
Impact of Technology on Organisation Knowledge for Building Novel Knowledge Work Systems

Focus: Biotech and Pharmaceutical Industries

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Abstract

The technological mapping of organisational work force knowledge with **Collaborative Corporate Intranets and Knowledge Management Initiatives** is gaining both financial and organizational importance in the global manufacturing and services industries alike.

The silent merger of different social-cultural-work systems in the post globalised markets, competition amongst the work force in large-scale multinational corporations which are in turn driven by the market based competitive forces, is playing a pivotal role towards firm and individual growth & development. Further there is an enhanced performance based expectations from the society, markets, organizations and employers.

Human workforce Synchronisation through mapping of organisational **Systems & Processes** from within the available organisational resources & intellectual systems would collectively bring out the best knowledge sharing practices, which are of the prime importance for the industry's sustenance.

Long-term sustainability for the industry in global competition will be in terms of designing of best knowledge management practices through cross-functional human resources and their ability to contribute and leap ahead of the market competition through sustainable social interventions and dynamically changing work culture requirements.

With most of the companies looking towards survival as the primary objective, organisational structures that protect the critical creativity i.e., Productive Human Units are becoming essential for their future survival.

Introduction: Knowledge & Work force

With increasing global competition organisations are depending on the human resources and its empowerment to perform multiple tasks in varied functional areas. This is the result of organisational preparation to face the new levels of global challenges and competition. Highly skilled and competent professionals are the requirement of the day in support of commercial product and business development teams, which can handle issues as wide as product development to accurate organisational monitoring of systems and processes for achieving the objectives and goals within the set time and resource frame work.

Organisations today are focused in management of organisational knowledge, building an

environment of innovation and research at work place, infrastructure support through capital funding and enhancement of performance-productivity of human resources for sustainability. With the unpredictable product lifecycles and the opportunity in meeting the customers/ markets dynamism, organisations long term sustenance planning or strategies are now put under the critical assessment.

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Market based competition is increasing organisations involvement in battles of Intellectual Property Rights (IPR), Regulatory & Safety guidelines which are acting as new entry barriers and is hence one of the key areas to protect and benefit from. For example, in the Biotech/ Pharmaceutical sector, product development alone can take anywhere between 10-12 years of productive innovation and cost US\$500 million - US\$1 billion that can be made commercially successful and globally competitive.

The technology based industry like Software and Biotech while building its competencies and capabilities would now be required to answer queries from all its stakeholders on whether should the organisation decide to invest in development of new technologies and products or to develop and cater to services such as through outsourcing.

Organisations that have best knowledge-process skills, resources and human work force units and which have built a sound technological-market base with conducive industrial environment and shrewd business policies would fail from business deliveries if they are not able to manage dynamically essential knowledge resources and drivers.

This is in fact the appropriate time for such technology based organizations to assess and strategise long-term survival of their people-processes. For example product journey in a multinational company, from a successful R&D stage to addressing new markets with positive cash flows and break even volumes may take years and involve hundreds of skilled and productive resources from both inside and outside organization located in different countries and continents.

For every project that is successful, there may be hundred that were to be dropped at various stages in new product development department or research labs of the companies. Knowledge based sunrise sectors like Pharmaceutical and Health care must hence be focused on having good discovery and development systems to capture-process-store the raw data-to- processed information.

Further, these systems store the data according to the functional groups within the organisation that generate such data. Efforts to

integrate such inaccessible and inseparable (from individuals) data across all the departments within a given organisation would increase the volume of data available, but might often reduce the accessibility of project specific information and knowledge relevant to the people.

Some companies have started implementing the corporate intranets to make information available to their staff, while these efforts work at first, the results typically spiral out of control and the benefits perceived by users are quickly swamped with the growth of organisation and its information needs. Hence a powerful technology driven flexible knowledge based intranet system is required in the organisations.

While the strength of today's organisation is in attaining the lowest cost per unit of productivity with regard to either in R&D, manufacturing or services. Lack of cross cultural social networks or disfunctioning of collaborative technological networks and inflexibility of the organisation to the changing environment and rigid posturing of employees with new incentive based performance structure needs to be addressed before preparing for global business exploration and competition.

The major sectors that are offering new business opportunities are in Health Care, Net working and Telecommunications, Energy, Banking and Business Process Services like ITES. Identification of key business drivers in each such global opportunity is important for the organisations before making further investments.

For example the business of Pharmaceuticals & Biotechnology involves, identifying potential research areas, product targets, and require long-term investments in R&D, basic drug discovery research, intellectual property development, knowledge management, technology transfer/ outsourcing and commercialisation.

The global success of Pharmaceutical, Biotechnology, Telecommunications, Software and Hardware based companies is due to their ability in bringing products, services to ahead of the Market expectations.

Business organisations with such strategic intent across the world would be investing in appropriate research areas, building intellectual assets and knowledge management based performance improvement indicators, technology acquisitions and transfers. Accountability both at the individual and organisational level would enhance with such focused approach. Meeting stakeholders' expectations for double-digit growth in revenues and equity has become a key objective for the top management.

It is, however, becoming increasingly difficult for both individuals and organisations to meet this objective by scaling up traditional work-job approaches. Added to this the business discontinuity makes it impossible to predict accurately what the business environment will look like even in the next year. Organisations and people are both threatened and hence are offered new opportunities by such discontinuity created by the rise of the technologies.

Finding new resources, locating relevant information and shifting information to glean the critical elements is not often straightforward, particularly when the credibility of the source may be hard to verify.

Access to information with a broad range of sources and tailor-made, structured components of information would effectively enable better performance. Hence, the challenge lies in improving database design, developing customised software for database access/ manipulation and data entry procedures to compensate for the varied computer procedures / systems used in different departments and workstations.

There would be a huge demand for top class database management systems in the organisations for not only managing all the data-information but also for building an intelligent knowledge management system supported by the lower end data base tools.

Companies need such common platforms, for seamless transfer of data; information and knowledge to achieve enterprise-wide people interfaced decision support system. Such system must facilitate both horizontal and vertical integration of job functionalities undertaken by the organisation and its people.

A symbiosis of information technology with

people would create the process, organisation and infrastructure necessary to handle and communicate data, information and knowledge throughout a company. Intelligently, corporate intranets can be used, for example, to capture and disseminate data and information involving a product, for target market identification, market development, analysis and lead follow ups. Future success depends on how good a job a company does now in selecting potential business areas, developing people skills and in optimizing resources/ utility.

When people and organisations reflect the power of data integration and disseminating information across an organization, the imperative to get data into an electronic form will be understood.

On the competitive side of the business, companies are investing in advanced computing technology in order to streamline product discovery and compliances.

Importance of Enterprise Knowledge Base

At the enterprise level, **Knowledge Management (KM)** is driven to the centre stage by the major forces like information and communications technologies. These technologies have made it possible for people to share enormous amounts of information unconstrained by the boundaries of geography and time. Enterprise knowledge base is quickly becoming the only sustainable competitive advantage. Until recently, companies could succeed based upon the individual knowledge of a handful of strategically positioned individuals. However, when competitors promise more knowledge as part of their services, the competition is over.

Changing the strategic direction by developing operational approaches that foster knowledge transfer, knowledge co-creation across corporations and cultures will result in value based activities to organizations and its stakeholders.

Since organizational knowledge does not replace individual knowledge; it complements individual knowledge, making it stronger and broader. Thus, the full utilization of an organisation knowledge coupled with the potentials of individual skills,

competencies, thoughts, innovations and ideas will enable a company to compete more effectively.

The more a company grows, the greater is its accumulated knowledge. Yet many successful companies like IBM and Microsoft, often find it increasingly difficult to keep track of just who knows what. They suspect, correctly, that the more complex their organization, the greater is the chance that the potential value is being lost or misplaced.

These companies realize that they must make a special effort to capture and exploit their dispersed knowledge. But this new task of hunting and gathering for business value doesn't seem an obvious fit for any of the standard business departments. This is the logic currently driving a thriving professional specialty made up of new, niche consulting firms, reinvented knowledge management (KM) practices within the established consultancies and the occasional in-house unit at some of the larger corporations.

Many companies would like to know how their use of knowledge stacks up against competitors and why some companies leverage knowledge better than others. But some companies like Novartis, Intel have already credited substantial one-time benefits to savvy usage of their knowledge.

Measuring Knowledge Importance in Pharmaceutical Business: The increasing pressure on the Pharmaceutical companies with the growing market demand for cheaper and effective medication to different diseases has amplified the importance of

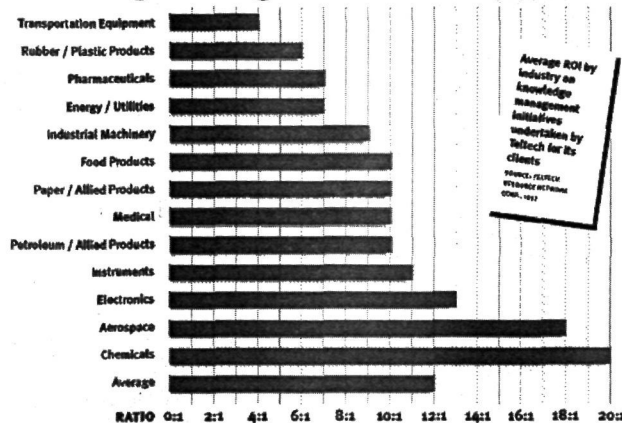
knowledge to fuel the process of innovation. The working environment of the Pharmaceutical manager and researcher is awash with information, rich in change and dynamic in structure. With the emerging markets, focus is on innovation apparently reinforcing the role of the established Pharmaceutical companies to bring product to market.

Knowledge management can effectively support the multifaceted activities of Pharmaceutical R&D but cannot define them. Though it would be difficult to assign a dollar value to the time and effort expended to bring an idea to the market, a company could analyze how an idea travels from its originator to a team or supervisor and on to a project team that executes it. It could then compare the cost of this effort with the value of the product or initiative that the idea has actually generated.

Advances in knowledge and decision support technologies have enabled implementation of decision support processes within the Pharmaceutical research environments.

These processes provide much-needed cost and efficiency benefits to control the burgeoning costs of drug discovery and development. Though there has been much discussion of the rapid growth in both quantity and variety of data generated in the drug discovery process. In large measure however, the emphasis has been on the capture and storage of data, rather than its application in support of decision-making.

Knowledge Management ROI



Managing Knowledge-The Pharmaceutical Experience

Most companies pursuing Pharmaceutical research employ matrix management methods. One dimension of the matrix is it consists of the functional groups of researchers with similar skills, while the other dimension is made up of the projects that cut across the various departments and at different stages of completion, with large volumes of knowledge generated during the conduct of such projects. Indeed, the same analytical data might be used by two different projects to reach different conclusions because of their different therapeutic objectives and goals.

The extent of information required and rapid implementation of new technologies demand a highly flexible environment. But they also require powerful indexing and retrieval methods to ensure that collected information is speedily accessible.

In many ways knowledge management in drug discovery is synonymous with project life cycle management of other industries. And there is considerable need to for comprehensive project life management approaches from the concept of drug discovery and development, to market and eventually leading to product market expiry. This need is not just to manage historic records, but also to facilitate the conduct and management of projects.

For example, in the drug discovery research, target selection should not be the exclusive province of bio-informaticians, but should entail inputs from chemistry, manufacturing, business development and marketing etc.

The Approach: Proper design and validation can simplify human navigation and assessment when information is presented in the same way for every target; but perhaps more importantly, it can also facilitate the subsequent direct comparison of drug targets. The second, more challenging task is to decide who should collect each type of information and when? If only a few targets are being reviewed, it may be sufficient for each team member to review each target in a repeating cycle, independently of the activity of other team members.

But if a large number of drug targets say tens of thousands are being reviewed, this is impractical, and hence computerized workflow tools must be used. Once the necessary information has been collected through such systems it must be provided in concise form as report to the appropriate decision makers as soon as it is generated.

Ideally, this process minimizes the chances that a discovery project is launched that would generate a drug for which there is no market or whose introduction would ultimately be blocked by the patent position of competitors. Effective target selection can lead to many other benefits, including improved chances of downstream success, less wasted effort, lower expenses, more effective resource allocation, etc.

Decision makers have access to information from many potential projects, but they need to be supported by query and reporting tools to allow them to track the status of each project, and to compare them in a variety of ways.

Keeping intellectual capital well protected within your company is the lifeline for all projects and, together with data and documents, forms the corporate memory.

The Knowledge Solution

A corporate knowledge repository containing of data in both structured and unstructured forms will be the most viable knowledge solution. Structured data is data that typically fits into rows and columns of excel spreadsheets, flat data files and tables within relational databases. Many tools are available that automate data collection and analysis. Reports generally are created from either the analysis or queries of data within these databases.

Information contained within these reports and the collective knowledge of all aspects of drug discovery projects are used to make decisions. Much of this collective individual's knowledge is not contained or captured and hence is not part of any structured database and is called unstructured. Capturing and retaining this form of knowledge is the most challenging and crucial issue faced by the corporate today.

As knowledge is the key enabler of so many business competencies and is affected by such a wide range of organisational factors that it can be confusing for management to know where to start. Until now there has been no reliable, independent and objective way to measure knowledge efficiency or the key "pressure points" for potential performance improvements.

The KM Assessment Proposed here is for :

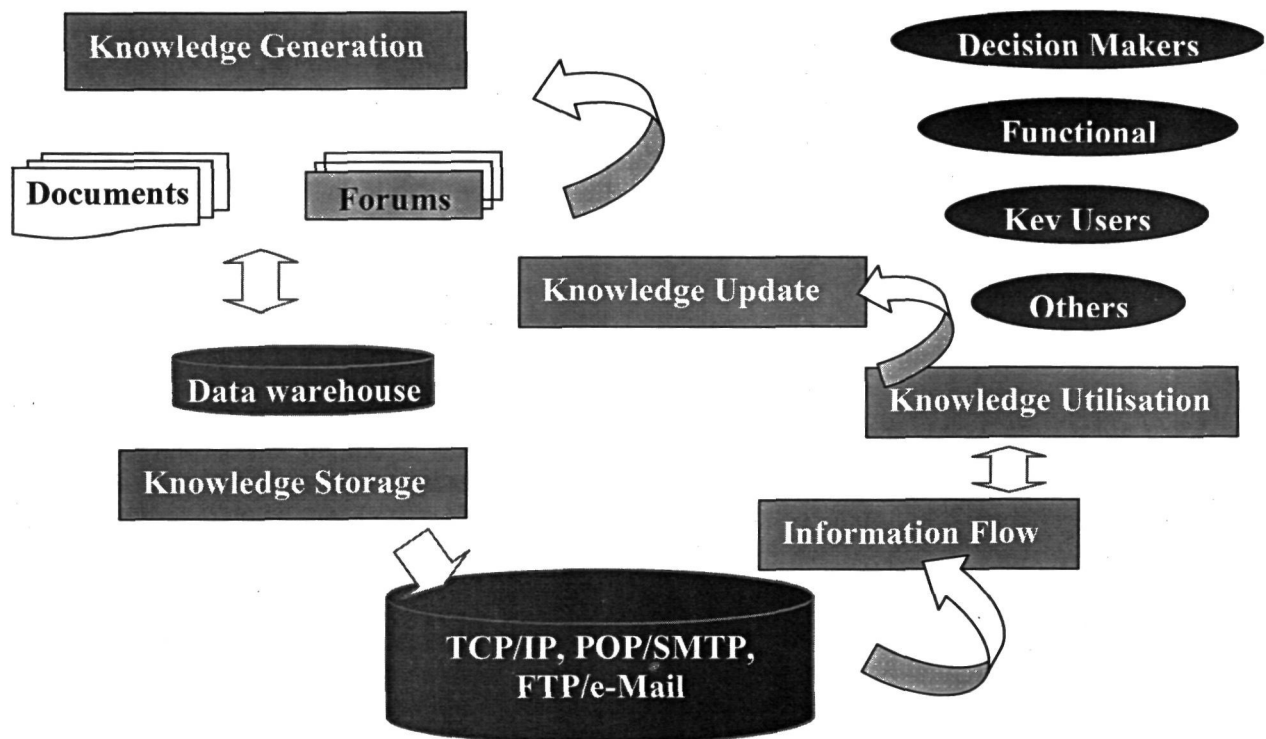
- Assessing nature and form of organization knowledge.
- Identifying information flow processes.
- Identifying knowledge generation checkpoints.
- Understanding usability and current knowledge storage paradigms.

- Knowledge utilization and user level updates.

The KM Intranet should cover 4 areas:

- KM Intranets to benchmark current levels of R&D performance.
- Key business drivers critical to the future sustenance.
- Significant assessment findings relating to the key business issues.
- Specific areas for improvement for opportunities to growth.
- Measure improvements over time using the established base line score.
- Compare the scores of different organizational units.
- Prioritize an action plan based on objective scores.

The Knowledge Intranet Cycle (Corporate K- Net)



KM Intranet to measure the Knowledge Metabolism

Each process above needs to be assessed and measured and the relationship has to be examined, as they are highly interdependent. It is important to take these relationships into account, because they influence KM effectiveness considerably. For instance, a weak process of knowledge update leads to a low acceptance level of the user community, which results in a lower knowledge utilization.

In many cases the organisational strategies offering the greatest improvement in performance are based on the improved applications of KM through significant investments that have already been spent, but are now being used effectively.

Conclusions

Organisations competitiveness is dependant on how well it manages its "intangible assets- knowledge" about customers and their needs, experienced and well-trained employees and the innovation rate of the organisation itself.

As the world is fast moving towards a knowledge-based economy, knowledge efficiency, the efficiency with which organisation generates, captures and innovatively uses its knowledge base is strategically crucial.

Management attention to these factors has increased with growing evidence that effective management of knowledge impacts key business issues such as profitability, growth, market position, asset utilisation, product & process innovation and management of customer relations.

The irony of this revolution is that while information and communication technologies are the enabler of much of this potential transformation, it is people who make it happen. Individually and collectively, an organization's employees hold the key and "know how" necessary to make the difference between the leader and the followers.

Our challenge is to capture, protect, optimize and utilise this unique and valuable asset called organizational knowledge.

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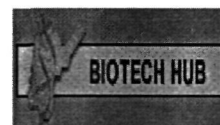
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