in purchasing cycle time	
12.2	Increase in throughput (number of transactions during the given time period)	
12.3	Reduction in requirement staff in purchasing department	
12.4	Reduction in matching (e.g. invoice, inventory) costs	
12.5	Reduction in overall search (e.g. goods/services, supplier) costs	
12.6	Reduction in communications costs	
12.7	Reduction in information processing costs	
12.8	Reduction in negotiation costs	
12.9	Reduction in monitoring (or enforcement) costs	
12.10	Reduction in maverick (off-contract) purchasing	
12.11	Reduction in the number of suppliers	
12.12	Reduction in the purchase price of goods and services (e.g. because of supplier competition and volume aggregation)	

Q13. To what extent has the implementation of e-Procurement (Full or partial) affected the performance of the following measures in your organization? Please indicate your choice for the following questions for each statement as per the scale below. (For example kindly put your choice as '1' for <10% to '7' for >85%)

Scale: < 10 % (1) | 10%~25% (2) | 25%~40% (3) | 40%~55% (4) | 55%~70% (5) | 70%~85% (6) | > 85% (7)

13.1	Reduction in errors and mismatches (re-keying and duplications)	
13.2	Reduction in administrative tasks (paperwork and manual filing etc.)	
13.3	Improvement in the quality of products/services	
13.4	Improvement in delivery reliability	
13.5	Improvement in information sharing with internal customers and suppliers	
13.6	Increase in reliability of management information and analysis (e.g. spend profile) capabilities	
13.7	Increase in flexibility to user/buyer's changing needs (e.g. customisation and volume of product/service)	

Q14. To what extent has the implementation of e-Procurement affected the performance of the following measures in your organisation? Please indicate your choice for the following questions for each statement as per the scale below.
(For example kindly put your choice as '1' for Negative to '5' for significant impact)
Scale:
Negative (1) ,No impact (2), Moderate impact (3), Great impact (4),Significant impact (5)

14.1	Increase in availability of public information on bids/offers and their depth	
14.2	Increase in transmission of timely public information on contract awards on price, volume and execution time	
14.3	Increase in availability of audit trial information	
14.4	Increase in visibility of management reporting processes and overall procurement performance	
14.5	Increase in ability to identify responsibilities and duties for significant purchases	
14.6	Increase in compliance with relevant delegations in procurement	

Q.15. Kindly prioritise the top three issues, for implementation of an e-procurement system, in-house or bought out, in **descending order of importance.**
(e.g. Privacy, Authenticity, Integrity, Reliability of system, Blocking of intrusion etc)
1. _____
2. _____
3. _____

Q 16. What are the top three priorities for your organization in the purchasing and supply chain area? (e.g., lowering cost, global sourcing, e-procurement, integration of supply chain etc.).
1. _____
2. _____
3. _____

Q17. If you would like to suggest to us further performance measures or provide additional comments on the antecedents of e-Procurement initiatives and impact on performance measures, please do so below.

Part D (Optional): ABOUT YOUR CONTACT DETAILS :

The objective of this optional part is to know your contact information in order to send you the summary of our research result. Your contact information will not be disclosed to anyone outside of this research project.
Please enter your e-mail address: _____.

THANK YOU VERY MUCH FOR YOUR PARTIPATION IN THIS SURVEY.

Kindly mail your responses to **samirkar@yahoo.com**

APPENDIX-II
Questionnaire-2

QUESTIONNAIRE SURVEY FOR THE STUDY OF 'ROLE OF E-PROCUREMENT IN STEEL INDUSTRY WITH A CASE STUDY ON VISAKHAPATNAM STEEL PLANT (INDIA)'

Dear Participant,

You have been identified as an experienced supplier in the steel industry. As such your kind help is solicited in the interesting and important study being conducted on the role of e-procurement in steel industry with a case study on Visakhapatnam Steel Plant (India). This study is being conducted as a part of the master thesis, by the undersigned, with the International Centre for Promotion of Enterprises, Ljubljana, Slovenia and the University of Ljubljana. Your help will be of immense value in finding the trends in e-procurement trends and practices in Indian Steel Scenario and will be particularly useful for implementation of a full-fledged e-procurement system integrated to the proposed ERP system in Visakhapatnam Steel Plant(VSP) .

In this study , Electronic Procurement (e-Procurement) , refers to the use of web-based information and communication technologies (especially the Internet) in order to support the individual or all stages of the operational and strategic procurement activities, such as catalogue search, item requisition request, approval, purchase order, delivery receiving, payment, after-sale support, identifying sourcing opportunities, supplier negotiation and contract.

I will be very much thankful if you can spare some of your valuable time to complete the survey. This survey is divided into three sections, and the questionnaire has three pages. Please try to respond to all questions. The survey should take around 10 minutes to complete. The answers may please be given based on the facts or on your best estimate.

All responses will be anonymous and strictly confidential. No individual will be identified in the questionnaire. Kindly try to send be the completed survey to me by 22nd of August, 2008, either by e-mail, fax to my contact given below.

If you have any queries regarding the completion of the questionnaire, please send me an e-mail at samirkar@yahoo.com or contact me on phone on 00386 40 382242 or by postal mail as indicated below.

As a token of appreciation, I will be pleased to send you a copy of the of our research result, as soon as all survey responses are collected and analysed.

Thank you very much for your kind assistance in this study.

Sincerely,

SAMIR KUMAR KAR
AGM (INSTRUMENTATION)
PLANNING SECTION
VISAKHAPATNAM STEEL PLANT
E-mail: samirkar@yahoo.com
Fax: 00 386 1 5682775
Ph.: 00 386 1 5682331
Mobile: 00386 40 382242.

Postal Address:
Samir Kumar Kar,
Assistant general Manager,
Instrumentation Department
Visakhapatnam Steel Plant,
Visakhapatnam-530031, AP. INDIA.

QUESTIONNAIRE

PART A. ABOUT YOU AND YOUR ORGANISATION

Q.1 Please fill up the following details about your organization

1.1	Name of the Company	
1.2	Nature of business a) Manufacturer b) Dealer c) Agent d) Other (please specify)	
1.3	Annual Turnover(in Rs)	
1.4	Type of product	
1.5	Year of Establishment	
1.6	Your association with VSP in no of years	

Q2 Please select one of the followings. In which functional area of the organisation is your position classified?

1. Sales & Marketing
2. Servicing
3. Others (Please specify). Your response_____

Q3 Please select one of the followings. Which of the following best describes your position in the company?

1. Top executive
2. Senior manager
3. Middle-level manager
4. Junior-level manager
5. Others (Please specify) Your response _____

Q.4 Your experience in the industry in number of completed years

Please enter _____

Q.5 Are the following transactional and strategic procurement activities/practices assisted by e-Procurement in your organisation? Please fill 'Y' for Yes or 'N' for No in your response

		Yes (Y)	No (N)
5.1	Does your company has a e-business policy		
5.2	Do you have infrastructure to engage in e-Procurement system of buyers?		
5.3	Have you ever participated in e-procurement process of any company?		
5.4	Do you consider it important to engage in electronic business to get competitive advantage		
5.5	Do you feel comfortable (regarding security, privacy etc.) engaging in e-Procurement		
5.6	Are you willing to share procurement related information electronically with Buyers?		
5.7	Does your company have an e-Commerce site?		

5.8	Do you have an electronic catalogue for buyers? (such as e-Procurement hosted Catalogue, Transactional customer facing website, CD Rom catalogue)		

Q 6. In which way are you receiving purchasing orders at present from various buyers? Please fill your response in percentage (%) of total purchase orders received.

Percentage of orders received by	**Percentage(%)**
Fax	
Email	
Post	
Telephone	
XML	
EDI	
Others (please specify)	

Q.7 In which way are you sending invoices at present? Please fill your response in percentage (%) of total invoices sent.

Percentage of Invoices sent by	**Percentage (%)**
Fax	
Email	
Post	
Telephone	
XML	
EDI	
Others (please specify)	

Q.8 In which way are you are receiving payments today? Please fill your response in percentage (%) of total payments received.

Percentage of payments received by	**Percentage(%)**
Cash	
Cheque / Demand draft	
Electronic Fund Transfer (Through Bank/Financial institutions)	
P-card	
Others (please specify)	

PART B : ABOUT THE IMPACT ON PROCUREMENT PERFORMANCE MEASURES

Q 9. With respect to the use of e-Procurement in VSP, please indicate to what extent you disagree or agree with the following statements, with respect to benefits earned to VSP.
Please rate each item from Strongly Disagree (1) to Strongly Agree (5) by putting the appropriate choice (1-5) for each statement.

Scale: Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)

9.1	Purchasing cycle time reduces	
9.2	Throughput (number of transactions during the given time period) 1 increases	
9.3	Communications costs reduces	

9.4	Negotiation costs reduces	
9.5	Maverick (off-contract) purchasing reduces	
9.6	Purchase price of goods and services (e.g. because of supplier competition and volume aggregation) reduces	
9.7	Improvement in delivery reliability increases	

Q10. What benefits you perceive that you will get from full fledged implementation of e-procurement system of Visakhapatnam Steel Plant (VSP)?
Please write 'Y 'for Yes and' N 'for No. by putting the appropriate choice Y/N for each statement.

10.1	Increased collaborative partnership	
10.2	Increase in transparency of procurement process	
10.3	Reduction in time in preparation of offer	
10.4	Reduction in effort in preparation of offer	
10.5	Faster payments	
10.6	Reduced cycle time of business	

Q 11. As per your estimate, the growth rate for e-procurement in Indian steel industry in next five years shall be around (%).

Please Indicate _____%

Q.12 . If you would like to suggest to us further performance measures or provide additional comments on the antecedents of e-Procurement initiatives and impact on performance measures, please do so below.

Part C : ABOUT YOUR CONTACT DETAILS :

The objective of this optional part is to know your contact information in order to send you the summary of our research result. Your contact information will not be disclosed to anyone outside of this research project.

Please enter your e-mail address: _____.

THANK YOU VERY MUCH FOR YOUR PARTIPATION IN THIS SURVEY.

Kindly mail your responses to samirkar@yahoo.com