CHAPTER - VIII
THE TECHNOLOGY INFRASTRUCTURE
(Facilitating Knowledge Sharing)

8.1. Introduction

Information technology plays an important part in all the cases of best practice in KM. This was most apparent in cases where knowledge databases had been built. New technology infrastructures such as the Intranet, now make it easier to disseminate information around and between organisations, and hence, support knowledge workers more effectively. Technology should not be viewed as a driving force for KM but simply as an important enabler. Mr. Arian Ward, emphasizes the dangers of putting technology first. Because, the real value is in linking people together, not in the technology itself.

8.2. Technology for Knowledge Management

The reach of know-how and experience possessed by individuals can be greatly extended once it is captured and explicated so that others can easily find it, and understand and use it.

a. In ancient Greece, the philosopher, Plato, in his dialogues, captured and elaborated the thinking of his mentor Socrates, and so succeeding generations have been able to discover and share that thinking, and in turn reinterpret those thoughts and to be stimulated to achieve fresh insights and creativity.
b. In modern times, reports of activities, minutes of meetings, memoranda, proceedings of conferences and document filing systems maintained by organizations are traditional and commonly used devices for recording content in paper format so that it can be transferred to others.

c. More recently, according to Mr. Tom Peters, the electronic databases, audio and video recordings, interactive tools and multimedia presentations have enabled the extension of the techniques for capturing and disseminating content. Although these tools are not yet available everywhere in the developing world, they are spreading rapidly and present a unique opportunity for developing countries to benefit most from the technological revolution now unfolding.

i. Low-cost telecommunication systems can help countries to leapfrog ahead through distance education, distance health services, and much better access to markets and private sector partners abroad.

ii. Nevertheless, even with modern tools, the process of knowledge transfer is inherently difficult, since those who have knowledge may not be conscious of what they know or how significant it is, or be able or willing to share it with others.

iii. Even when they are so willing, the readiness to accept the wisdom of others is often not obvious.

iv. Thus, know-how is “sticky” and tends to stay in people’s heads, says Mr. John Moorcroft. The availability of new information technology, particularly the World Wide Web, has been instrumental in catalyzing the KM movement. Information technology may provide a comprehensive knowledge base that is speedily accessed, interactive and of immediate value to the user.

In the opinion of Mr. Charles D. Winslow and Mr. William L. Bramer, most of the technological tools now available tend to help dissemination of know-how, but offer less assistance for knowledge use. Tools that assist in
knowledge creation are even less well developed, although collaborative workspaces offer promising opportunities, by enabling participation, across time and distance, in project design or knowledge-base development, so that those most knowledgeable about development problems (the people living them on a day-to-day basis) can actively contribute to their solution. One of the major risks in KM programs is the tendency for organizations to confuse KM with some form of technology, whether it is Lotus Notes, the World Wide Web, or one of the off-the-shelf technology tools that are now proliferating. According to Mr. Ghoshal and Bartlett, there are four main trends in the application of technology to KM. They are presented below.

a. A Renewed Interest in Intelligent Solutions: After the unfulfilled promises of artificial intelligence techniques and experts systems in the 1980s, it was found a growing resurgence of interest in intelligent techniques including case based reasoning, knowledge discovery system and neural networks.

b. An Infrastructure, as well as a Solution Perspective: With rapidly evolving collaborative technologies such as groupware, the Internet and Intranet, many of the companies saw opportunities to make knowledge easy to share and diffuse using computer networks.

c. A Growing Awareness of the Human Factors: Simply providing a knowledge-sharing infrastructure is only the starting point of creating effective knowledge exchange.

d. A Shift to Information Pull Strategies: With vastly increasing incoming flows of information, many users are concerned about information overload.
8.3. The Role of Technology

The role of technology in KM is to put workers in touch with the knowledge they need. Technologies like data mining, text analysis and search tools, Web crawlers, document management, and employee skill inventory tools - all have intuitive appeal. In other words, they help us to find stuff. More accurately, they help us to discover stuff. Technology, on this side, is fairly straightforward. It deals with how an individual interacts with "the system" to discover useful content. But KM is about behavior - about a group's extended activities. IT solutions play an important value-adding role in knowledge processes e.g., in the extraction of new knowledge from databases, for structured storage of explicit knowledge, and for the networking and communication facilities to aid the dissemination and sharing of knowledge.

8.4. IT Supported Infrastructure

References are drawn to the following IT supported infrastructures.

a. Connections: Connectivity from people to computers, and between people and computers is an important underlying capability.

b. Communications: Building on connectivity is communication, e.g., the use of electronic mail by knowledge workers to exchange information and share ideas.

c. Conversations: It was observed among the knowledge leaders a growing interest in technology infrastructure that goes beyond making connections and communications to higher levels of structuring.

d. Collaboration: A new generation of collaborative technologies, such as groupware, meeting support software, group decision support system, and desktop video-conferencing genuinely start to support knowledge work, even over a distance.

e. Document Databases: Another field showing considerable growth and having potential for KM is that of document management.
Documents give the user more 'context' and visual impact than when the same information is reduced to standardised computer-based text.

f. Text Databases: A characteristic of the leading knowledge organisations in our cases was their thirst for external information. Much of this information is textual, with very little specified structure, although some providers do add keywords alongside other basic source details.

g. Pull Vs Push Strategy: Customised information services are an example of a 'push' strategy - information is pushed from source to user. With the growing use of e-mail, knowledge workers have become used to having information 'pushed' at them. However, information intermediaries (librarians) have traditionally used a pull strategy, where they pull the information that they need from the most appropriate external databases when required. This has the advantage that the information is current and has usually been well structured by a specialist database provider.

8.5. Knowledge Discovery Tools

There are a growing number of tools that help users discovering new knowledge in information repositories such as those described above. The simplest tools are basic query tools using standard procedural logic. Thus, if a user has a query regarding how many units of product X we sold to customer Y in region Z during a given time period, then that is a five-dimensional query. M/s DEC Computing, have presented the following tools.

8.5.1. Parallel Processing Systems: The large amounts of processing power needed to analyse massive data warehouses requires significant amounts of processing power. One of the technologies that has made the shift from the scientific provenance of such a powerful processor is that of parallel computing.
8.5.2. Knowledge Gathering Tools: Intelligent agents are a class of software that acts semi-intelligently, some might even say knowledgeably. They are also known as software robots, groupware, 'know bots', etc.

8.5.3. Text Retrieval: Intelligent solutions are also being applied to retrieving relevant information from large blocks of text. Rather than the traditional search by key words, many modern systems do concept-based retrieval, using knowledge of word structures and synonyms to find items of relevance.

8.5.4. Video Conferencing: The ideal way of transferring tacit knowledge involves face-to-face settings, so that the process of socialisation can take place.

8.6. Future Settings

With the pace of technology continuing to advance, Mr. Michael Dempsey highlighted the importance of KM teams keeping an eye open to emergent technologies that could enhance knowledge sharing. Virtual reality is opening up new dimensions for knowledge sharing. The enabling role of information technology means that the IS function will play key role in most KM programmes. Organisations are making some significant investments in either specific technologies, such as document management or video-conferencing, or in general networking infrastructure, such as Intranets.

8.7. Seven Driving Principles

The Corporate Intranet in their featured editorial brought out the principal drivers behind the integration of information systems strategy and architectures with knowledge initiatives. They are presented below
a. One-to-One Transmission from Sender to Recipient - by avoiding any distortion of the communication. Ideally, it should go straight from originator to recipient.

b. Everyone has access to the company's knowledge base.

c. Problem Solving - anyone can contribute to the solution to anyone else's problem, wherever it occurs, and wherever people are located.

d. Kept Open All Year Round - since speed of response to customers is important, the network has to be accessible at any time from any place.

e. Simple to use.

f. Using the Best Possible Language - communication must seamlessly across cultures and language barriers; therefore, users should use the most appropriate language.

g. Capturing the Strands of Conversation - this describes the bottom up activity of subject matter experts monitoring electronic discussions and drawing out the potentially reusable information for storage in the electronic library files.

8.8. Knowledge Management - Survey Findings

8.8.1. KM as a Technical Solution: It was evident from the survey that organisations had failed to comprehend the cultural implications of KM. An ideal KM programme should bridge the gap between employee and the free flowing of knowledge within the organisations. KM activities focusing on cultural factors had a very low implementation rate. Activities like deriving knowledge policies (32.5%), rewarding knowledge working (42.6%), developing knowledge maps (i.e., a catalogue or guide showing employees what information is available) (32.4%) appeared to be the main focus. Lack of organisational commitment was apparent from the findings that only 5.2% of respondents whose organisations had, or were considering, a KM programme measured intellectual capital viz., that part of an organisation's value that is based on
intangible assets such as knowledge, innovation and relationships. As against, organisations have evinced keen interest in latest technologies for KM purposes. 90% of the Respondents used the Internet to access external knowledge, 80% used intranet, 65% document management systems, 55% decision support systems, 50% data warehousing or mining technologies, 28% extranets and 35% groupware. (Note: The participants were allowed to indicate more than one criterion, if they are using the same. Hence, the total of the percentages will not equal to 100).

8.8.2. Use of Technology to Implement KM: Technology in itself does not constitute a KM programme, rather it facilitates one, especially in large, geographically dispersed organizations, typical of the participants in this survey. Accordingly, respondents were asked about their use of technology to manage information. The responses are tabulated below (Table - 8.1).

<table>
<thead>
<tr>
<th>SL No.</th>
<th>Technology</th>
<th>Implemented (%)</th>
<th>Planning to Implement (%)</th>
<th>Not Planned (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.</td>
<td>Intranet</td>
<td>90</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>02.</td>
<td>Internet</td>
<td>80</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>03.</td>
<td>Data Warehousing/ Mining</td>
<td>50</td>
<td>23</td>
<td>27</td>
</tr>
<tr>
<td>04.</td>
<td>Document Mgt. System</td>
<td>65</td>
<td>35</td>
<td>0</td>
</tr>
<tr>
<td>05.</td>
<td>Decision Support</td>
<td>55</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>06.</td>
<td>Groupware</td>
<td>35</td>
<td>40</td>
<td>25</td>
</tr>
<tr>
<td>07.</td>
<td>Extranet</td>
<td>28</td>
<td>52</td>
<td>20</td>
</tr>
<tr>
<td>08.</td>
<td>Artificial Intelligence</td>
<td>0</td>
<td>5</td>
<td>95</td>
</tr>
</tbody>
</table>
90% had implemented Internet access, 80% had an intranet, and 65% used a document management system. Around 55% had a decision support system in place and 50% used data warehousing and mining techniques. One interesting finding was a very low use of Groupware technologies, but 40% of the organizations with a KM strategy in place were planning to implement Groupware in the next 3 - 5 months. Another interesting finding was that the Respondents with a KM strategy in place are currently at a preliminary level. This is because, the use of Artificial Intelligence based techniques for making pertinent knowledge available in a most accurate manner was not on the planning agenda. This is due to the fact that techniques like artificial intelligence are used at the system implementation stage.

In the context of technology, Respondents were looking at implementing Internet and intranet to develop a strong external and internal flow. In the current scenario, developing a strong internal information backbone is of
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primary thrust. This resulted in, "document management systems" being the third most effective technology helping Respondents in managing information.

8.9. Conclusion

Knowledge based companies rely heavily on a good technological infrastructure. Collaborative technologies such as, Intranets and GroupWare, are emerging as the dominant technologies for effective knowledge creation and sharing. Knowledge-based systems are not new. After years of steady but unspectacular use, expert systems and other systems using artificial intelligence techniques are witnessing resurgence. New technology and techniques, such as neural networks and data mining, are discovering new knowledge in corporate data repositories such as data warehouses. A technology infrastructure provides facilities at several levels to support personal interaction - physical connections, communications, conversations and collaboration. Few organisations have fully developed capabilities at the upper levels. Technology solutions are used to augment knowledge processes at different stages of knowledge flow. To help knowledge workers get just the information they need at the right time, many organisations are emphasising an information pull strategy, where users access the information as and when they need it (e.g., from an Intranet or knowledge base). This is complemented by a certain amount of push (e.g., via electronic mail), particularly through filtering information and profiling user needs. To exploit technology to the full, organisations need to give due attention to human and organisation factors. Extensive user involvement, active facilitation of computer conferences, training and coaching are the key factors of success.
Notes and references


2. Tom Peters, "Whence comes Innovation?", Forbes, August 29, 1994, p. 34.


