UNIT - I

KNOWLEDGE MANAGEMENT

INTRODUCTION

Knowledge is increasingly being recognized as the new strategic imperative of organizations. The most established paradigm is that knowledge is power. Therefore, one has to hoard it, keep it to oneself to maintain an advantage. The common attitude of most people is to hold on to one's knowledge since it is what makes him or her an asset to the organization. Today, knowledge is still considered power – an enormous power in fact – but the understanding has changed considerably, particularly from the perspective of organizations. The new paradigm is that within the organization knowledge must be shared in order for it to grow. It has been shown that the organization that shares knowledge among its management and staff grows stronger and becomes more competitive. This is the core of knowledge management – the sharing of knowledge.

Definition of Knowledge

Knowledge is defined as the remembering of previously learned material. This may involve the recall of a wide range of material, from specific facts to complete theories, but all that is required is the bringing to mind of the appropriate information. Knowledge represents the lowest level of learning outcomes in the cognitive domain.

Knowledge management is the collection of processes that govern the creation, dissemination, and utilization of knowledge. – **Brian Newman**

Knowledge management is the management of the organization towards the continuous renewal of the organizational knowledge base – this means, for example, the creation of supportive organizational structures, facilitation of organizational members, putting IT-instruments with emphasis on teamwork and diffusion of knowledge (e.g., groupware) into place. – **Thomas Bertels**

Knowledge management is the systematic management of an organization's knowledge assets for creating value and meeting tactical & strategic requirements. It consists of the initiatives, processes, strategies, and systems that sustain and enhance the storage, assessment, sharing, refinement, and creation of knowledge.

Each enterprise should define knowledge management in terms of its own business objectives. Knowledge management is all about applying knowledge in new, previously overburdened or novel situations.

Knowledge Management is a Continuous Cycle

Knowledge management is currently seen as a continuous cycle of three processes, namely −

- Knowledge creation and improvement
- Knowledge distribution and circulation
- Knowledge addition and application

Knowledge management expresses a deliberate, systematic and synchronized approach to ensure the full utilization of the company's knowledge base, paired with the potential of individual skills, competencies, thoughts, innovations, and ideas to create a more efficient and effective company.

In simple words, knowledge management incorporates both **holding and storing** of the knowledge perspective, with respect to the intellectual assets. It is the deliberate and systematic

collaboration of an organization's people, technology, processes, style and structure in order to add value through reuse and innovation.

Why Knowledge Management

Application of Knowledge Management (KM) lie in the below four key areas

- **Globalization of Business** − Organizations today are more universal i.e., they are operating in multiple sites, multilingual, and multicultural in nature.
- **Leaner Organizations** − Organizations are adopting to a lean strategy where they understand customer value and focus on key processes to continuously increase it. The ultimate goal is to provide perfect value to the customer through a perfect value creation process that has zero waste.
- **Corporate Amnesia** − We are freer as a workforce, which creates issues regarding knowledge continuity for the organization and places with continuous learning demands from knowledge worker. We no longer expect to spend our entire work life with the same organization.
- **Technological Advances** − The world is more connected with the advent of websites, smart phones and other latest gadgets. Advancements in technology has not only helped in better connectivity but also changed expectations. Companies are expected to have online presence round the clock providing required information as per the customer needs.

Scope of knowledge management?

Broadly defined, knowledge management (KM) refers to a deliberate and consistent effort to improve the utilization, transfer and creation of knowledge in organizations. As a field of academic inquiry, it is the combination of a wide range of theories and constructs appropriated from various disciplines with some original models and concepts developed specifically to address such a problem.

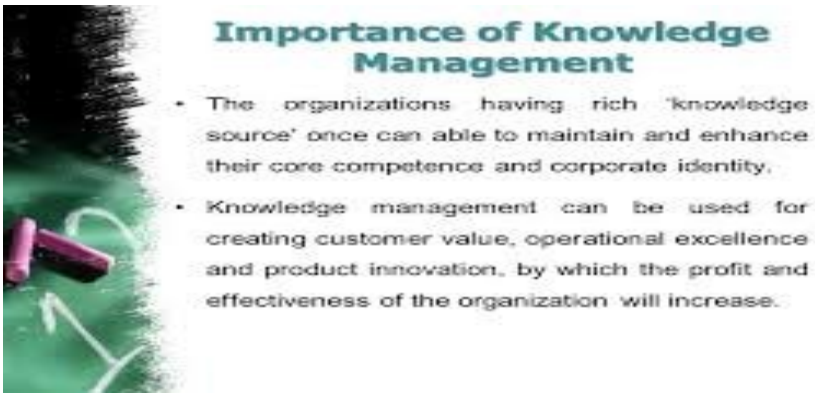
Knowledge management is well known to be a multidisciplinary field

Contributing disciplinary areas include:

- management science
- business

- computer science
- organizational science
- library and information science
- psychology
- social sciences
- planning and development

SIGNIFICANCE OF KM



Today, knowledge management is applied across the world, in all industry, sectors, public and private organizations. Knowledge management involves a strategic commitment to improving the organization's effectiveness as well as improving its opportunity enhancement. The goal of the knowledge management process is to improve the organization's ability to execute its core processes more efficiently. It provides the following benefit to achieve the organizational goals:

1. **Employee awareness**

Knowledge management helps the employees to be aware of their tasks and responsibilities. It facilitates the employees to save their time and efforts because everyone knows where to go to find the destination of the organization.

2. **Availability**

Knowledge can be used wherever it is needed whether from the office or on the road or at the customer's site. Knowledge management enables increased responsiveness to customers, partners, and co-workers.

3. **Timeliness**

Knowledge is available whenever it is needed. It helps to eliminate the wastage of time for the distribution of information. But it is achieved just in case when people are interested.

4. **Adapt organizational change**

Knowledge management helps to develop, acquire, process and retain old knowledge. Thus, such knowledge helps to adapt the organizational change.

5. **Helps in decision-making**

Knowledge gained from experience gives the idea about the future. It shows the trend of the past which helps to take the right decision at present and future. The manager can collect essential information from the knowledge store and analyze the situation in a systematic way.

6. **Transfer Knowledge**

Knowledge management ensures the sharing of information among all employees in the organization. Such sharing of information helps to transfer knowledge from the employees to other employees which help to develop employees.

7. **Reduces risk**

It accumulates knowledge or information from internal and external sources. Such information can be used in decision making and its implementation. The manager can take the right decision using such knowledge. Thus, it reduces risk.

8. **Goal achievement**

Effective knowledge management facilitates to reduce costs. It should also increase the speed of the response of employees as a direct result of better knowledge. People are developing their competence and confidence faster in an organization that practice effective knowledge management.

9. **Availability of information**

All the information either tacit or explicit is stored in knowledge store or in the form of information. Such sharing of information helps to transfer knowledge from one employee to other employees and also provides sufficient information for conducting various activities.

FUNCTIONS OF KM

We can divide all the functions performed by Knowledge Management in five main categories:

1) Intermediation: Intermediation refers to the brokering or knowledge transfer between an appropriate knowledge provider and knowledge seeker. Its role is to "match" a knowledge seeker with the optimal source of knowledge for that seeker. By doing so, intermediation ensures a much more efficient transfer of knowledge.

2) Externalization: Externalization refers to the transfer of knowledge from the minds of its holders into an external repository, in the most efficient way possible. The function of externalization is to provide the sharing of knowledge. This is where Competitive Intelligence/Business Intelligence comes in. Through KM tools it is possible to track the vast quantity of data about competitors — from news stories to price changes.

3) Internalization: Internalization is the extraction of knowledge from the external repository, and the filtering of this knowledge to provide greater relevance to the knowledge seeker. Knowledge should be presented to the user in the form most suitable to its comprehension. This, this function may include interpretation and/or reformatting of the presentation of the knowledge. To implement this function, companies can build yellow pages thus mapping and categorizing the skills and work experience of the organization. Another aspect of internalization would be the documentation of best practices.

4) Cognition: Cognition is the function of systems to make decisions based on available knowledge. Cognition is the application of knowledge which has been exchanged through the preceding three functions.

5) Measurement: Measurement refers to all KM activities that measure, map and quantify corporate knowledge and the performance of KM solutions. This function acts to support the other four functions, rather than to actually manage the knowledge itself.

PRINCIPLES OF KNOWLEDGE MANAGEMENT

Knowledge management principles are an enduring set of guidelines for managing knowledge that are established by an organization, program or team. Establishing principles is one of the most effective actions management can take to support your knowledge management program.

1. Knowledge is a Valuable Asset

Knowledge management is based on the idea that knowledge is an asset that should be managed (just as capital assets are managed). Explicitly stating that knowledge is a valued asset makes it clear that teams are expected to manage and protect knowledge.

2. Knowledge is Stored in A Central Repository

One of the biggest problems that knowledge management programs face is islands of knowledge. Teams and individuals have a tendency to horde knowledge in their own makeshift repositories. This principle makes it clear that everything goes into one central repository. Your knowledge repository (e.g. enterprise content management system) should allow teams and users to create their own knowledge spaces.

3. Knowledge is Retained

Knowledge is retained according to organizational retention policies. Retention may be managed with a set health check criteria for knowledge. For example, knowledge that is old, unreferenced and unused may be pruned.

4. Knowledge is Quality Controlled

Set the expectation that knowledge is quality controlled. For example, quality guidelines may state that document authorship (who contributed to knowledge) be captured.

5. Knowledge is Sustained

A sustainable approach to knowledge management. For example, minimizing the resources used by knowledge repositories.

6. Knowledge is Decentralized

Most knowledge management responsibilities lie with those teams closest to the knowledge. It's a bad idea to centralize all knowledge management processes.

7. Knowledge is Social

Knowledge that sits on a shelf has no value. The value of knowledge depends on communication and socialization. The creation, assessment, improvement and use of knowledge is largely a social process.

8. Knowledge is Shared

A primary goal of knowledge management is to facilitate the sharing of knowledge. Encourage your organization to share (e.g. lunch and learn sessions).

9. Knowledge is Accessible

Knowledge is more valuable when it's accessible to a wide audience. Privacy and confidentiality prevent most organizations from sharing all knowledge. However, it's important to set the expectation that a valid reason is required to restrict access.
The concept of accessibility also addresses access to knowledge for individuals with disabilities or special needs.

10. Knowledge is Secured

Knowledge is your most valuable information. It's critical that information security best practices be followed for knowledge management processes and tools.

11. Knowledge is Searchable

Search is a critical tool for knowledge discovery. Executive management may choose to make search a priority.

12. Work Produces Knowledge

Set the expectation that every program, project, process and initiative is expected to generate knowledge. In some organizations, every meeting is expected to generate knowledge.

13. Knowledge is Measured

Require teams to measure their knowledge management processes and knowledge assets.

14. Knowledge is Improved

Knowledge that isn't improved quickly loses it's value. Knowledge management is a process of continual improvement.

Knowledge dynamics

According to Hedlund and Nonaka (1993) 'the generation and exploitation of knowledge in an organizational context revolve around two critical issues: the interplay of articulated and tacit knowledge, and the transfer and transformation of knowledge between individuals, organizational units and the surrounding environment".

Based on the preliminary analysis of the interviews, three knowledge processes have emerged:
- **Articulation** refers to the transformation of tacit knowledge into explicit knowledge.

- Formalization, refers to the transformation of individuals' knowledge into a collective knowledge controlled by the organization's hierarchy (the knowledge becomes institutionalized in formal procedures, methods or databases)

- Horizontal Sharing refers to the diffusion of knowledge, both tacit and explicit within the community where the knowledge originates.

UNIT – II

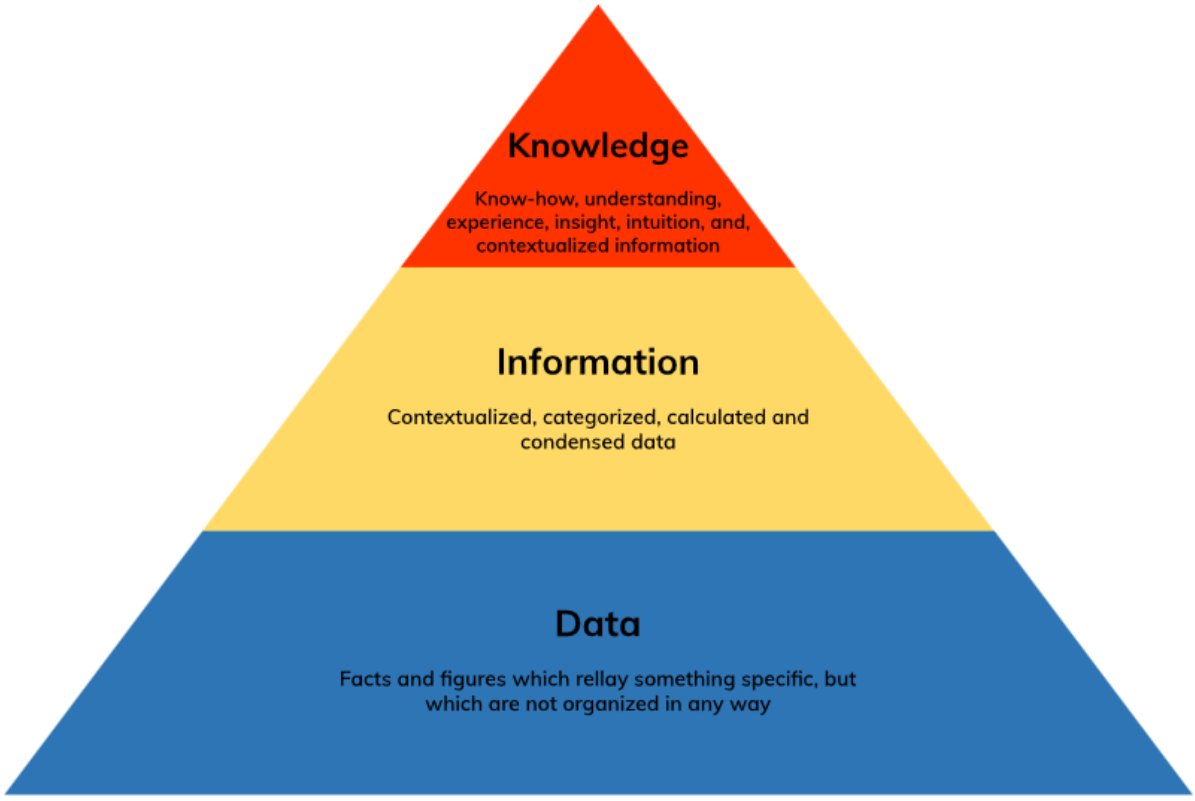
ESSENTIALS OF KNOWLEDGE MANAGEMENT

Data Information and Knowledge

What is the relationship between data information and knowledge? We will try to discuss this in the context of knowledge management program. A basic understanding of Data, information and knowledge helps in understanding of knowledge management system. Here we will try to explain all these with some simple examples.

Defining Data, Information, and Knowledge

Below, I have included the definitions that will be used throughout this site.



Data: Facts and figures which relay something specific, but which are not organized in any way and which provide no further information regarding patterns, context, etc. I will use the definition for data presented by Thierauf (1999): "unstructured facts and figures that have the least impact on the typical manager."

Information: For data to become information, it must be contextualized, categorized, calculated and condensed (Davenport & Prusak 2000). Information thus paints a bigger picture; it is data with relevance and purpose (Bali et al 2009). It may convey a trend in the environment, or perhaps indicate a pattern of sales for a given period of time. Essentially information is found "in answers to questions that begin with such words as who, what, where, when, and how many" (Ackoff 1999).

IT is usually invaluable in the capacity of turning data into information, particularly in larger firms that generate large amounts of data across multiple departments and functions. The human brain is mainly needed to assist in contextualization.

Knowledge: Knowledge is closely linked to doing and implies know-how and understanding. The knowledge possessed by each individual is a product of his experience, and encompasses the norms by which he evaluates new inputs from his surroundings (Davenport & Prusak 2000). I will use the definition presented by Gamble and Blackwell (2001), based closely on a previous definition by Davenport & Prusak:

Examples of Data, Information and Knowledge.

Blood pressure of a patient is known as Data. By checking the blood pressure of the patient we can say that the patient is having high blood pressure. This is information. Please note that we are able to conclude or get a meaningful conclusion from the blood pressure readings, so we call this information. The patient is having high blood pressure because of his family history. This conclusion is of reason of high blood pressure given by a doctor based on his experience and learning.

In everyday language we use knowledge all the time. Sometimes we mean know-how, while other times we are talking about wisdom. On many occasions we even use it to refer to information. Part of the difficulty of defining knowledge arises from its relationship to two other concepts, namely data and information. These two terms are often regarded as lower denominations of knowledge, but the exact relationship varies greatly from one example to another.

Within more technologically oriented disciplines- particularly involving information systems- knowledge is often treated very similarly to information. It is seen as something one can codify

and transmit, and where IT plays a pivotal role in knowledge sharing. For instance, the encyclopedia at fact-archive.com defines it as: "information that has a purpose or use."

This kind of simplistic view of knowledge was particularly widespread during the 90s when information technology became increasingly more common. However even today, some KM systems are little more than information management systems using knowledge as a virtual synonym for information.

TYPES OF KNOWLEDGE

Types of Knowledge

Knowledge can be divided into fout types, Tacit knowledge, Explicit knowledge, Individual Knowledge and Collective Knowledge. Tacit knowledge is implicit, whereas Explicit knowledge is rule-based knowledge that is used to match actions to situations by invoking appropriate rules. An organization promotes the learning of Tacit knowledge to increase the skills and creative capacities of its employees and takes advantage of Explicit knowledge to maximize efficiency.

Tacit Knowledge

- Tacit knowledge includes hands-on skills, best practices, special know-how, and intuitions. Personal knowledge that is difficult to articulate.
- Tacit knowledge in an organization ensures task effectiveness. It also provides for a kind of creative vitality – intuition and spontaneous insight can often tackle tough problems that would otherwise be difficult to solve.
- Traditionally the transfer of Tacit knowledge is through shared experience, through apprenticeship and job training.
- Tacit knowledge is cultivated in an organizational culture that motivates through shared vision and common purpose.

Explicit Knowledge

- *Explicit knowledge is used in the design of routines, standard operation procedures, and the structure of data records. These forms of knowledge can be found in any organization.*
- *It allows an organization to enjoy a certain level of operational efficiency and control.*

- *Explicit knowledge promotes equable, consistent organizational responses.*

An organization must adopt a holistic approach to knowledge management that successfully combines Tacit and Explicit knowledge at all levels of the organization. Personal knowledge is leveraged with Explicit knowledge for the design and development of innovative products, services and processes.

INDIVIDUAL KNOWLEDGE:

Individual knowledge is knowledge applied by one human. It is not depend on the specific unique circumstance, and is controlled by one person (Fig. 5).

COLLECTIVE KNOWLEDGE:

Collective knowledge is knowledge that applicable in a certain environment like companies, clubs, etc. It is not an individual thing, group individuals have to apply their collective knowledge to develop the organization in an effective manner. For example, a single man cannot able to perform the effective music album; group talented persons in specific musician have to combine to create an effective music album. It can also contain the knowledge shared by everyone in a group.

KNOWLEDGE CAPITAL

In the information economy, intellectual capital is key to an organisation's competitive position and long term shareholder value.

At the heart of developing intellectual capital is the knowledge management challenge: *how to go about capturing, storing, maintaining and leveraging the knowledge that exists inside the organisation.*

Intellectual capital can be thought of as 'the stored knowledge possessed by an organisation'. This knowledge may be tacit (personal knowledge possessed by an employee that may be difficult to express or communicate to others); in other cases it may be explicit knowledge, which is codified and stored by the organisation and available to all employees.

Most KM projects focus on collecting, storing and making this knowledge available. KM projects can involve a wide range of software tools and products, ranging from simple collaborative software to intranets, extranets, portals and sophisticated databases.

Knowledge Management, increasingly the responsibility of a Chief Knowledge Officer (CKO), is supported by a comprehensive body of knowledge that has developed over a relatively short time period. One of the challenges faced by anyone who wishes to derive business value from KM is the sheer volume of information that has been generated on the subject.

Much of the published material suggests that organisations can get immediate benefits from a KM project. Knowledge Management projects need to be approached constructively, and with a clear understanding of both the benefits and the challenges inherent in such projects.

Key to long term success with KM projects is the full understanding and involvement of everyone in the organisation. The better a KM project is structured, and the better an understanding everyone involved has, the more likely will the project deliver the real, long-term benefits expected of it.

KNOWLEDGE LIFE CYCLE

Knowledge Management is the methodology, tools and techniques to gather, integrate and disseminate knowledge. It involves processes involving management of knowledge creation, acquisition, storage, organization, distribution, sharing and application. These can be further classified into organization and technology components.

The organization component consists of organization-wide strategy, standard and guidelines, policies, and socio-cultural environment. The technology component consists of tools and techniques to implement effective knowledge management practice which provides values to its business, employees, customers and partners. The tools can furthers be classified into knowledge creation, knowledge integration, knowledge sharing and knowledge utilization.

The various steps are described here:

1. **Knowledge Creation** - Knowledge is created either as explicit or tacit knowledge. Explicit knowledge is put in paper or electronic format. It is recorded and made accessible to others. Tacit knowledge is created in minds of people. This knowledge resides within individuals. This knowledge needs to be transformed into explicit knowledge so that it can recorded and shared with others in the organization.

2. **Knowledge Storage** - Knowledge is stored and organized in a repository. The decision on how and where lies with the organization. But the objective of this phase to enable organization to be able to contribute, organize and share knowledge with.

3. **Knowledge Sharing -** Knowledge is shared and accessed by people. They can either search or navigate to the knowledge items.

4. **Knowledge Utilization** - This is end goal of knowledge practice. The knowledge management does not have any value if knowledge created is not utilized to its potential. The more knowledge is created as knowledge is applied and utilized.

ORGANISATIONAL KNOWLEDGE PROCESS

Organizational knowledge

Organizational knowledge is the type of company asset to which no value can be named. When individuals pool their **knowledge** within an **organization**, that**knowledge** can give the **organization** advantages over others in the same field.

Organizational knowledge is **all the knowledge contained within an organization that provides business value**.

Organizational knowledge resources

include things like product knowledge, intellectual property, customer communications, employee handbooks, manuals, and lessons of success and failure.

Knowledge Management Processes to Know

- Acquisition.
- Storage.
- Distribution.
- Use.

For a successful start to KM, an organisation should engage in a clear understanding of how, and where, knowledge resides, and is developed, in the company. An organisation must identify its knowledge assets as a first step to develop plans for acquiring, retaining, building, and leveraging those assets on a continuous basis. All organisations that valued knowledge saw it imperative to know how and where to access it, and successful attempts so far have started by classifying intellectual portfolio by producing an organisational 'knowledge map' (Bontis, 1996). The most common initiative was building some form of 'knowledge repositories' which was intended to take some form of knowledge that has been extracted from people's heads and store it in an information system for later access.

IBM, for instance, has expert repositories for researchers in its Laboratories and Corporate Education groups. The cases analyzed revealed the following main knowledge repositories: 1. External knowledge – by definition, the easiest to acquire, organize, and communicate. This includes knowledge about the market place, competitors, customer information, etc. 2. Internal knowledge - 2.1 Formal / Structured – this type of knowledge includes research reports, marketing material, processes and methods, etc. HP (Davenport et al,

1998) used artificial intelligence software to manage such knowledge. They created an 'electronic sales partner' which contained technical product information, sales and marketing information, customer account information, etc. Sales support area reported having phenomenal feedback from both submitters (of knowledge) and users. 2.2 Informal – the most important area, and most difficult to manage. It mainly deals with tacit knowledge. To transfer tacit knowledge from individuals into a repository, organisations usually use some sort of community based electronic discussion and 'lessons learnt' databases. For many companies the issue is not acquiring or retaining organisational knowledge, instead it is figuring out how to more effectively capture and share the knowledge that already exists within a department, division, or even employees' mindsBefore attempting to understand and capture organisational knowledge, there are a number of questions that the organisation should seek to answer. These are essential to clarify why the organisation is going down the path of KM and to justify the costs (which can be substantial) of the initiative(s).

The main questions at this stage include: (1) What is the objective of KM? Objectives could vary for leveraging implicit knowledge, retaining knowledge of employees as they exit the organisation, or more efficient access to knowledge repositories. While these objectives might fall under one strategy for KM, they require different tactics and tools. (2) What is the scope of KM in relation to the types of knowledge that the organisation should embrace? Explicit and tacit knowledge require different approaches to acquire and manage. (3) What technologies and techniques are to be employed? These can vary from document creation and management technologies to group working technologies. Each approach requires different approaches, skills, training, and investments.

TECHNOLOGY ENABLERS

Digital transformation enablers are **technologies that help businesses harness the power of information technology to improve performance and drive productivity**. The term "enabler" is often used in business process re-engineering, but it also describes achieving digital transformation utilizing automation.

An **enabling technology** is an invention or innovation, that can be applied to drive radical change in the capabilities of a user or culture. Enabling technologies are characterized by rapid development of subsequent derivative technologies, often in diverse fields. See General purpose technology.

Equipment and/or methodology that, alone or in combination with associated technologies, provides the means to increase performance and capabilities of the user, product or process.

Enablers can be defined as technologies in which many CIOs have already invested time and effort, but which warrant another look this year because of new developments. Enablers may be more evolutionary than revolutionary, but the potential is there to elevate the business game with technology.

Why Are Enablers Important?

Enablers can be defined as equipment and/or methodology that, alone or in combination with related technologies, provides a way to generate giant leaps in performance and capabilities of the user.

In short they allow the business to do things that it has not been able to do before; or at least doing things in a more inexpensive and smarter way.

Some of the Enablers are

1. Sensors
2. Advanced Robotics
3. Cyber Security
4. Cloud Computing (for storing large volume of data)

5. Business solutions (CRM, ERP)
6. Intelligence and control solutions (Big Data & Analytics)

UNIT- III

The Imperatives of Knowledge Management in an Organization

The primary focus of most organizations throughout the industrial age and even today has been on production of gadgets that are faster, cheaper and of higher quality. As the information age came into existence, the power of the microprocessor allowed companies to produce goods of high quality at speeds unimaginable during the start of the industrial revolution, at a much cheaper rate.

Organizations ensured their existence by deriving competitive edge by investing heavily in advanced technologies. In other words, most of the organizations had a technology-focused strategy.

The rapid advancements in technology brought in machines of high processing power at a low cost which widened the scope of usage and their reach. In the process, the competitive window of opportunity created by applying advanced technology which previously lasted years, came down to months or even days with the tools available today. This implies that although technology can provide tremendous advantages to an organization, it can also provide the same advantages to its competitors also.

Products and their designs can be copied with increasing ease, but an individual's experience and creativity cannot be copied as easily. Compressing the timeframe to generate new ideas is the sole ingredient of tomorrow's global leaders.

There are two key reasons to expect the management of knowledge to become an increasingly important, issue in the corporate world over the next few years. One is the imperative to accomplish "more with less" in the wake of downsizing and restructuring of organizations; the other is the need to strengthen relationships with customers.

In this capacity, the consultant organizes monitors and facilitates the flow of knowledge for a specific community of practice or a group that shares a certain type of knowledge or expertise. Knowledge managers, help the enterprise, leverage its knowledge in the following fashion:

1. Understanding the information needs within the enterprise and aligning them with the organization's overall business strategy.

2. Nurturing an environment that fosters learning, knowledge creation, and information sharing. This involves creating awareness so that everyone within the enterprise must understand the benefits of sharing knowledge and contributes to the knowledge pool.

3. Ensuring that quality, depth and tone of the knowledge pool content evolves with the organization. This includes regularly updating the information and sustaining the ability to identify and fill knowledge gaps,

4. The enterprise must have a supporting infrastructure, which permits the leveraging of knowledge to bring about benefits to the organization. The manager must be a knowledge leader who is fully versed in the tools of the trade and must also ensure that the enterprise has the proper technology at its disposal.

5. Creating and enhancing business processes, synthesizing and creating new knowledge and stimulating knowledge sharing by others within the organization.

The process for sharing or tapping into the knowledge pool must be simple, straightforward and efficient; else, it would discourage people from contributing to or tapping into an enterprise's overall body of knowledge. Leveraging intangible assets is one of the most critical business issues of this decade. This necessitates the free flow of ideas, insights and knowledge within an organization along with a high degree of trust and requires a great deal of nurturing and facilitating. It is imperative that knowledge workers must constantly upgrade their knowledge and skills in order to thrive in the new economy.

Learning is not only important but is vital and requires time out from being engaged in productive activity. Some companies have devoted a fixed percentage of payroll or revenue to training and development. This necessitates the need for meaningful metrics of performance and demonstrations of payoff.

The emergence of the knowledge era places a premium on agile and productive mind work, and will remain the key trend underlying this new learning imperative. High-velocity change demands high-velocity learning which is made possible by the development of information architectures that facilitate the real-time acquisition, exchange and generation of knowledge.

Knowledge is of value, only if, it is made available at the point and moment of need. The focus needs to shift from classroom training to creation of knowledge networks that enable individuals to share expertise, exchange knowledge and learn on- demand.

There should be investing in intranets, groupware, interactive multimedia, tale learning technologies and performance support systems. The strategic application of learning, performance and knowledge-based technology allows an organization to acquire significant competitive edge and the resulting gains enable them to thrive in an era of customized service and contracting product cycles.

MARKET SPACE VS. MARKETPLACE

Marketplace **is a physical location of buyer and seller interaction**. At the marketplace, the **seller and buyer meet each other individually and share information**. Thereafter, negotiations take place and exchange of product or service occurs. Examples of marketplace are retail stores, outlets, supermarkets, etc. A marketplace would have a physical address and the buyers may routinely visit a marketplace to have a look around of what's in store.

At the marketspace, the traditional marketplace transaction is eliminated. Marketspace can be **defined as the information and communication technology based electronic or online exchange environment**. Physical boundaries do not possess any interference for such transactions. The **buyers and sellers interact and transact in a virtual environment** where direct physical communication is not required. The sellers may exhibit their products on their own websites or dedicated sales engines such as eBay while buyers can perform a targeted search query to find their relevant requirements.

Traditional Marketplace

A marketplace is a location where buyers and sellers come together to perform transactions. That includes retail stores, outlets, warehouse clubs, farmer's markets and flea markets. The buyer and seller meet in person to talk about the product, price and in some cases delivery arrangements.

eMarketspace

To move a traditional method of handling business over to an online format simply add an "e" before the activity. So eMarketspace is a catch phrase for a marketplace where people meet online to perform sales transactions. eMarketspaces bring online buyers together in one place to communicate with sellers. Sellers set up websites or set up selling accounts with other websites to sell their wares on an eMarketspace.

VIRTUAL VALUE CHAIN

Introduction

Today's organizations are dealing with digital information provision and this has created another approach to customers, suppliers and business partners. In addition to the physical market, the abstract market is becoming more and more important. To understand and get a grip of the interaction between these two markets, John Sviokla and Jeffrey Rayport created the Virtual Value Chain model.

What is the Virtual Value Chain?

The Virtual Value Chain works like a business model and describes the dissemination of value generating services within an "Extended Enterprise"; an organization that cooperates closely with other organizations to provide services or products. The virtual value chain begins with the information provided by the provider. Then this information is distributed and supported throughout the information-infrastructure whereupon the real interaction with the customer/end user follows.

Two separate value chains

As both the market place (that is physically present) and the abstract market space (virtual) need to be managed in different ways to be effective and efficient, the value chain is separated into two chains. Nonetheless this linkage between the two is crucial for an effective management value chain. Many businesses use these value chains such as banks that provide services to customers in the physical word (at their branch offices) and in the virtual world (online services).

Five elements

In the Virtual Value Chain the information in the abstract market space is applied in a series of steps. Creating knowledge and adding value comprise five elements: gathering, organization, selection, analysis and distribution. These five elements enable organizations to generate new markets and build up new business relationships. The entire process turns raw data into valuable information.

Virtual value chain

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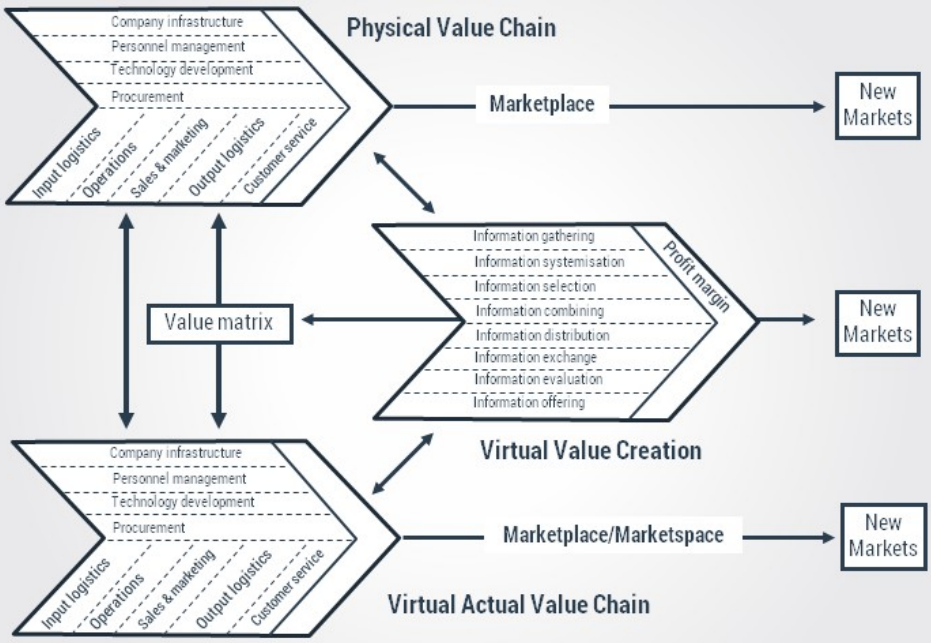

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NEW UPDATES

CUSTOMER RELATIONSHIP MANAGEMENT (CRM)

Customer relationship management (CRM) is a technology for managing all your company's relationships and interactions with customers and potential customers. The goal is simple: Improve business relationships. A CRM system helps companies stay connected to customers, streamline processes, and improve profitability.

When people talk about CRM, they are usually referring to a CRM system, a tool that helps with contact management, sales management, productivity, and more.

A CRM solution helps you focus on your organization's relationships with individual people — including customers, service users, colleagues, or suppliers — throughout your lifecycle with them, including finding new customers, winning their business, and providing support and additional services throughout the relationship.

Features of CRM

1. **Flexible Security & Access Permissions**

A good CRM system keeps data secure, but it also allows right users access to needed information. It should have an obvious way of allowing specific users access, without compromising data security.

2. **Tracking Partners & Product Support**

CRM software can help effectively collect information about partners and product support. This helps better manage the customer experience as it organizes information about when, why, where, how, etc. the client was dissatisfied with a product or service. It also helps track whether and how the issue was addressed.

3. **Billing & Invoicing Functionality**

A well-equipped CRM system can also track billing and invoicing status of each customer. This helps keep financial information organized and reviews things such frequency or timeliness of payments.

4. **Hardware monitoring**

CRM software that has hardware monitoring features can provide assistance with things such as checking the status and availability of hot spots, routers and other network equipment. It can save time in managing or troubleshooting hardware, leaving more time to deal directly with customers.

5. **Integration with External applications**

A key feature of any CRM system is its ability to integrate with external applications. Features such document exchange or integration with an organization's existing ERP are crucial when the goal is to collect and maintain accurate customer information.

6. Data Reporting

While entering and organizing the data to create a flexible and realistic customer database is a key function of CRM solutions, a truly effective CRM system will also help analyze the existing data. Without a data reporting component it will be hard to find customer behavior trends or to understand which actions need to be taken to improve a customer relationship. Exporting, compiling and analyzing marketing data or customer billing analysis tools are all part of effective CRM software.

Business Process Automation

Above all, a CRM system helps automate business processes. Although it is up to each company to decide which tasks will benefit most from automation (not every integration will be profitable for every company), the time and money saved with less data entry or better reporting will bring many benefits, including an improved relationship with each customer.

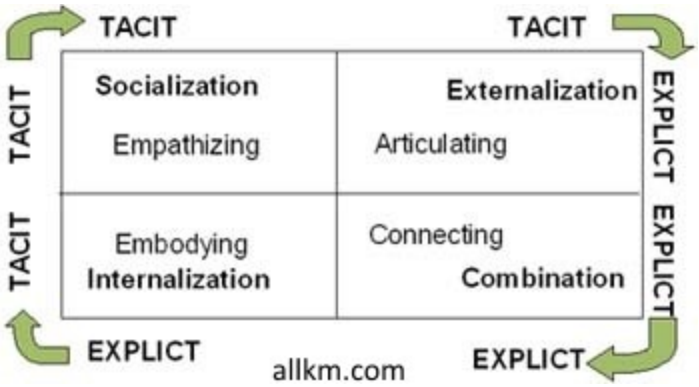
IMPORTANCE OF CRM

1. A CRM system consists of a historical view and analysis of all the acquired or to be acquired customers. This helps in reduced searching and correlating customers and to foresee customer needs effectively and increase business.
2. CRM contains each and every bit of details of a customer, hence it is very easy for track a customer accordingly and can be used to determine which customer can be profitable and which not.
3. In CRM system, customers are grouped according to different aspects according to the type of business they do or according to physical location and are allocated to different customer managers often called as account managers. This helps in focusing and concentrating on each and every customer separately.
4. A CRM system is not only used to deal with the existing customers but is also useful in acquiring new customers. The process first starts with identifying a customer and maintaining all the corresponding details into the CRM system which is also called an ‘Opportunity of Business’.
5. The strongest aspect of Customer Relationship Management is that it is very cost-effective. The advantage of decently implemented CRM system is that there is very less need of paper and manual work which requires lesser staff to manage and lesser resources to deal with
6. All the details in CRM system is kept centralized which is available anytime on fingertips. This reduces the process time and increases productivity.

KNOWLEDGE CREATING PROCESS, SECI MODEL

How the knowledge creating process works in an organization? The answer lies with how we engage the tacit and explicit knowledge in the process. It can't be just one way or the other. The process works by different linking process of these two types of knowledge in the organization. Knowledge creating process is a continuous, self-transcending process. As knowledge is created between individuals or between individuals and the environment, individuals transcends the boundary between self and others. As per Ikujiro Nonaka there are four types of knowledge creating process.

Socialization
Externalization
Combination
Internalization



Socialization

This process focuses on tacit to tacit knowledge linking. Tacit knowledge goes beyond the boundary and new knowledge is created by using the process of interactions, observing, discussing, analyzing, spending time together or living in same environment. The socialization is also known as converting new knowledge through shared experiences. Organizations gain new knowledge from outside its boundary also like interacting with customers, suppliers and stack holders. This occurs in traditional environments where son learns the technique of wood craft from his father by working with him (rather than from reading from books or manuals).

Externalization

This process focuses on tacit to explicit knowledge linking. It helps in creating new knowledge as tacit knowledge comes out of its boundary and became collective group knowledge. This process we can say that knowledge is crystallized. The process of externalization is often driven by metaphor analogy and models. Quality circles are formed in manufacturing sectors where workman put their learning and experience they have to improve or solve the process related problems.

Combination

Combination is a process where knowledge transforms from explicit knowledge to explicit knowledge. The finance department collects all financial reports from each departments and publics a consolidated annual financial performance report. Creative use of database to get business report, sorting, adding , categorizing are some examples of combination process.

Internalization

By internalization explicit knowledge is created using tacit knowledge and is shared across the organization. When this tacit knowledge is read or practiced by individuals then it broadens the learning spiral of knowledge creation. Organization tries to innovate or learn when this new knowledge is shared in Socialization process. Organizations provide training programs for its employees at different stages of their working with the company. By reading these training manuals and documents employees internalize the tacit knowledge and try to create new knowledge after the internalization process.

KNOWLEDGE SHARING

Knowledge sharing is the act of exchanging information or understanding between individuals, teams, communities or organizations. Knowledge may be **explicit** (procedures and documents) or **tacit** (intuitive and experience-based). Sharing knowledge is an intentional process that not only bolsters an individual's understanding, but helps create or enhance an archive of accessible knowledge for others.

The concept of knowledge sharing is important because it helps individuals and businesses are more agile and adaptable in the face of change, and helps ensure continued growth and survival. Think about it this way: If you're the only person at work who understands the company's filing system, and something happens to you (e.g., you become ill, lose your job or relocate), who will have knowledge of the filing system? The answer is no one, unless you've engaged in the process of knowledge sharing to pass along what you know.

The Knowledge Sharing Process

The knowledge sharing process relies on a few key ingredients:

- Articulation: Defining what knowledge needs are present.
- Awareness: Knowing what knowledge is available and what is necessary.
- Access: Being able to get to the knowledge.

Benefits of knowledge sharing

1) Nurturing a learning corporate culture

2) Identifying and Filling Knowledge Gaps

3) Augmenting Efficiency and Competence

4) Constructing a Supportive Corporate Community

5) Providing your reps with an internal knowledge base

6) Cutting down Costs and Time

KNOWLEDGE CAPTURING AND STORAGE

Dalkir (2005) refers to knowledge capture as a first high-level phase of the knowledge management cycle, but makes difference similar to Becerra-Fernandez and

Sabherwal (2010) between the capture or identification of existing knowledge and the creation of new knowledge.

Knowledge capture is the process by which knowledge is converted from tacit to explicit form (residing within people, artifacts or organizational entities) and vice versa through the sub-processes of **externalization** and **internalization**. The knowledge being capured might reside outside the organizational boundaries including consultants, competitors, customers, suppliers, etc.

Externalization is the sub-process through which an organization captures the tacit knowledge its workers possess so that it can be documented, verbalized and shared. This is a difficult process because tacit knowledge is often difficult to articulate.

Internalization is the sub-process through which workers acquire tacit knowledge. It represents the traditional notion of learning. Knowledge capture can also be conducted outside an organization.

Why do we need to care about storage?

• Average information worker spends over an hour and a half on email each day, which is 20% of their work time

• Employees get 50% - 75% of their relevant information directly from other people

• More than 80% of enterprise's digitized information reside in individual hard drives and personal files)

Approach on Knowledge Storage

• Structured

• Storage-wise

• Easy to locate

• Document-wise

• Easy to understand

• Un Structured

• Storage-wise

• Flexibility on storing new type of knowledge

CHIEF KNOWLEDGE OFFICER (CKO)

Chief knowledge officer (CKO) is a corporate title for the person responsible for overseeingknowledge management within an organization. The CKO position is related to, but broader than, the CIO position. The CKO's job is to ensure that the company profits from the

effective use of knowledgeresources. Investments in knowledge may include employees, processes and intellectual property; a CKO can help an organization maximize the return on investment (ROI) on those investments.

Furthermore, a CKO can help an organization to:

- Maximize the return on investment (ROI) in knowledge.
- Maximize benefits from intangible assets, such as branding and customer relationships.
- Repeat successes and analyze and learn from failures.
- Promote best practices.
- Foster innovation.
- Avoid the loss of knowledge that can result from loss of personnel.

LEVERAGING KNOWLEDGE

To **leverage** one's **knowledge** means that you use whatever you know about a topic to your advantage or the advantage of others. Although you are specifically asking about the word "**knowledge**" I believe that it can be more generalized to skills, experience, your brain, a possession such as money, and or even influence.

The Advantages of Corporate Knowledge Sharing

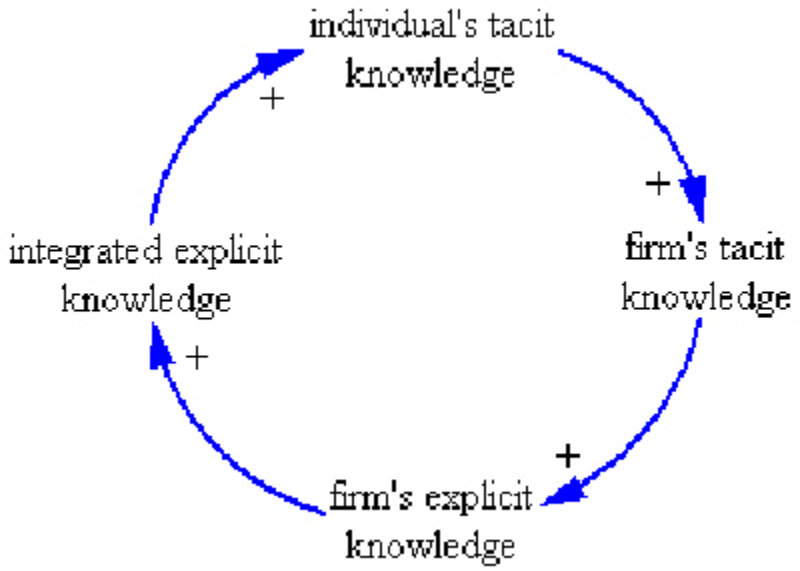
- Support Learning As It Actually Happens. Learning does not happen exclusively through a push-down approach consisting of only formal activities such as lectures and classroom-based training. ...
- Fill **Knowledge** Gaps. ...
- Increase Efficiency. ...
- Promote Innovation. ...
- Encourage Leadership.

KNOWLEDGE CREATION CYCLE

The knowledge creation cycle Socialization is a process based on sharing of experiences that results in the creation of tacit knowledge. Tacit knowledge is acquired by direct interactions with other people, even without the use of language. An example of socialization is training on-the-job. Externalization is a knowledge creation process, in which tacit knowledge becomes

explicit by assuming the form of concepts or models. Writing is the most common form of externalization, but mental pictures are sometimes difficult to translate by means of linguistic expressions.

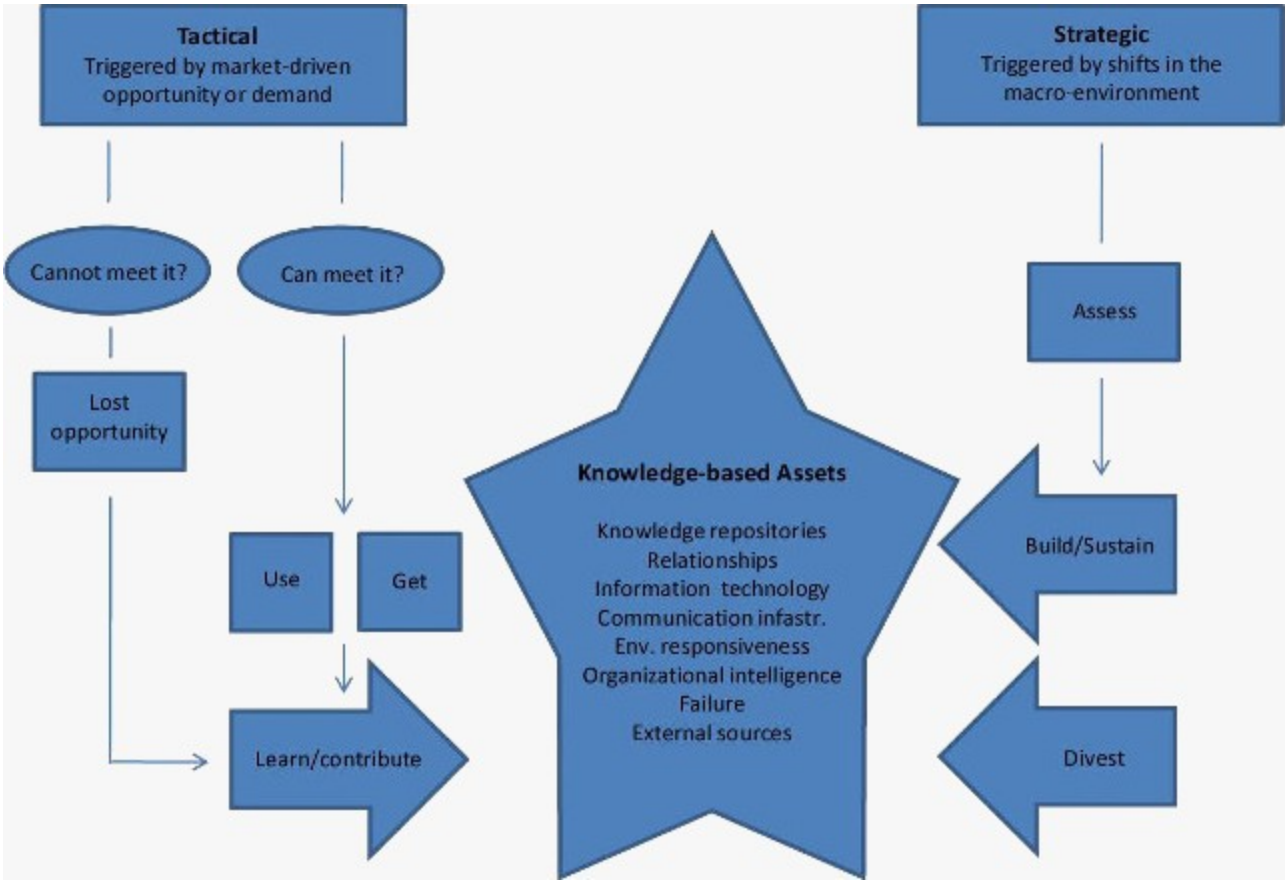
The gap between mental pictures and linguistic expressions stimulate the interaction among individuals, which is often driven by non-analytical methods, as analogy and metaphor. Combination is the organization of explicit knowledge in a knowledge system, in which existing explicit knowledge is reconfigured by means of clustering, categorization and combination with new explicit knowledge. Internalization is the process in which explicit knowledge becomes part of the individual tacit knowledge asset. In this way, the experiences gained and formalized in the previous phases of the knowledge cycle become really usable inside the organization.



KNOWLEDGE MODELS

knowledge management (KM) models that take three very different approaches to KM.

The KM Process Framework by Bukowitz and Williams (1999)



This KM model depicts the process that defines the strategy for management to build, divest, and enhance knowledge assets.It is a model that emphasizes the "why" and "when" aspects. The strengths of this model rest on its strategic focus, which essentially puts knowledge management action into context. It is also worth noting that the notion of "divestment" is included - something which is often missing from KM models.

KM initiatives are the result of the response to tactical and strategic changes and needs. The model provides a great overview of the strategy behind KM but it does not include any deeper insight into what initiatives are suitable in a given instance.

The KM Matrix by Gamble and Blackwell (2001)

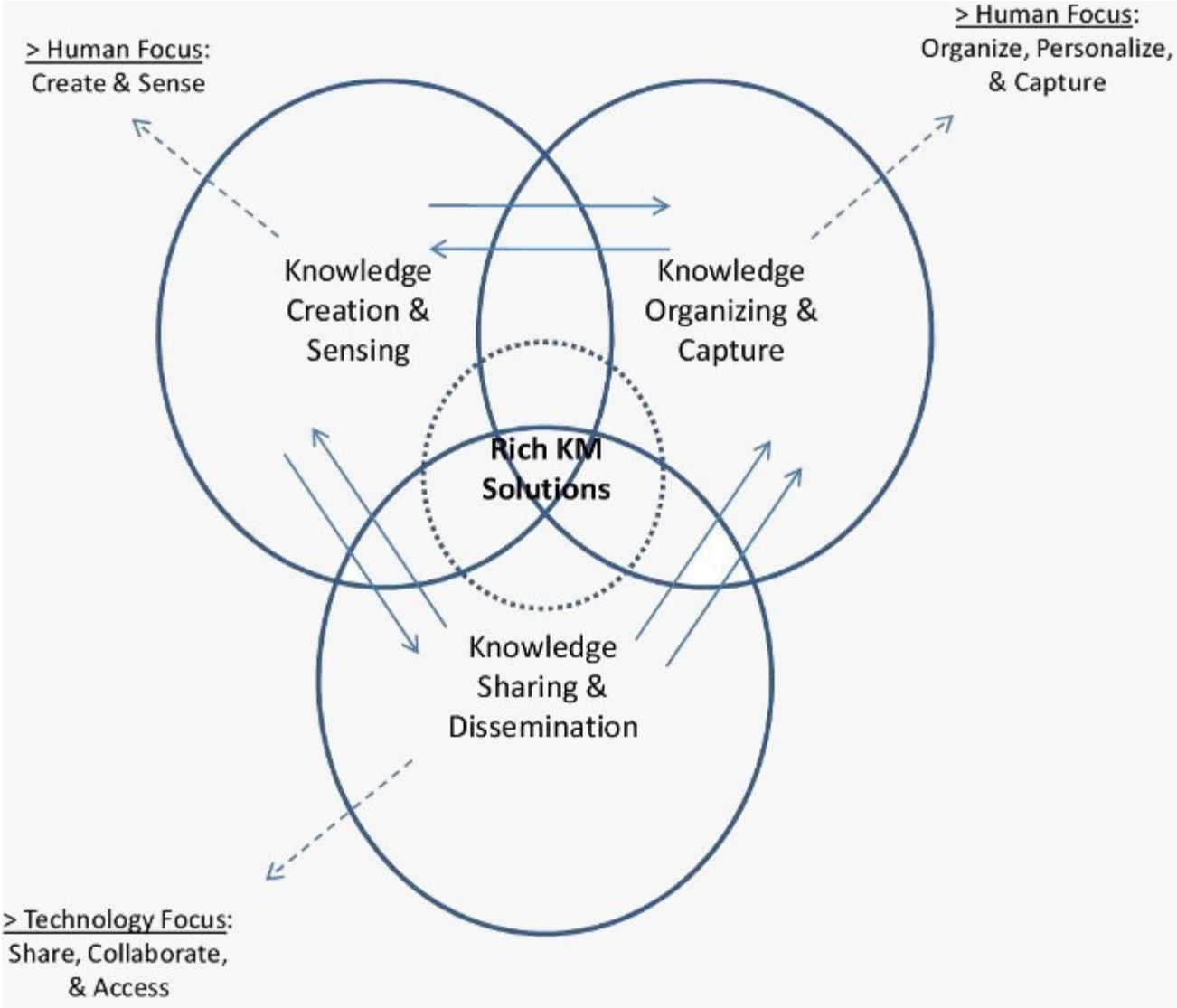
Type / Approach	Embodied	Represented	Embedded
Sense	Observe	Gather	Hypothesize
Organize	Contextualize	Categorize	Map
Socialize	Share	Disseminate	Simulate
Internalize	Apply, Decide, Act		

This KM model presents a general theoretical framework, as well as specific guidelines for implementation..

The KM process is split into four stages. First management must locate the sources of knowledge. Then they must organize this knowledge so as to assess the firm's strengths and weaknesses and determine its relevance and reusability. This is followed by socialization, where various techniques are used to help share and disseminate it to whomever needs it in the organization. Finally, the knowledge is internalized through use.

As all sequential models, the steps are not to be taken literally, but they do provide an excellent overview of the role of the KM manager. However, one limitation of this model is its focus. First of all, the overall strategic role outline by Bukowitz and Williams is not included. Secondly, KM's role here is limited to knowledge sharing, omitting the processes of knowledge acquisition/creation and divestment. This is a perfectly legitimate approach to KM where the focus is on the sharing and retrieval of existing knowledge, but it does not fulfill the scope of the knowledge management definition outlined on this site.

The Knowledge Management Process Model by Botha et al (2008)



This model attempts to offer a more realistic overview of the KM process. The three broad categories overlap and interact with one another. Like Gamble & Blackwell, the focus is on managerial initiatives. Here too the strategic focus (the "when" and the "why" as opposed to the "what") is omitted. It is noteworthy that this model does include the creation of new knowledge as a specific KM initiative.

The model further shows which of the three categories are more people oriented and which are more technology focused. Whether or not knowledge sharing should be largely technology focused is certainly debatable and it is something that I will address in future

sections. However, for better or for worse, this is largely how organizations tend to approach the issue i.e. as a technological rather than organizational and social challenge.

KNOWLEDGE MAPPING

Knowledge mapping is one of the most powerful **knowledge** management (KM) approaches. A **knowledge map** is a visual representation of the organization's intellectual capital. With it, stakeholders can pinpoint where critical **knowledge** is, how it flows, and any barriers or gaps.

For four out of the five organizations above, the only technology tool involved is one that almost every organization has on hand: Microsoft Excel. The entire process can be distilled into four major steps.

1. **Identify knowledge areas.** If you have them, process maps are a great place to start looking for areas of knowledge that should be mapped. Otherwise, begin by asking leaders and managers about what knowledge people need to get work done in their areas. This helps you identify who you need to talk to in order to complete the maps.
2. **Draft knowledge map.** APQC offers downloadable knowledge mapping templates. Use the template to collect information from the experts, process owners, or teams that have information about the knowledge areas.
3. **Evaluate risks and identify opportunities**. Review the map with stakeholders to pinpoint the most important critical knowledge, knowledge loss risks, knowledge sharing barriers, and knowledge gaps.
4. **Act on the map!** Use map insights to fix knowledge-related problems, select the best-fit KM approach for specific teams and knowledge environments, and improve knowledge flow across the business.

Unit-4

KNOWLEDGE MANAGEMENT TOOLS

The development of IT for organisations has produced many successful ERP-type systems that manage well-defined processes. But systems to manage ill-defined, knowledge intensive processes have met with less success. KM practitioners use a wide range of IT tools to share, create, codify, and share knowledge. The trend in the development of IT for organisations is toward more communication and collaboration tools.

Requirement of Knowledge Management Tools

The tools for KM are focused on assimilation, comprehension, and learning of the information by individuals who will then transform data and information into knowledge. Knowledge is strictly linked and connected to the individual (or group) who creates it, which may cast doubts on the availability of information systems tools to effectively support KM. Thus the visible part of knowledge, what the literature calls explicit as opposed to the tacit dimension of knowledge, is only information regardless of the amount of the other individual knowledge embedded into it.

Therefore, there is requirement of KM tools, which can collect, catalogue, organise, and share knowledge or transfer information (the explicit knowledge) embedded in various forms and types of documents and media. These reasons are:

(i) Facilitate information contextualisation: To facilitate information contextualisation, metadata on its characteristics and integration within a specific environment must be attached to it before storing. This facilitates better retrieval and management for the knowledge seeker.

(ii) Intelligently transfer information: Information transfer must occur by taking into account the user, the content, and the time of transfer. A tool that can optimise these three aspects can truly provide information according to the needs of the users, respecting one of the key functional foundations of KM.

(iii) Facilitate social interactions and networking: Direct communication and verbal knowledge transfer through social interactions among individuals is the most natural aspect of knowledge sharing. A KM tool supports this social aspect and facilitates searching.

(iv) Present a customised human-computer interface: The tools also support interface customisation and ease of use. The human-computer interface, ease of use and usability will drive intention to use and reuse the tools.

7 ESSENTIAL KNOWLEDGE MANAGEMENT TOOLS

The more things change, the more they stay the same. Knowledge management tools have changed over the years. However, they still address the same basic needs. The following 7 categories of tools are essential for any knowledge management practice.

1. Content Repository

Tools that allow users to manage and share knowledge content.

For many years the dominant tool for knowledge management repositories was document management software.

Today, most firms prefer tools that can manage diverse content (e.g. documents, web content, social content). For example, Content Management Systems (CMS), Enterprise Content Management (ECM) and Cloud Content Management (CCM).

2. Knowledge Search

A text search tool is often part of your content repository. For example, ECMusually has a search tool.

Search is a critical function that improves the value of your knowledge. All search tools are not created equally. There's a big difference in the performance of search solutions. Some firms invest in a search tool that can search across multiple sources of data (e.g. your ECM and CRM).

3. Communication Tool

Tools that communicate knowledge and capture the knowledge generated by communication. This may include a variety of tools such as email, chat, instant messaging, telephone services (include VOIP), speech recognition, video conferencing and collaboration tools (e.g. whiteboards).

Unified communications (UC) tools integrate communications into a single user experience.

4. Social Software

Tools that facilitate the socialization of knowledge.

Social features are now commonly included in core enterprise software such as customer relationship management (CRM) and ERP

5. Knowledge Visualization

Tools that are used to visually communicate knowledge.

The vast majority of business knowledge is communicated with static 2D representations such as web pages and powerpoint slides. There is great interest in dynamic, explorable, 3D representations of knowledge.

A plethora of knowledge visualization tools have hit the market in recent years. The knowledge visualization market is still in its infancy but tools are maturing rapidly.

6. Decision Support

Tools that seek knowledge in large volumes of data. For example, analytics and reporting software that allows users to discover patterns of knowledge in data.

7. Big Data

Big data are a class of tools that store, manage and explore high velocity, variety and volume data.

Firms use big data technologies to find knowledge in high volumes of structured (e.g. database tables) and unstructured data (e.g. documents, conversations).

PERSONAL KNOWLEDGE MANAGEMENT TOOLS

Personal knowledge management is a collection of processes that a person uses to gather, classify, store, search, retrieve, and share ideas, opinions and thoughts in order to support knowledge structuring, sharing and personal content management. Useful tools for PKM include wikis and mindmaps.

Information Literacy Tutorial

KOnstanz Postgraduate Information Literacy Online Tutorial (KOPILOT): KOPILOT has primarily been developed to support postgraduates at the University of Konstanz with their research. The tutorial aims to provide users with a holistic overview of information and also focuses on the rapidly changing world of scholarly communication. It offers modules on

how to search and retrieve information, how to acquire and manage information, as well as modules on digital libraries, the publishing process and web tools for knowledge management.

Wiki Software

Wiki software is collaborative software that runs a wiki, i.e., a website that allows users to create and collaboratively edit web pages via a web browser. A wiki system is usually a web application that runs on one or more web servers. The content is usually stored in either a file system or a database. There are currently dozens of actively maintained wiki engines, in a variety of programming languages, including both open source and proprietary applications.

You can find a comparison of wiki software on **Wikipedia** and a comparison of wikis and features selected by the user on **WikiMatrix.org**.
If you aim to set up your wiki software on your own server you may choose **DokuWiki** or **TWiki**, for example. If you prefer subscribing to a hosted service on the Internet which will run the Wiki for you, you may choose **MindTouch** or **NotePub**. NotePub can be used as an open purpose wiki (without a markup language) as well as an online notepad for private, public, and shared notes. Notes can include files and images, and can be linked to other notes within NotePub, or to external websites.

PmWiki can be used as a software, as well as a hosting service.

All of the listed tools are free of charge and offer tutorials on their websites.

Mind mapping software

Concept-mapping and mind-mapping software are used to create diagrams of relationships between concepts, ideas or other pieces of information. **Read more**...
A **list of concept mapping and mind mapping software** can be found on Wikipedia. Two notable free tools are **FreeMind** and **XMind**. See web sites for help.

Evernote is a suite of software and services designed for notetaking and archiving. A "note" can be a piece of formatted text, a full webpage or webpage excerpt, a photograph, a voice memo, or a handwritten "ink" note. Notes can also have file attachments. Notes can be sorted into folders, then tagged, annotated, edited, given comments, searched and exported as part of a notebook. Evernote supports a number of operating system platforms, and also offers online

synchronization and backup services.

Docear is what the developers call an “academic literature suite”. Comparable to Microsoft Office, which bundles several applications for office workers, Docear bundles several applications for academics. As of now, these applications are BibTeX based reference management, mind mapping, and some pdf management capabilities. Docear has two key features, other tools don't offer. First, Docear lets you import PDF annotations (bookmarks, comments and highlighted text). If more information is required than the bookmark or comment itself provides, Docear can open the PDF on the page the bookmarks points to. Second, all information is structured in a mind map. **Read more**...

Blogging Software

The free blogging platform **wordpress** is also a useful tool for knowledge management. The user is able to set up a private blog for oneself or a small group and to structure entries by tags and categories. Wordpress offers extensive support on its **website**.

Networking

ResearchGate is a free social networking site for scientists and researchers. It provides members with a number of tools to facilitate global scientific collaboration. Researchers can create professional profiles, discuss their work in topic specific Q&A forums, share papers, search for jobs and discover conferences in their field.

Knowledge Management Technology

Knowledge Management requires technologies to support the new strategies, processes, methods and techniques to better create, disseminate, share and apply the best knowledge, anytime and anyplace, across the team, across teams, across the organisation and across several organisations, especially its clients, customers, partners, suppliers and other key stakeholders.

The key technologies are communication and collaboration technologies that are web based for internet and intranet usage, as well as mobile technologies such as PDA’s, PC’s, telephone and videoconferencing. New technologies are rapidly emerging that act as intelligent agents and assistants to search, summarise, conceptualise and recognise patterns of information and knowledge.

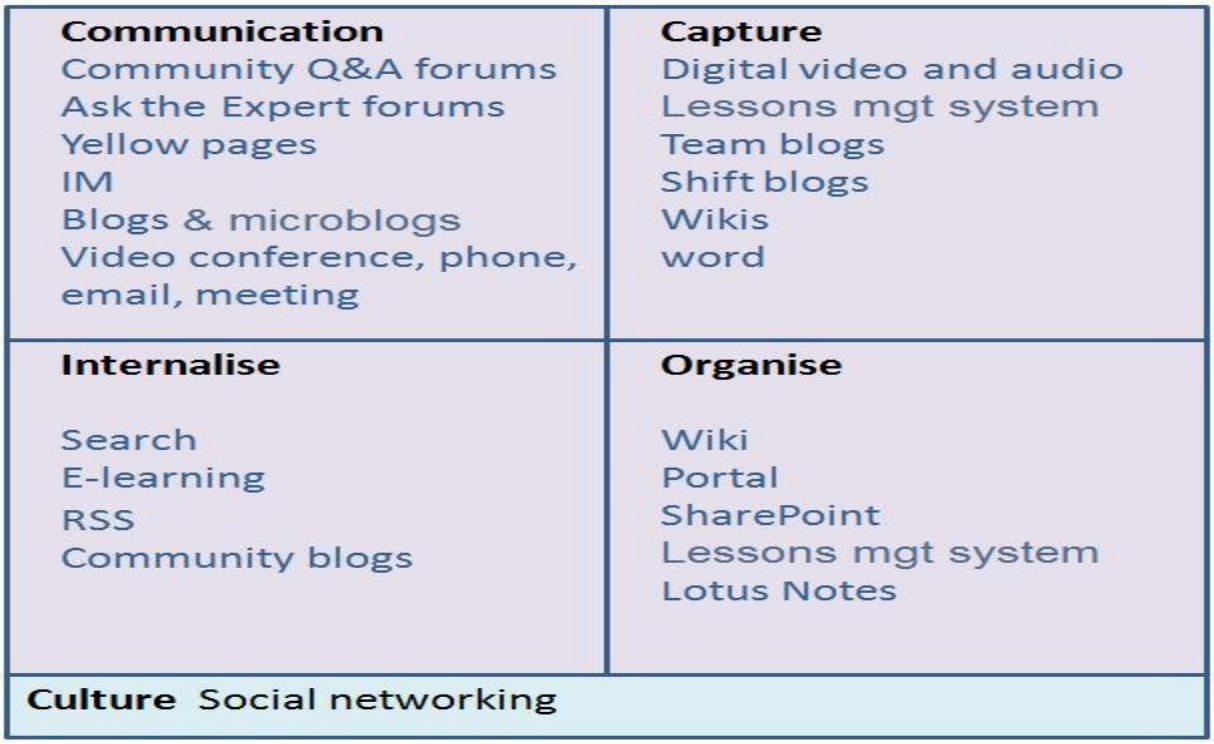
Knowledge Management Technologies are information technologies that can be used to facilitate knowledge management. Knowledge Management Technologies are intrinsically no different from information technologies, but they can focus on knowledge management rather than information processing.

Knowledge Management Technologies also support knowledge management systems and benefit from the knowledge management infrastructure, especially the information technology infrastructure. KM technologies constitute a key component of KM systems.

Technologies that support KM include **artificial intelligence** (AI) technologies including those used for knowledge acquisition and case-based reasoning systems, electronic discussion groups, computer-based simulations, databases, decision support systems, enterprise resource planning systems, expert systems, management information systems, expertise locator systems, videoconferencing, and information repositories including best practices databases and lessons learned systems. KM technologies also include the emergent **Web 2.0 technologies**, such as wikis and blog

Technology has long been an enabler for Knowledge Management. Technology alone cannot deliver successful knowledge management, but knowledge management in any but the smallest organisation will need technology. Some of the key technologies are shown in the matrix on this page.

No single company will need all these technologies. Select a set of technologies based on the Knowledge Management Framework that you need to have in place.



Knowledge Management Technology Components

1. User Interface, User Experience, and Usability for Knowledge Management
2. Intranets for Knowledge Management
3. Team Spaces for Collaboration Using SharePoint or Other Platforms
4. Virtual Meeting Rooms, Web/Video/Audio Conferencing, and Telepresence
5. Portals, Digital Experience Portals, and Digital Workplace
6. Repositories and Knowledge Bases
7. Threaded Discussions and Enterprise Social Networks (ESNs)
8. Expertise Locators and Ask the Expert
9. Metadata and Tags
10. Search Engines and Enterprise Search
11. Archiving, Document Management, and Records Management

12. Blogs and Blogging
13. Wikis
14. Podcasts and Videos
15. Syndication, Aggregation, and Subscription Management Systems
16. Social Software and Social Media
17. External Access and Extranets
18. Workflow Applications
19. Process Automation
20. Gamification Applications and Digital Badges
21. E-learning (or if you prefer, eLearning)
22. Analytics and Business Intelligence
23. Cognitive Computing and Artificial Intelligence

KNOWLEDGE MANAGEMENT INFRASTRUCTURE?

Knowledge Management infrastructure reflects the long-term foundations for**knowledge management**. In an organizational context, **knowledge management infrastructure** includes five major components: ... organization structure. organisation's information technology **infrastructure**.

KM Infrastructure KM infrastructure reflects the long-term foundations for knowledge management. KM infrastructure at the organizational level, supports KM mechanisms and KM technologies. KM infrastructure itself benefits from KM mechanisms, KM technologies and KM processes.

KM Infrastructure:

KM Infrastructure KM infrastructure includes five major components: Organisation culture Organisation structure Information technology infrastructure Common knowledge and Physical environment

Organization Culture:

Organization Culture Organizational culture reflects the norms and beliefs that guide behaviour of the organization's members. It is an important enabler of knowledge management in organizations. Attributes of enabling organizational culture include: Understanding value of knowledge management practices, Managing support for knowledge management at all levels, Incentives that reward knowledge sharing, and Encouragement for creation & sharing of knowledge.

Organisation Structure:

Organisation Structure Knowledge management depends to a considerable extent on the following: Hierarchical structure Decentralization Matrix structures Communities of practice Specialized Structures and Roles Chief Knowledge Officer Separate Department for KM R&D Department and the Corporate Library

Hierarchical Structure:

Hierarchical Structure Hierarchical structure of organisation affects people with whom each individual frequently interacts To/from whom he is likely to transfer/get knowledge. Traditional reporting relationships influence: flow of data and information nature of groups making decisios and affecting the sharing and creation of knowledge

Decentralization:

Decentralization By decentralizing/flattening organisation structures, companies often seek to eliminate organisation layers, Place more responsibility with each individual and increasing the size of groups reporting to each individual. Knowledge sharing occurs with a larger group of individuals in more decentralized organisations .

Matrix Structures:

Matrix Structures Matrix structures in which a manager reports to two or more superiors and takes instructions from them This type of structure emphasises on “leadership” rather than on “management” facilitating greater knowledge sharing by cutting across departmental boundaries.

Communities of Practice:

Communities of Practice A community of practice is an organic and self organized group of individuals They are dispersed geographically or organizationally but regularly discuss issues of mutual interest At Xerox Corporation, professionals frequently interact among them informal y & promote knowledge sharing An organisation's external stakeholders: customers, suppliers & partners can act as a greater knowledge reservoir than the organisation itself. Relationships with university researchers can help new biotechnology firms to maintain their innovativeness.

Specialised Structures and Roles :

Specialised Structures and Roles Chief Knowledge Officer - Some organisations appoint Chief Knowledge Officer & make him responsible for KM efforts. Separate Department for KM - Some organisations establish a separate department for knowledge management, which is often headed by the Chief Knowledge Officer. R&D Department and the Corporate Library R&D department supports management of knowledge about the latest, or future developments. Corporate library supports KM by facilitating knowledge sharing and serving as a repository of historical information.

Information Technology Infrastructure:

Information Technology Infrastructure Knowledge management is facilitated by organisation's information technology (IT) infrastructure. Certain information technologies and systems are directly developed to pursue knowledge management. Organisation's overall IT infrastructure includes : data processing, storage, communication technologies & systems.

Information Technology Infrastructure (Contd.):

Information Technology Infrastructure (Contd.) IT infrastructure comprises entire spectrum of organisation's information systems. It consists of: databases (DB), data warehouses and enterprise resource planning systems. Capabilities of IT infrastructure depend on four important parameters: reach, depth, richness and aggregation.

Reach:

Reach Reach pertains to access, connection and the efficiency of such access. Reach reflects the number and geographical locations of the nodes that can be efficiently accessed. Reach refers to the locations and IT platform, capable of linking "anyone, anywhere". Much of the power of

internet is attributed to its reach and the fact that most people can access it quite inexpensively. Reach is enhanced not just by advances in hardware but by progress in software. Standardization of communication standards & languages, make it easier for firms to communicate with other partners

Depth:

Depth Depth focuses on detail and amount of information that can be effectively communicated over a medium. The dimension closely corresponds to the aspects of bandwidth and customization. Communicating deep and detailed information requires high bandwidth. Availability of deep and detailed information about customers enable customization. Technological progress in channel bandwidth has enabled considerable improvement in depth.

Richness:

Richness Communication channels can be arranged along a continuum representing their "relative richness". The richness of a medium is based on its ability to: Provide multiple cues (e.g., body language, facial expression, tone of voice) simultaneously; Provide quick feedback; Personalize messages and Use natural languages to convey Information technology has traditionally been viewed as a lean communication medium. Progress in IT, has shown a significant increase in its ability to support rich communication.

Aggregation:

Aggregation Rapid advances in IT have significantly enhanced the ability to store and quickly process information. This enables the aggregation of large volumes of information drawn from multiple sources. Data mining & data warehousing enable synthesis of diverse information from multiple sources, producing new insights. ERPs also present a natural platform for aggregating knowledge across different parts of an organisation.

Physical Environment :

Physical Environment Key aspects of physical environment are: design of buildings and the separation between them location, size & type of offices and type, number and nature of meeting rooms, etc. Physical environment can foster KM by providing opportunities for employees to meet & share ideas In coffee rooms, cafeterias, water coolers & hallways employees can learn &

share insights with each other Employees gain knowledge about work from informal conversations in these areas

Common Knowledge:

Common Knowledge Common knowledge refers to: Organisation's cumulative experiences in comprehending a category of knowledge & activities Organizing principles that support communication & coordination Common knowledge provides unity to organisation It helps in enhancing value of an individual expert's knowledge by integrating it with knowledge of others. It supports knowledge transfer within the organisation but impedes leakage of knowledge outside organisation

UNIT- V

KNOWLEDGE MANAGEMENT IMPLEMENTATION

A winning knowledge management program increases staff productivity, product and service quality, and deliverable consistency by capitalizing on intellectual and knowledge-based assets.

Many organizations leap into a knowledge management solution (e.g. document management, data mining, blogging, and community forums) without first considering the purpose or objectives they wish to fulfill or how the organization will adopt and follow best practices for managing its knowledge assets long term.

A successful knowledge management program will consider more than just technology. An organization should also consider:

- **People**. They represent how you increase the ability of individuals within the organization to influence others with their knowledge.
- **Processes**. They involve how you establish best practices and governance for the efficient and accurate identification, management, and dissemination of knowledge.
- **Technology**. It addresses how you choose, configure, and utilize tools and automation to enable knowledge management.
- **Structure**. It directs how you transform organizational structures to facilitate and encourage cross-discipline awareness and expertise.
- **Culture**. It embodies how you establish and cultivate a knowledge-sharing, knowledge-driven culture.

8 Steps to Implementation

Implementing a knowledge management program is no easy feat. You will encounter many challenges along the way including many of the following:

- Inability to recognize or articulate knowledge; turning tacit knowledge into explicit knowledge.
- Geographical distance and/or language barriers in an international company.
- Limitations of information and communication technologies.

- Loosely defined areas of expertise.
- Internal conflicts (e.g. professional territoriality).
- Lack of incentives or performance management goals.
- Poor training or mentoring programs.
- Cultural barriers (e.g. “this is how we've always done it” mentality).

The following eight-step approach will enable you to identify these challenges so you can plan for them, thus minimizing the risks and maximizing the rewards. This approach was developed based on logical, tried-and-true activities for implementing any new organizational program. The early steps involve strategy, planning, and requirements gathering while the later steps focus on execution and continual improvement.

Step 1: Establish Knowledge Management Program Objectives

Before selecting a tool, defining a process, and developing workflows, you should envision and articulate the end state. In order to establish the appropriate program objectives, identify and document the business problems that need resolution and the business drivers that will provide momentum and justification for the endeavor.

Provide both short-term and long-term objectives that address the business problems and support the business drivers. Short-term objectives should seek to provide validation that the program is on the right path while long-term objectives will help to create and communicate the big picture.

Step 2: Prepare for Change

Knowledge management is more than just an application of technology. It involves cultural changes in the way employees perceive and share knowledge they develop or possess. One common cultural hurdle to increasing the sharing of knowledge is that companies primarily reward individual performance. This practice promotes a "knowledge is power" behavior that contradicts the desired knowledge-sharing, knowledge-driven culture end state you are after.

Successfully implementing a new knowledge management program may require changes within the organization's norms and shared values; changes that some people might resist or even attempt to quash. To minimize the negative impact of such changes, it's wise to follow an established approach for managing cultural change.

Step 3: Define High-Level Process

To facilitate the effective management of your organization's knowledge assets, you should begin by laying out a high-level knowledge management process. The process can be progressively developed with detailed procedures and work instructions throughout steps four, five, and six. However, it should be finalized and approved prior to step seven (implementation).

Organizations that overlook or loosely define the knowledge management process will not realize the full potential of their knowledge management objectives. How knowledge is identified, captured, categorized, and disseminated will be ad hoc at best. There are a number of knowledge management best practices, all of which comprise similar activities. In general, these activities include knowledge strategy, creation, identification, classification, capture, validation, transfer, maintenance, archival, measurement, and reporting.

Step 4: Determine and Prioritize Technology Needs

Depending on the program objectives established in step one and the process controls and criteria defined in step three, you can begin to determine and prioritize your knowledge management technology needs. With such a variety of knowledge management solutions, it is imperative to understand the cost and benefit of each type of technology and the primary technology providers in the marketplace. Don't be too quick to purchase a new technology without first determining if your existing technologies can meet your needs. You can also wait to make costly technology decisions after the knowledge management program is well underway if there is broad support and a need for enhanced computing and automation.

Step 5: Assess Current State

Now that you've established your program objectives to solve your business problem, prepared for change to address cultural issues, defined a high-level process to enable the effective management of your knowledge assets, and determined and prioritized your technology needs that will enhance and automate knowledge management related activities, you are in a position to assess the current state of knowledge management within your organization.

The knowledge management assessment should cover all five core knowledge management components: people, processes, technology, structure, and culture. A typical assessment should provide an overview of the assessment, the gaps between current and desired states, and the

recommendations for attenuating identified gaps. The recommendations will become the foundation for the roadmap in step six.

Step 6: Build a Knowledge Management Implementation Roadmap

With the current-state assessment in hand, it is time to build the implementation roadmap for your knowledge management program. But before going too far, you should re-confirm senior leadership's support and commitment, as well as the funding to implement and maintain the knowledge management program. Without these prerequisites, your efforts will be futile. Having solid evidence of your organization’s shortcomings, via the assessment, should drive the urgency rate up.

Having a strategy on how to overcome the shortcomings will be critical in gaining leadership's support and getting the funding you will need. This strategy can be presented as a roadmap of related projects, each addressing specific gaps identified by the assessment. The roadmap can span months and years and illustrate key milestones and dependencies. A good roadmap will yield some short-term wins in the first step of projects, which will bolster support for subsequent steps.

As time progresses, continue to review and evolve the roadmap based upon the changing economic conditions and business drivers. You will undoubtedly gain additional insight through the lessons learned from earlier projects that can be applied to future projects as well.

Step 7: Implementation

Implementing a knowledge management program and maturing the overall effectiveness of your organization will require significant personnel resources and funding. Be prepared for the long haul, but at the same time, ensure that incremental advances are made and publicized. As long as there are recognized value and benefits, especially in light of ongoing successes, there should be little resistance to continued knowledge management investments.

With that said, it's time for the rubber to meet the road. You know what the objectives are. You have properly mitigated all cultural issues. You’ve got the processes and technologies that will enable and launch your knowledge management program. You know what the gaps are and have a roadmap to tell you how to address them.

As you advance through each step of the roadmap, make sure you are realizing your short-term wins. Without them, your program may lose momentum and the support of key stakeholders.

Step 8: Measure and Improve the Knowledge Management Program

How will you know your knowledge management investments are working? You will need a way of measuring your actual effectiveness and comparing that to anticipated results. If possible, establish some baseline measurements in order to capture the before shot of the organization's performance prior to implementing the knowledge management program. Then, after implementation, trend and compare the new results to the old results to see how performance has improved.

Don't be disillusioned if the delta is not as large as you would have anticipated. It will take time for the organization to become proficient with the new processes and improvements. Over time, the results should follow suit.

When deciding upon the appropriate metrics to measure your organization's progress, establish a balanced scorecard that provides metrics in the areas of performance, quality, compliance, and value. The key point behind establishing a knowledge management balanced scorecard is that it provides valuable insight into what's working and what's not. You can then take the necessary actions to mitigate compliance, performance, quality, and value gaps, thus improving overall efficacy of the knowledge management program.

The Power of Knowledge Management

Implementing a complete knowledge management takes time and money, however, the results can be impressive and risks can be minimized by taking a phased approach that gives beneficial returns at each step. Organizations that have made this kind of investment in knowledge management realize tangible results quickly. They add to their top and bottom lines through faster cycle times, enhanced efficiency, better decision making and greater use of tested solutions across the enterprise.

Roadblocks to success

11 Major Roadblocks to Success and How to Avoid Them

1. Lack of a well-defined purpose in life

There is no hope of success when you don't have a central purpose, or definite goal at which to aim. Ninety-eight percent of people are followers who have no definite idea of their ultimate goal. What to do: As an absolute first step in your personal or professional success, know your passion. What is your higher purpose?

2. Lack of ambition to aim above mediocrity

   If you don't like where you are, you must find a way to change that. What to do: Becoming a fulfilled Home Executive or accomplished Business Leader will occur only when you consistently strive for excellence.

3. Negative environment

   As the saying goes, "you are who you know," so it is of the utmost importance to have only those people in your life who support you and what you believe/desire yourself to be. What to do: Control the amount of doom and gloom you allow into your life, creating an environment that is filled with people and things that are supportive of your higher purpose.

4. Poor health

   It is impossible to enjoy outstanding success when you lack physical and emotional health. Obtaining this goal is an ongoing process. What to do: Consume a healthy, well-balanced diet of nutritious food and, also, exercise regularly. This regimen will lead to both physical and emotional well-being.

5. Unfavorable environmental influences during childhood

   "As the twig is bent, so shall the tree grow?" This isn't a curse, its a challenge. Anyone can overcome their childhood difficulties. What to do: Surround yourself with people who emulate who you want to be, study the behaviors you like about them and change the behaviors you don't like about yourself.

6. Lack of persistence

   Most of us are good "starters" but poor "finishers" of what we begin. Moreover, people are prone to give up at the first signs of defeat. There is no substitute for PERSISTENCE. What to do: Watch out for this one! Snuff it out the minute you feel it creep in. You'll notice it when you procrastinate or feel stagnant in your daily living.

7. Negative personality

   There is no hope of success for the person who is offensive because of their negative personality. What to do: You have power in your presence, so use your winning/positive personality instead of manifesting a negative character.

8. Lack of ability to make a decision

   Those who succeed reach decisions promptly (no procrastinating!), because they know there are no failures – only tests. What to do: Know that everything is happening according to your divine order. Keep this in mind and you will never suffer from indecision.

9. Inability to take risks

   The person, who takes no chances, generally has to take whatever is left when others are finished choosing. Over-caution is as bad as under-caution. Both are extremes to be guarded against. What to do: Take chances. Remember, there are no failures! Live your life in the divine flow and remember that everything is happening according to plans.

10. Lack of concentration of effort

    The "jack-of-all-trades" seldom is good at any of them. What to do: Concentrate all of your efforts on your higher purpose in life, then, with laser focus, continue on that path that brings you passion.

11. Lack of enthusiasm

    Having no enthusiasm generally means you don't enjoy your current lot in life. Whatever you are doing, as long as you are moving in the direction of your higher purpose, will make you enthusiastic. What to do: Test yourself. Are you not enthusiastic? This is a sign you're on the wrong path and need to re-evaluate your higher purpose.

IMPLEMENTATION ISSUES

Knowledge Management Implementation Issues

Every human being have plenty of knowledge in their respective Domain based on their culture, society, attitude, interest, experience, etc. Similar way there are lot of explicit Knowledge available globally both in public and private repositories, in addition to books, magazines, periodicals, papers etc.

Harnessing the Knowledge and utilizing it effectively and efficiently at the right time improves management decision making and collaboration amongst the teams involved. Transparency amongst the teams, mutual respect and trust, collaboration, helping tendency, attitudes of the individuals, learning sprit, innovative culture and team approach enables and eases Knowledge management implementation. Lack of any of these parameters, hinders effective Knowledge Management implementation and further practicing it on day to day basis.

People, process, technology, and methodology together enables to bring in the change in the Enterprise. Management and Leadership awareness on latest technology trends, process automation and optimization benefits, LEAN and Six-Sigma methodologies, usage of Information Technology Systems and Applications in the business etc. enables Micro, Small and Medium Enterprises to apply the knowledge to complete in the globally challenging market place, continue to sustain in the business and gain competitive advantage.

Training Stakeholders and Employees on essence of Knowledge Management to create awareness and the associated benefits it will provide each one of them, will help to get their support and active involvement. Organization change management and investment in implementing Knowledge Management Information system are key criteria's, which needs management / leadership commitment and support.

Common Knowledge Management implementation issues are Poor Knowledge Management awareness, Less financial and non-financial resources, Poor understanding of Knowledge Management benefits, Insufficient time & human resources, and Inadequate knowledge oriented people.

CHALLENGES AND FUTURE OF KNOWLEDGE MANAGEMENT

knowledge management—propositions for future research

Management

- A better understanding of tacit knowledge is needed, as is the ability to apply this knowledge in the process of work to solve and identify complex problems in organizations.
- The following gaps have been identified in the existing literature in this area: the organizational benefits to tacit knowledge transfer, the role of tacit knowledge in organizational

learning and development, the influence of tacit knowledge in intellectual capital, the transfer of tacit know-how and its use in communities of practice, and the role of information communication technology with regard to sharing tacit knowledge.

- Another problem is how to effectively manage workers who own the organization's knowledge assets.
- Challenges which still exist are related to identifying, developing and evaluating knowledge workers to maximize their effectiveness and the quality of work. Knowledge workers possess higher levels of both tacit and explicit knowledge and are engaged in more complex, less routine tasks involving greater levels of original work, creativity, and problem solving. More research is needed to increase the possibility and quality of more effective management of knowledge workers.
- Also the area of knowledge protection is important, for example: the prevention of unwanted knowledge spillovers, which focus on leakage of knowledge to non-authorized people, and the prevention of knowledge loss which focuses on unavailable employees, e.g. those leaving or retiring.
- One major issue for organizations is finding a balance between sharing and protecting knowledge. This issue also needs further research.

In its basic form, knowledge management is about converting available raw data into understandable information. The information is then placed in a reusable repository for the benefit of any future need based on similar kinds of experiences. Knowledge management contributes towards streamlining the ideas problems, projects and deployment driving towards productivity. But, it's more than just knowing everything your organization knows, it's creating a synthesis between the people and the information to the point that the whole is more than the sum of the parts. CREC, Dept of MBA. Page 89 Today's Knowledge Management Challenges 1. Security. Providing the right level of security for knowledge management is key. Sensitive information should be shielded from most users, while allowing easy access to those with the proper credentials. 2. Getting people motivated. Overcoming organizational culture challenges and developing a culture that embraces learning, sharing, changing, improving can't be done

with technology. There is no use in launching a tool if there is no drive to share the knowledge. 3. Keeping up with technology. Determining how knowledge should be dispensed and transferring it quickly and effectively is a huge challenge. Constantly changing structures mean learning how to be smart, quick, agile and responsive – all things a KM tool must be able to accomplish. 4. Measuring knowledge. Knowledge is not something that can be easily quantified, and is far more complex because it is derived out of human relationships and experience. The focus should be on shared purpose rather than results or efforts. 5. Overcoming shared leadership. KM tools allow others to emerge as voices of power within an organization. Workers are given a "voice", which can sometimes cause internal conflict. 6. Keeping data accurate. Valuable data generated by a group within an organization may need to be validated before being harvested and distributed. Keeping information current by eliminating wrong or old ideas is a constant battle. 7. Interpreting data effectively. Information derived by one group may need to be mapped or standardized in order to be meaningful to someone else in the organization. 8. Making sure information is relevant. Data must support and truly answer questions being asked by the user, and requires the appropriate meta-data to be able to find and reference. Data relevancy means avoiding overloading users with unnecessary data. 9. Determining where in the organization KM should reside. Does KM fall under HR, IT, communications? This decision will determine what drives your knowledge sharing initiative and who will be responsible for maintaining the community. CREC, Dept of MBA. Page 90 10. Rewarding active users. Recognizing the users who actively participate and contribute to a knowledge database will not only encourage them to continue contributing, but will also encourage other users to join. Overcoming Knowledge Management Challenges Knowledge, learning and sharing come from people and their relationships with one another, not necessarily from the tools, databases and technological aids used. However, with the proper technology in place you can facilitate better communication and overcome these challenges to have an up-to-date, secure and organized knowledge base.

KNOWLEDGE ENGINEERING

What is Knowledge Engineering?

Imagine an education company wanting to automate the teaching of children in subjects from biology to computer science (requiring to capture the knowledge of teachers and subject matter

experts) or Oncologists choosing the best treatment for their patients (requiring expertise and knowledge from information contained in medical journals, textbooks, and drug databases).

Knowledge Engineering is the process of imitating how a human expert in a specific domain would act and take decisions. It looks at the **metadata** (information about a data object that describes characteristics such as content, quality, and format), structure and processes that are the basis of how a decision is made or conclusion reached. Knowledge engineering attempts to take on challenges and solve problems that would usually require a high level of human expertise to solve. Figure 1 illustrates the knowledge engineering pipeline.

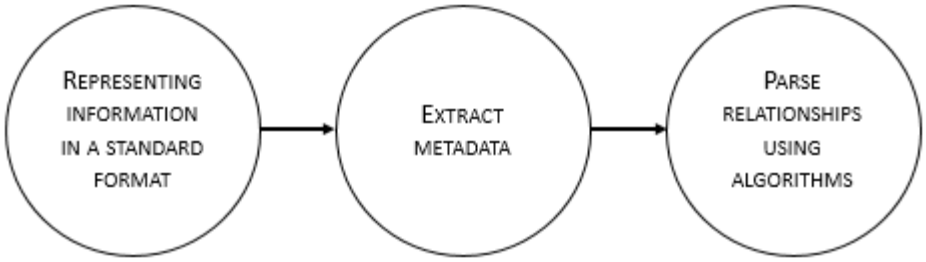


Figure 1: Knowledge engineering pipeline

Knowledge Engineering Processes

In terms of its role in **artificial intelligence (AI)**, knowledge engineering is the process of understanding and then representing human knowledge in **data structures**, **semantic models** (conceptual diagram of the data as it relates to the real world) and **heuristics** (rules that lead to solution to every problem taken in AI). **Expert systems**, and **algorithms** are examples that form the basis of the representation and application of this knowledge.

The knowledge engineering process includes:

- Knowledge acquisition

- Knowledge representation
- Knowledge validation
- Inferencing
- Explanation and justification

The interaction between these stages and sources of knowledge is shown in Figure 2.

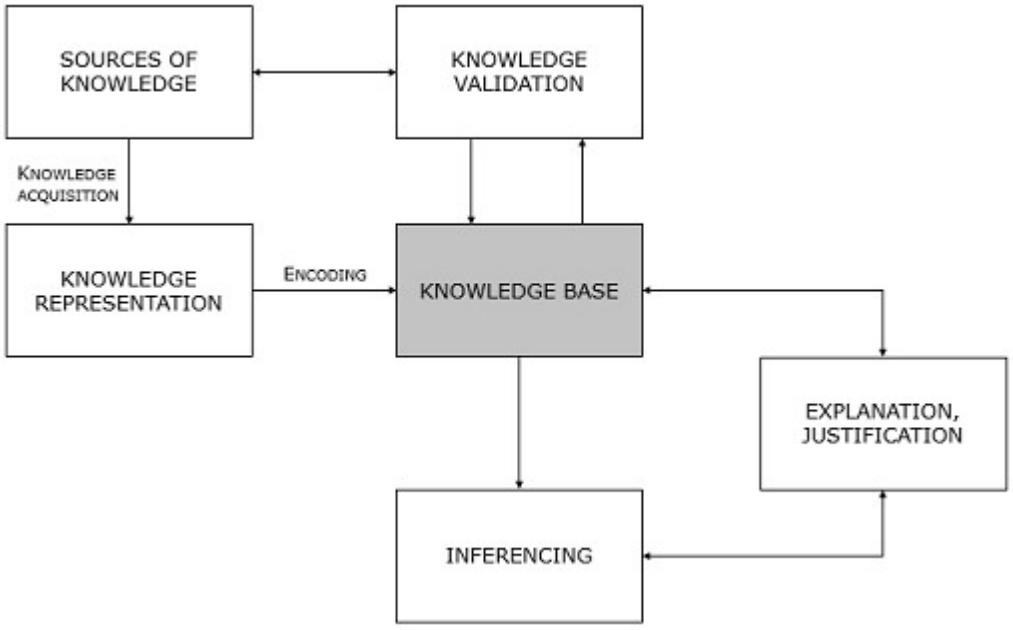
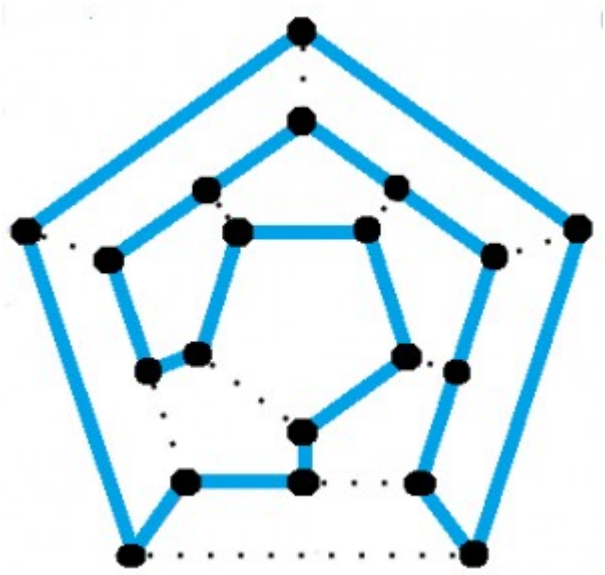


Figure 2: Knowledge engineering processes

The amount of collateral knowledge can be very large depending on the task. A number of advances in technology and technology standards have assisted in integrating data and making it accessible. These include the **semantic web** (an extension of the current web in which information is given a well-defined meaning), **cloud computing** (enables access to large amounts of computational resources), and **open datasets** (freely available datasets for anyone to

use and republish). These advances are crucial to knowledge engineering as they expedite data integration and evaluation.

Hamiltonian Cycle: Simple Definition and Example



A dodecahedron (a regular solid figure with twelve equal pentagonal faces) has a Hamiltonian cycle.

A Hamiltonian cycle is a closed loop on a graph where every **node** (vertex) is visited exactly once.

A loop is just an **edge** that joins a node to itself; so a Hamiltonian cycle is a path traveling from a point back to itself, visiting every node en route.

If a graph with more than one node (i.e. a non-singleton graph) has a Hamiltonian cycle, we call it a **Hamiltonian graph.**

There isn't any equation or general trick to finding out whether a graph has a Hamiltonian cycle; the only way to determine this is to do a complete and exhaustive search, going through all the options.

History of the Hamiltonian Cycle

The Hamiltonian cycle was named after Sir William Rowan Hamilton who, in 1857, invented a puzzle-game which involved hunting for a Hamiltonian cycle. The game, called the Icosian game, was distributed as a dodecahedron graph with a hole at each vertex. To solve the puzzle or win the game one had to use pegs and string to find the Hamiltonian cycle — a closed loop that visited every hole exactly once. The solution is shown in the image above.

Examples of Hamiltonian Graphs

Every complete graph with more than two vertices is a Hamiltonian graph. This follows from the definition of a complete graph: an undirected, simple graph such that every pair of nodes is connected by a unique edge.

The graph of every **platonic solid** is a Hamiltonian graph. So the graph of a cube, a tetrahedron, an octahedron, or an icosahedron are all Hamiltonian graphs with Hamiltonian cycles.

A graph with n vertices (where $n > 3$) is Hamiltonian if the sum of the degrees of every pair of non-adjacent vertices is n or greater. This is known as **Ore's theorem**.

Applications of Hamiltonian cycles and Graphs

A search for Hamiltonian cycles isn't just a fun game for the afternoon off. It has real applications in such diverse fields as computer graphics, electronic circuit design, mapping genomes, and operations research.

For instance, when mapping genomes scientists must combine many tiny fragments of genetic code ("reads", they are called), into one single genomic sequence (a 'superstring'). This can be done by finding a Hamiltonian cycle or Hamiltonian path, where each of the reads are considered nodes in a graph and each overlap (place where the end of one read matches the beginning of another) is considered to be an edge.

In a much less complex application of exactly the same math, school districts use Hamiltonian cycles to plan the best route to pick up students from across the district. Here students may be considered nodes, the paths between them edges, and the bus wishes to travel a route that will pass each students house exactly once.

What is Queuing Theory?

Queuing theory is the **study of queues and the random processes that characterize them.** It deals with making mathematical sense of real-life scenarios. For example, a mob of people queuing up at a bank or the tasks queuing up on your computer's back end.

In queuing theory we often want to find out how long wait times or queue lengths are, and we can use models to do this. These models are typically important in business and software applications, and queueing theory is often considered a part of operations research.

About Queuing

Any queuing activity can be summarized as entities (customers in your supermarket queue, or jobs in a computer queue) trying to get through an activity (waiting to be served). Queues happen when we can't all access the activity at the same time: when it is not economically efficient to have enough checkout lines for everyone to go right through as soon as they were ready, or there isn't enough server space to do an unlimited amount of computer tasks at one moment.

In queueing theory a queue does not refer simply to a neat row which is always first come, first served. This is one example of a queue, but not the only kind. A mob trying to rush for the door on Black Friday is considered a queue as well, as is a group of job applicants waiting for interviews who are picked randomly, one by one, to be interviewed.

Types of Queues and Types of Service

First In First Out, or First Come First Served, is fairly common in banking and commerce. It is the type of queue you get when you have people politely lined up, waiting for their turn.

Last In First Out is the opposite scheme; whoever has been waiting for the shortest time is served first. This type of queue management is common in asset management, where assets produced or acquired last are the ones used or disposed of first. For example: the most recent employees are often the ones laid off first.

Priority is where customers are served based on their priority level; these levels could be based on status, task urgency, or some other criteria.

Shortest Job First is when whoever needs the shortest amount of service gets taken care of first

Processor Sharing is when everyone gets served, or half-served, at the same time; service capacity is distributed evenly among everyone waiting.

There may be a **single server**, where a line of people or items must go through a single bottleneck, or **parallel servers**, where the same line is served by several servers. Or there may be a **tandem queue**, where each of multiple servers has their own queue or line.

Balking when a customer decides not to wait for service because the wait time threatens to be too long. **Reneging**is similar, but when a customer who has waited already decides to leave because they've wasted too much time. **Jockeying** is when a customer switches between queues in a tandem queue system, trying to orchestrate the shortest wait possible.

ORGANISATIONAL RESTRUCTURING

A business organization makes changes in personnel and departments and can change how workers and departments report to one another to meet market conditions. Some companies shift organizational structure to expand and create new departments to serve growing markets. Other companies reorganize corporate structure to downsize or eliminate departments to conserve overhead. Often new owners or managers rearrange business structure to create a familiar business model

Reasons for Organizational Restructuring:

Here are a few reasons for organizational restructuring. There are so many reasons why you should organize your structure as it will boost efficiency and keep technology up to date.

1. Changing nature of business:

In the world we live in today, there is only one thing that is constant: change. Companies that don't want to change tend to face huge risks in the line of production and become obsolete with time as well. Because of things like these, businesses also experiment with new kinds of products, explore and go to new markets, visit new customers on a regular basis. Businesses always want new areas so that they can boost sales, boost the capacity and shed off the divisions which don't add much value. All of these initiatives will need corporate restructuring strategies. If you come with a new product line, it will require changes in their system, hire new experts which are familiar in the line of business and place them in high positions with other interventions.

2. New methods of working:

There are traditional systems of organizations that follow the same old 9-5 working hours tradition. But there are other requirements that could trigger organizational restructuring such as having new and good methods of work such as telecommunicating, having new systems and policies which could change the culture of your working place etc. The presence of having telecommunicating employees or temporary employees could enquire an overhaul of all the management parameters, benefits, compensations of the administration etc. The new methods of working require giving emphasis on the results instead of the methods, having a strong policy of communication and reporting of relationships.

3. Proper technology:

Innovations in technology, the process of working, materials and other factors tend to influence your business and workplace in several ways. It also needs to restructure the organization with time. For example, the enterprise resource planning which links the whole system and its procedures of an organizational by boosting the power of IT could need some overhaul of the procedures and systems. Failure to do so could result in the system of the company as well as the procedures that turn more discordant and obsolete with time.

4. Buy outs:

There are times when restructuring exercises could result of the whims and other fancies of the owners. For example, the company could have a new owner who would like his stamp or even some personal authority and style in the business. The restructuring will allow the owner to start a fresh and in that way, he will be able to have better control. It will also allow him to reshuffle the key personnel and provides some power to all lieutenants who are trusted. He may also be able to pre-empt any of the inefficiencies that are caused by the previous owner to sell out even more.

LEARNING ORGANISATION

Leadership and "The Learning Organization"

The term "learning organization", not to be confused with organizational learning, was popularized by Peter Senge. It describes an organization with an ideal learning environment, perfectly in tune with the organization's goals. Such an organization is a place "where people

continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole (reality) together." (Senge 1992).

This subsection will focus largely on the work of Peter Senge, and it will serve as a basis for understanding:

- The ideal organizational environment for learning, knowledge management (KM), innovation, etc, as described through the term "the learning organization".
- The leadership qualities necessary for promoting and encouraging this ideal environment.

The Learning Organization

According to Senge, the learning organization depends upon the mastery of five dimensions:

Systems thinking: The notion of treating the organization as a complex system composed of smaller (often complex) systems. This requires an understanding of the whole, as well as the components, not unlike the way a doctor should understand the human body.Some of the key elements here are recognizing the complexity of the organization and having a long-term focus. Senge advocates the use of system maps that show how systems connect.

Personal mastery: Senge describes this as a process where an individual strives to enhance his vision and focus his energy, and to be in a constant state of learning.

Mental models: "Deeply ingrained assumptions, generalizations, or even pictures and images that influence how we understand the world and how we take action" (Senge 1990). These must be recognized and challenged so as to allow for new ideas and changes.

Building shared vision: Shared vision is a powerful motivator. A leader's vision does not necessarily become shared by those below him. The key here is to pass on a picture of the future. To influence using dialogue, commitment, and enthusiasm, rather than to try to dictate. Storytelling is one possible tool that can be used here.

Team learning: The state where team members think together to achieve common goals. It builds on shared vision, adding the element of collaboration.

The Role of Leadership

Senge emphasized the role of the leader in the creation of this learning organization. He defined three leadership roles (1990) that would reshape the old-fashioned approach to being the boss. These are:

Leader as Designer: Senge likens this to being the designer of a ship rather than its captain. He defined it in three ways:

- Creating a common vision with shared values and purpose.
- Determining the "policies, strategies, and structures that translate guiding ideas into business decisions."
- Creating effective learning processes which will allow for continuous improvement of the policies, strategies, and structures.

Leader as Teacher: The leader here is seen as a coach that works with the mental models present in the organization. He must understand the (usually tacit) concepts of reality and restructure these views "to see beyond the superficial conditions and events [and] into the underlying causes of the problems."

Leader as Steward: This is the vaguest of the three and refers largely to the attitude of the leader. He emphasizes the importance of a leader that feels he is part of something greater; whose desire is first and foremost not to lead, but to serve this greater purpose of building better organizations and reshaping the way businesses operate.

The first two roles outlined by Senge shed a lot of light into the requirements of effective KM and organizational learning.