

Leveraging Steel Hard using Knowledge Management in Vizag Steel Plant – a Case Study

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Abstract : In today's era of globalization, the only resource which can provide sustainable competitive advantage to any organization is knowledge. Business Excellence can be achieved when knowledge management initiatives are in place, and have integrated people and technology together. The objective of Knowledge Management (KM) is to create, store, extract, disseminate and make the requisite knowledge available for the intelligent decisions making. Organizations should strive to capture the experiences and expertise of their employees and convert them into explicit knowledge thereby enriching the organizational knowledge base. The manuscript explores thorough literature of KM enablers, KM practices, knowledge processes, underlying essential Information Technology support; and their impact on organizational performance. We have conducted a study to understand the genesis of Knowledge Management, its present status and perception of employees of Vizag Steel, a Public Sector Undertaking of Government of India, about it. The objectives of this study are to establish relationships between Knowledge Management factors. "Harness and leverage knowledge in the organization for accelerated improvements", is the KM vision statement crafted by management at Vizag Steel. KM initiatives started sometimes in 2002, in Vizag Steel and at present have taken the shape of a complete system under the mentorship of Corporate Strategic Management department. Other organizations from steel industry or across industries can learn from Vizag Steel experiences and evolve their own KM system for achieving their business objectives.

Keywords : Competitive Advantage, Knowledge Management, Steel Industry, Vizag Steel

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I. Introduction

Rashtriya Ispat Nigam Limited (RINL) is a public sector enterprise under the control of Ministry of Steel, which has a Navratna title and operates Visakhapatnam Steel Plant popularly known as "Vizag Steel". It is the first shore based integrated steel plant in India and is known for its quality products. The plant was set up in 1990, faced turbulent times and incurred losses for few initial years. Gradually it attained stability and made net profit for the first time in the year 2002. Since then there is no looking back and it is known as one of the most modern steel plant in Public Sector Undertaking (PSU) categories and has a wide range of delighted customers. Considering the present economic scenario, where business needs and priorities are ever changing, employee mobility and attrition is a reality, rapid advances in the technology are demanding more capital; the need for development of organizational knowledge and its renewal on an on-going basis is of prime importance. All these factors call for implementing an integrated knowledge management system which covers all dimensions of knowledge management, is inevitable for every organization. In a large technology intensive organization like Vizag Steel, knowledge management systems have to be carefully evolved over a period of time with vision, meticulous plan and diligent implementation. In this light - this article discusses review of literature including previous case studies conducted in India and abroad related to KM implementations, purpose and objectives of study, methodology employed description of specific KM tools developed by Vizag Steel for different KM processes and KM practices.

II. Review Of Literature

2.1 KM Concepts

Knowledge is widely recognized as a vital organizational asset and hence needs to be managed like other assets. The extant literature has numerous definitions of knowledge and consequently of knowledge management. There is not one universally acceptable definition of knowledge. Knowledge is the top tier in a three-level hierarchy that begins with "data" (i.e. raw facts), which, when processed, yields "information" [1], which, when combined with experience and judgment and used in decision-making becomes "knowledge" [2]. Knowledge is information combined with experience, context, interpretation and reflection [3]. Knowledge is a process [4], an object [4], a condition of access [5], a capability [6], the currency of current economy [7].

According to resource based view of the firm, the only sustainable source of competitive advantage is knowledge [8]. Similarly the literature has various definitions for organizational knowledge. For the purpose of our study, we can simply use the definition of organizational knowledge as all the knowledge resources within an organization that can be realistically used as and when required. Knowledge management involves all the processes related with creation, storing, dissemination and utilization of organizational knowledge. KM is also defined in terms of resources, flows and enablers [9]. First it has to manage the knowledge and then move it around in the organization for decision making and also manage the support system.

KM enablers are necessary factors which must exist and nurtured for successful implementation of KM [10, 11]. Some of the enablers emphatically discussed in extant literature are top management support, a conducive work environment where employees get an opportunity for learning, have mutual trust, collaborate with one another and Information Technology (IT) support.

2.2 KM in steel industry

One of the first organizations, where Knowledge Management (KM) was implemented belonged to steel industry. “Chaparral, a steel mini-mill in Texas, has practiced systematic and comprehensive KM since its inception in 1975”, [12]. Top management of Nucor Steel was concerned about, its’ managers not sharing their knowledge. To overcome this problem of knowledge hoarding, the management created social ecology; a social system in which people operate, [13]. A study on Nucor Steel revealed that one of the important findings that companies often make mistake of considering KM as synonymous of information management. Nucor Steel achieved success by becoming and remaining most efficient steel producer in the world by exploiting KM’s social dimension. An interesting case study was published on technological collaboration between two steel makers of Japan (Nippon Steel) and Britain (British Steel Strips Products) in 1999 [14]. Japan’s firm was given the responsibility of improving the product quality, production control management and customer links of its British counterpart. The study talks about the difficulties in transferring KM practices because they are highly dependent on broader contextual factors, or in other words deeply embedded.

One of the world’s largest steel makers Arcelor Mittal Steel has institutionalized a simple mechanism for sharing knowledge across their units located in different parts of the world [15]. In Indian context Tata Steel is pioneer in adopting KM practices [16]. They have even developed an index termed as “Knowledge Manthan” which is an indicator of KM activities happening in the organization. Some of the major Indian players in the steel sector belonging to public sector undertakings viz. Bhilai Steel Plant the flagship unit of Steel Authority of India Limited, Vizag Steel Plant operated by Rashtriya Ispat Nigam Limited and others started KM initiatives almost a decade ago. Hence there is a need to study their Knowledge Management Practices and their impact on organizational creativeness and performance.

III. Objectives Of Study

The objective of this paper is to ascertain the current status of knowledge management (KM) adoption in a large integrated steel plant belonging to public sector for the benefit of other similar organizations. The study also attempts to identify the essential knowledge management enablers and impact of KM initiatives on organizational creativity and organizational performance as perceived by employees.

IV. Methodology

Keeping in view the purpose of the study, qualitative research methodology was selected and inductive reasoning is applied for analysis of data. The sample of the study comprised executives working at different managerial levels ranging from Executive Directors to Junior Managers and belonging to different functional areas. Few line workers from different shop floors were also interviewed. In total 22 interviews were conducted face-to-face, having time duration range varying from 20 to 60 minutes with a simple mean of about 30 minutes. The semi-structured and in-depth interviews were conducted to collect information.

V. Description Of Km Tools

Corporate Strategic Management (CSM) Department is responsible to coordinate all KM activities at Vizag Steel. At present it is headed by a top level executive of the rank of General Manager and four executives of the rank of Assistant General Manager have been assigned the tasks related with continuation, refinement, promotion of knowledge management system in the organization. KM initiatives are named as “Gnana” which in Sanskrit language means “Knowledge”. Over a period of time based on suggestions and experiences of all the stake holders they have designed following KM tools which meet almost all the KM processes requirements. A KM portal has been designed in house by the Information Technology department which has experts in different domains of information systems and communication technologies.

5.1 KM Portal

The Key Objective is to generate K-Assets that have potential for use in other areas. A well defined procedure is followed. Employees are encouraged to post their unique experiences and learning. This posting is termed as a K-chip. Now the role of K-Veteran is to get more information from K-Author if required by framing probing questions and evaluate the K-Chip. Guidelines to allot points on a ten point scale have been specified. K-Veteran allots points to this K-Chip based on potential to use by others, suitability for development of a specific application or to register as an Intellectual Property Right (IPR). Once the points are given, a chain of events is initiated. K-Chip becomes a part of K-repository, concerned departments are communicated for possible use, who in turn create a utilization report, and employee is rewarded based on specified scheme. Even if the K-Chip is not able to score requisite points to be qualified as K-Asset, it is not discarded but it finds its place in the portal as an I-piece (Information piece). The players involved in the process are K-Author, K-Veteran, Head of Department (HOD) and CSM Department and their responsibilities are well defined.

5.2 K-Asset Analysis

The key objective of K-Asset analysis is to learn from other's knowledge and drive improvements in working process. The responsibility lies with Head of Departments and concerned in-charges. They conduct a meeting on quarterly basis of all stakeholders to analyze the K-Assets posted on the portal and communicated to them. They identify the assets that can be used directly or improvised upon for improvements. An action plan for improvement is prepared and then it is subsequently executed using a proper method. All these activities are posted in K-Repository.

5.3 K-Groups – Community of Practice (CoP)

A CoP is defined as a group of professionals informally bound to one another through exposure to a common class of problems, common pursuit of solutions and thereby themselves embodying a store of knowledge. There are many CoPs operational at Vizag Steel. The main objective is to arrive at a realistic and practical solution for the identified problem through knowledge sharing. They meet on regular intervals or on demand when some specific problem is encountered and the solution is required. The responsibility for identification of topic lies with K-Veteran. He seeks the requisite inputs for deliberations, then arranges and steers the session with all concerned. The idea is to find suitable solution for the problem and the meeting goes on in multiple sessions till the solution is found. This is displayed on K-Repository for the purpose of viewing and usage. An implementation report which crystallizes learning, outcomes and course of action for future sessions is prepared. It also puts on record the opportunity for improvement and identifies owners.

5.4 K-Groups at Shop Floor

Many groups meet at shop floor to identify issues related with work process. The objective is to capture experience and knowledge based collaborative ideas and drive improvements. This meet involves Non-executives who are very busy in the shop floor process and do not get time for interaction with other concerned colleagues and neither they do have the ability to articulate their thoughts in writing. It is the responsibility of HOD or concerned In-charge and K-Propagator to identify the challenges at work process level and define the problem. Sessions are conducted and steered by HOD by invoking insightful thoughts and involve concerned group. Ideas put forward are collated and an action plan for improvement is drawn. This plan is fine tuned in subsequent session and process and finally executed. All these activities are iterative in nature. Once the group is satisfied, the outcomes are displayed on K-Repository for everyone to view and usage.

5.5 Learn From Each Other (LEO) Workshops

Steel Authority of India Limited (SAIL), the public sector undertaking under the government of India is the largest steel producer in the country and it has established Management Training Institute (MTI) at Ranchi, with an aim to improve managerial competence of senior executives. The main customer base is executives from steel plants of SAIL, but very often it also invites executives from other plants also to share their experiences and learn from each other. LEO workshops are very useful and Vizag Steel also sponsors it's executives to participate and learn best practices from other plants. It is the responsibility of the CSM department and concerned HOD to be in touch with MTI and track relevant topics and KM related conferences. HOD nominates people based on need and demand and he is also responsible for incorporation of learning if any. The team thus nominated and concerned prepares its presentation and participates in the event. After the event is over, the team makes a presentation to top management regarding learning. Subsequently this presentation finds its place in the K-Repository and if found relevant, improvement activity is also initiated. In this way Vizag Steel keeps on updating itself about the best practices in the industry.

5.6 The role of Case Studies

In an integrated steel plant major works like capital repair, expansion and modernization are taken up frequently. This is an opportunity for learning, experience sharing and knowledge capturing. Vizag Steel does this in the form of case studies. The responsibility lies with concerned HODs, K-Propagator and CSM department. It is the job of HOD to identify the case study based on recent improvements, major capital repairs and modernization/up gradation projects. Then relevant data and information is gathered through interaction with all concerned. Next, this information is compiled in predefined formats. K-Propagator and CSM department along with experts involved play a crucial role in this. Finally HOD in a meeting validates this learning of case study and subsequently it is stored in K-Repository for viewing and usage.

5.7 Intellectual Property Rights (IPR)

Nowadays, it is very essential for organizations to protect the innovative work and exploit the same on commercial basis. Registration of innovations as Intellectual Property Rights is a way of doing this. There is a specific cell formed in CSM department known as IPR Cell for doing this job. It is the responsibility of HODs and K-Veterans to identify projects having potential for IPRs. When a K-Chip is submitted by an individual or a group of employees, it is evaluated by K-Veteran. If K-Chip is of very high quality and awarded points 9 and above, it is rated as excellent. Some K-Chips have already resulted in tangible benefits for the organization and some are considered to have this potential, then IPR Cell of CSM department forwards it for Ideal Patent Examination Training (IPET). Upon critical discussions and deliberations patentable worthiness of the K-Asset is examined, documentation is done and forwarded to Patent Attorney. It is also stored in K-repository for viewing and usage by those interested and concerned. To inspire and motivate the individual or the group involved, a scheme for monetary and non monetary rewards has also been designed by the top management. Different rewards are given at the stage of filing of patent, grant of patent and grant of copyrights.

VI. Discussion

Findings of our KM related study conducted at Vizag Steel are described below.

6.1 The Genesis

The beginning of KM in Vizag Steel happened in its Steel Melting Shop (SMS). In an integrated steel plant iron ore is converted into steel and subsequently different products. SMS converts hot metal into liquid steel using LD process. Blooms and Billets are made by continuous casting from liquid steel. Later these are rolled into different products like wire rods, bars, angles, channels etc. in different rolling mills. Hence SMS and continuous casting department are considered core operational area in any integrated steel plant. Vizag Steel faced lot of difficulties in its initial years in stabilizing the operations of SMS and continuous casting. The concerned engineers and technicians thought of sharing their experiences, and started recording them in hard copies for future use. This was the beginning of KM activities at Vizag Steel. Later other departments also took cue from SMS and started discussing their problems within the department and recording the solutions. Thus KM which started in different pockets gradually became the centre of attraction and inter department sharing of knowledge started taking place. At the same time KM was catching up in other industries too. Soon top management realized the value and decided to make a centralized strategic plan for KM implementation across organization. One factor which makes Vizag Steel different from its peers is the average level of education of its workforce. Most of the workers at every level are more educated as it is the youngest steel plant in public sector was, told by an executive of CSM department.

6.2 Top Management Support

Keeping pace with developments taking place in the industrial world, the top management assigned the job of KM to CSM department. Information Technology (IT) department was already in place at Vizag Steel with contemporary hardware and competent software professionals. Top management provided the requisite resources for implementing a knowledge management system which really delivers value. Self motivated employees from each department who could volunteer themselves for this extra responsibility of KM initiatives were identified. Under the exemplary leadership these knowledge worshippers performed, kept on refining and an efficient KMS is functioning at Vizag Steel.

6.3 Organizational Culture

A very conducive culture for thriving KM activities, exists at Vizag Steel. It has its own township which meets the housing needs of its approximate 18,500 employees. There are avenues for recreational and social activities.

6.3.1 Working environment

Employees have trust in their colleagues and supervisors. They identify problems, discuss alternative solutions and implement the best. Collaboration is the buzz word within departments and across departments. Every respondent interviewed by us talked very high about the social ecology at Vizag Steel.

6.3.2 Opportunity for Learning

Employees must get an opportunity for new skill developments and learning, with this objective in mind the top management has setup a Technical Training Institute (TTI) at Vizag Steel. This also caters to the requirements of students from different educational institutes and Universities. Top management is actively involved through various training advisory committees. For employees training needs are identified through annual surveys. There is an on-line training information system which displays the annual training calendar and accepts nominations for different training programs. Every HOD can view the training record of every employee. Training courses are designed with the help of line managers. To evaluate the effectiveness of training, there exists a three tier evaluation system. All the training programs are constantly reviewed and improvements are done on the basis of feedbacks received from trainees. Main focus of TTI is on internal faculty development.

6.4 Information Technology

IT Support means the degree to which KM is supported by the use of Information Technologies [17]. Interest of the practitioners and researchers in the field of knowledge management grew with the advent of availability and advancement of the IT Services. To enable and facilitate knowledge management processes and initiatives a capable technological infrastructure is vital.

“We already had a fully fledged Information Technology (IT) department in place”, said an IT executive. KM portal was designed by in house software professionals. There are approximately 18,500 employees in the organization out of which about 3500 are at executive levels. Login ID to all the executives have been provided as at present they only have access to computers. With the advancement of technologies now even smart phones are able to access the data from the server. The server available is powerful enough and meets the demand of more login IDs. More over IT department in collaboration with Training department has developed E learning management system which is having about 54 on-line courses based on moodle platform. In March 2014, they have implemented SAP, Enterprise Resource Planning System. One notable unique feature of KM portal is that any employee can communicate with the Chairman directly. A program called “Chairman On-line” has been launched. Employee irrespective of his department or position can send a query to chairman, and if found suitable, chairman’s office gives a reply in a stipulated period.

6.5 Knowledge Management Processes

KM system in any organization is implemented using appropriate KM processes in a top down approach. Essential processes identified in extant literature are Knowledge Acquisition, Knowledge Creation, Knowledge Transfer, Knowledge Utilization and Knowledge Retention [18]. KM tools, which have been designed at Vizag Steel and discussed earlier in this paper are based these processes and are meeting all the requirements. Modifications and refinements in the processes are done periodically as and when the needs are felt.

6.6 Knowledge Management Practices

Knowledge Management practices are distinguished from knowledge processes. Knowledge management practices are observable organizational activities that are related to KM [19]. Highlighting the difference between KM processes and KM practices in another research paper authors argue that KM practices refer to those aspects of organization that are manipulable and controllable by conscious and intellectual management activities [20]. Knowledge in organizations is generated in practice but implemented through process [21]. At Vizag Steel most of the Knowledge Practices are being followed which are termed as essential. Some of these are (a) ability to locate and share existing knowledge, (b) ability to experiment and create new knowledge, (c) to develop an organizational culture that encourages knowledge creation and sharing, (d) a regard for strategic value of knowledge and learning, (e) rewarding employees with non-monetary and monetary incentives motivates knowledge sharing and knowledge creation.

6.7 T-shaped skilled employee

A T-shaped skilled employee has both depth and breadth of knowledge. One of the executive from Human Resource Department said that the manpower in our plant is low compared to other steel plants. Even for expansion work we do not recruit new people. We design training programs for our employees to impart new skills as and when required. Our employees are trained in multiple tasking. It raises the job satisfaction level of the employees and results in cost reduction for the organization.

6.8 Some Specific KM incidents

Now we describe two of the events related with knowledge based initiatives which are indicators of knowledge utilization and have helped the plant in deriving value.

6.8.1 Power trading when faced with coal shortage

Vizag Steel has its own thermal power plant and needs coal for its operation. In the past when the organization was faced with shortages of coal and the price of coal became very high, imported delivery got delayed; the plant started facing shortage of electric power. By then Government of India had setup power exchanges for state run electricity boards to exchange power at market driven prices. The executives of Thermal Power Plant came out with a novel idea. They sought permission from government and started to bid for purchasing power on-line at power exchanges ensuring uninterrupted power supply for the plant operations and also saved electricity worth millions of rupees in this process.

6.8.2 Lessons learnt from Hudhud

A strong tropical cyclone named “Hudhud” struck some Southern parts of India and caused extensive damage to the city of Visakhapatnam during October 2014. Vizag Steel plant was also affected by this and was shutdown. The management and employees worked as a collective in this moment of crisis and revamping of essential operational machinery was done within the shortest possible time. Recordings of related experiences have been done to deal with such natural calamities in future if it happens god forbid.

6.9 Organizational Performance

KM literature suggests that KM practices are positively associated with organizational performance [19]. Organizational performance includes factors such as financial performance, profitability, operational excellence and many more. Most of the respondents agreed that KM practices may not be directly related with organizational performance; but is definitely related with organizational creativity and innovation which in turn may be related to organizational performance.

VII. Conclusions

This study brings out the important elements of KM implementation plan which other technological organizations can follow as a role model. Top management must create a social ecology, wherein employees learn to embed knowledge sharing activities into their daily work life. KM strategy must be linked with organization’s vision and mission statement. Information Technology Support facilitates KM adoption. Other organizations who want to embark on their KM journey may find this study useful.

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