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**Introduction**

**Knowledge Management**

**1. Introduction**

In a substantially viable business environment, organizations are eying enhanced tools that could provide them a better opportunity to prosper and to make a strategic benefit in their market. Their prime concern consequently is constant, effective, and protected approach to their accrued knowledge. Knowledge Management approaches and tools are developing, mainly for the use of big organizations, but increasingly small and medium enterprises (SMEs) are interested in implementing them. Knowledge is a pace forward of Information and deals with the seizing and collecting of Information along its steps and rules connected to a Working Process, to execute the latter at an ideal level.

The problem, however, is, that for knowledge to be accessed, it must be stored in the most effective and resourceful way. Once knowledge is mapped and stored in a database structure, it will reach an operative and effective access to knowledge that is stored securely.

**Importance of Knowledge**

The world is in the age of the Knowledge revolution, where knowledge conquers the center stage. Its continuous provision, sharing, and application have become vital for organizations and countries. This revolution is reinforced by the development in information technologies (Pillania, 2008). The deferred is to back current KM efforts in its numerous activities and probably, to propose advanced and more effective techniques to employ them. The significance of KM is not contended by the academic or the practitioner’s groups, nor is it a matter of exhibition. Currently, highly viable business environment, organizations are focusing on KM tools, which could offer them the highest efficiency, a better opportunity to succeed and to make a strategic lead in their market.

**What Is Knowledge?**

To validate that the right track and popular terminology are used, some of the definitions of Knowledge were examined. Currently, the tenure Knowledge Management has been applied, to define the labors of organizations to seize, stock, and deploy Knowledge. For some, Knowledge is a rather ambiguous concept. Knowledge is a fluid mix of edged experience, principles, background information, and professional vision that delivers a basis for assessing and including new experiences and information. It initiates and is used in the perceptions of apprehenders. In organizations, it often befalls fixed not only in documents or sources but also in organizational sequences, practices, processes, and norms.

Knowledge is usually distinguished from information and information from data, based on value-adding processes which alter raw material (for example, transaction records) into transmissible dispatches (for instance documents) and later into knowledge and some higher-order notions. These value-adding procedures are contained in the first case contextualization, classification, calculation, transformation, and condensation; and in the second, connection, comparison, and conversation. Authors like Thomas Stewart dismissed the concept of a data-to-wisdom hierarchy as false and uncooperative on the basis that, one man's acquaintance is other man's information.

**Knowledge Management and Its Features**

An additional topic debated among the experts is the difference between explicit knowledge and implicit knowledge. Here are some perceptions. A more significant distinction, which is basic to the idea of knowledge management, is that between explicit and implicit knowledge, clarified by Ikujiro Nonaka. Explicit knowledge is official and methodical. Consequently, it can be simply conversed and shared, in product stipulations or a scientific formulation, or a computer program. Implicit knowledge is highly personal. It is tough to formalize and hence difficult, and impossible to communicate.

Many authors identify the diverse facets of KM as being Capturing, Organizing, and storing, whereas everyone asserts the sharing feature of KM. It is the goal of any KM efforts.

Ramjani perceives the following phases or steps in KM:

* Improve Knowledge (attain, capture, generate,)
* Maintain Knowledge (hoard, fortifying,)
* Modernize knowledge (developing, improving,)
* Move knowledge (transmission, deploying,)
* Transmute knowledge (collecting, regulating,)
* Evaluate knowledge (assessing, appraising,)
* Employ knowledge (applying, performing,)

Somewhat than wax philosophical about what knowledge is, let it be any information that can advance an organization's objectives. If managing it can be likened to herding cats, managing knowledge is compared to keeping fleas on a cat herd. A collation of data is not information. A collation of information is not acquaintance. A collation of acquaintance is not perception. A collation of perception is not the truth, stated Neil Fleming, Lincoln University, and Canterbury, New Zealand.

These secrecies appear with every new employment or accountability change, slaying valuable time resolving the same drawback again and again. With knowledge management, systems are set up to gather the answers and force them more accessible. This method can be applied anywhere in an organization, nonetheless most frequently creates sense in customer provision applications. Applications can comprise compiling solutions to MIS problems, providing human resources support for workforces, and offering self-service patronage for vending clients in various businesses.

Although it is more a business ideal than a technology, knowledge management embraces new technologies as they emerge. Organizations networked their computers in the late 1980s and early 1990s allowing more employees both to use and add to initial knowledge management systems. These systems relied on centralized databases in which employees submitted information about their careers and from where other employees could search for answers.

Knowledge management systems have constantly depended on data management know-hows for example, relational database management systems, data cleansing, and data warehousing. To trace and scrutinize how knowledge management systems are being run, managers change the reporting functions in their database systems. Such notifying gadgets also aid produce knowledge for the organization and control available knowledge resources.

Experts in knowledge management have been fast to accept advances in groupware tools, as well. Differentiating between knowledge management and groupware can be hard; Knowledge management systems frequently depend on groupware know-hows like Lotus Notes, and, by description, groupware eases the interchange of organizational information. One effective difference is a knowledge management system's stress on classifying knowledge analysis, knowledge sources, and administering the stream of knowledge in an organization while giving access to knowledge stores. The knowledge management standard considers the entirety of all knowledge in the organization as its knowledgeable assets and offers tools for running those assets.

Knowledge management systems as a management tool, need technology as well as experts who advise on how to manage knowledge reviews, scrutiny, and flow. And knowledge management experts are rapid to using new technologies. During the past few years, just as groupware applications moved from branded client/server patterns to a platform-agnostic Web pattern, knowledge management's adoption of Web technologies has prolonged its worth and slashed costs. Web-based knowledge management systems entail no (or minimal) modification to users' desktops and can be easier to install and manage.

More lately, knowledge management systems began using XML to identify related data elements and excerpt knowledge from them equally in and out of the organization. XML provides document schemes and labels, allowing readers to gather meta-information about each bit of information.

Knowledge management needs buy-in at the very peak levels of an organization. Expenses can be relatively high, as standard products are doubtful to resolve the normally enormous and composite challenges challenging big organizations. In addition, knowledge management systems are seldom useful outside of big organizations. Consequently, high prices for software and hardware may be shadowed by referring fees for modifying knowledge management software or making modified in-house applications.

Eventually, whether you build or buy, generating a knowledge management system signifies an important management choice, one that should have support through the organization.

**The Instance of PMGT Inc.**

To represent Knowledge into a Database Model, the knowledge of a factual organization situated in Montreal, Canada was used. PMGT Inc. is a company that runs a real estate group of about 1200 residential units, mainly rented to individuals. The company has throughout the years' collected wide knowledge and substantial experience in the numerous procedures developed around the management of rental units. This includes some unrestrained factors, such as the credit payments of the candidates, recommendations from employers and former landlords, and so forth. Another important peripheral factor is the Government lawmaking engaged with the tenancies signed by parties. The tenancy itself is a legal document and must follow certain guidelines which are uncontrolled, at the organization level. All these factors merged with the internal factors upon which the organization depends, make the Rental Management macro process, rather difficult.

Initially, PMGT had to split the whole process into sub-processes which are defined later. All are currently well documented in many computer files, mostly Excel and plain text documents keeping the company’s procedures to track. This is the Knowledge Center and anyone working on behalf of the company, must obey the instructions, and the recommendations defined in aspect in those files. The Company too employs a standard program for Property Management, applied by many other Property management companies. The program is provided to counter to the country’s juridical setting and background, administered by a government body named the Rental Board. These joint Resources are presently, the KM system of the company. PMGT Inc. has been operating its KM basic system, for any assumed situation which must be tackled, concurring to the company policies. The managers are so stern about tracking all the stages and activities, just as recorded in the processes. Along the sequence of its use, it was obvious that the system had many faults. Initially, the employees criticized it was often hard to find the right Knowledge relating to a specified situation. Sometimes, it took very long to find and login in, and in some cases, it was stated that the Knowledge used was improper and even specious. This may be clarified by the fact that the Knowledge kept was vague, imperfect, and so often, was not contemporary. These issues had harmful consequences on the quality of the choices used by the employees, to the extent that they impacted the global performance of the company in operatively handling its properties.

Similarly, Administration did not have a technique of confirming accountability for actions and decisions used by employees, since the real system could not deliver the authors and source of the Knowledge, nor the subjects who performed the actions and decisions. At the present, the managers needed to develop and bring their real KM system, to the next level, as it is called.

PMGT Inc. has administered real estate residential properties for over 25 years. All Along the years, it has gathered the most valued experience in the numerous processes included in its activities. The alteration and flexibility of the employees and the will to maintain all their experience in position have inspired the company to capitalize in a Knowledge System in which the goal is to seize the knowledge and store it as fast as possible, to make it simply accessible to all employees. PMGT has instituted an advantage over its contestants in regards to efficiency and it is now time to build a more designed KM tool. The aim is to present the current basic system as an automated one that might be available effectively and securely. A more structured system must be designed and developed, which will be mostly stored and supported by a Relational DBMS and advanced, and should be coupled with XML files. The priority is the storage feature of all the actual knowledge, kept in these documents.

**Knowledge Storage**

Most knowledge management actions are a buildup of business processes and information technology. In the PMGT KM system, Business Processes are indeed been used, as it is simply called, working processes. In terms of technology, most present knowledge management activities depend on databases and internet systems; it is normally stored in databases either as plain tables or partial-structured text. For Knowledge to be retrieved in the best and most secure way, it must be captured in a system that allows quick discerning queries in a managed environment. Hence, a DBMS is a useful effective tool. Knowledge is broken down into stable atomic truths which can be stored in a typical relational database and administered very professionally. It also delivers the effective inquiring of a knowledge base, competent implication of new knowledge, and interpretation into and out of the tongue. Inquiries can also be managed with full tongue explanations of where the responses came from.

**How Is KM Stored?**

Knowledge, ultimately of its types, whether explicit or implicit, contains rules, steps, actions, and so forth, which should be stored in some manner.

* This order appears to be from the smallest to the most advanced tool.
* Simple or designed (ex groupware program) manuscript format
* Hyperlink form applying XML, applied mostly within the Internet atmosphere, XML is dedicated to operating libraries. XML intends to assist information systems in sharing designed data, particularly via the Internet. The data is outlined in a Ranked format, which allows, for example, a library, to enter the citation data of all its books. The client interface for inserting the data is in a sort of a Table. The interface XML will be a table, but the storage is Internet suited using a hyperlink, to access another structure, connected to the current information linked.
* Database structures
* Advanced and expensive KM illustration systems for example Loom, Classic, or G2, are aimed at larger scale organizations.
* A mixture of the above.

**The choice for KM Storage**

All along, it was known that it was an experimental project and as an SME, the alternative of the more advanced options was rejected. There is little usage of advanced knowledge illustration systems for example Loom, Classic, or G2. Rare organizations have a systematic process for seizing knowledge, as discrete from their conventional information-capture procedures. Based on this principle, and based on the author’s experience, an easier solution was required, an internal solution, a self-reliant one, so as not to rely on any external resources, applying tools, alien to the employees. It had been evident that KM can be kept and administered by a DBMS. Nevertheless, PMGT was combined with an XML solution and created more intelligent, effective, and efficient tools, representing the security of the very privacy of the Knowledge, bagged in the system. Thus, the conclusion was to start with a simple model linking one Process only. The most important one however chosen for PMGT is the Application Rental Apartment, codified ARA.

**Methodology**

* The list of all working processes starts from P(A,1) to P (A, n)
* The Methodology is cautious and follows this procedure:
* Possess and preserve the current system in usage
* Elaborate P(A,1) to P(M,1)
* Test P(M,1) in an operational working environment
* Bring the essential alterations and modifications and authenticate P(M,1)
* Substitute P(A,1) by P(M,1)
* Repeat procedure to all remaining P (A, n)
* Once the cycle is ended, the new system would substitute the current one and would become the effective KM System in use by PMGT.

**Body of Assignment**

**Write 2 to 6 paragraphs**

**Knowledge Management II**

**1. What is KM?**

**Knowledge Management**(**KM**) is the procedure of seizing, developing, portioning, and effectively applying organizational knowledge. It denotes a multi-disciplined method to attaining organizational objectives by creating the best use of knowledge.

As a recognized discipline since 1991, KM consists of courses trained in the domains of information systems, management, business administration, and library and information sciences. Recently, other fields have commenced subsidizing KM research; which comprises computer science, public health, public policy, and information and media.

Several large companies, non-profit organizations, and public institutions contain resources devoted to internal KM exertions, frequently as a share of their commercial strategy, human resource management, or information technology departments. Numerous consulting companies offer strategy and advice concerning KM to these organizations.

Knowledge management efforts normally focus on organizational goals namely enhanced performance, competitive advantage, innovation, the sharing of lessons acquired, integration, and incessant development of the organization. KM exertions coincide with organizational knowledge and can be differentiated from that by a greater emphasis on the management of knowledge as a strategic resource and a focus on inspiring the sharing of knowledge. It is also enabling organizational learning.

**History**

Knowledge management exertions have an extensive history, including on-the-job discussions, corporate libraries, formal internships, professional training, discussion forums, and mentoring programs. With the risen application of computers in the second half of the 20th century, explicit distinctions of technologies like knowledge bases, professional systems, knowledge sources, intranets, group decision support systems, and computer-supported cooperative work have been hurled to further advance such efforts.

In 1999, the name personal knowledge management was instituted; it denotes the management of knowledge at the individual level.

In the initiative, early assortments of case studies acknowledged the prominence of knowledge management proportions of process, strategy, and measurement. Vital lessons learned comprise people and the cultural norms which impact their behaviors are the most crucial means for successful knowledge creation, spreading, and application; reasoning, social, and organizational education processes are vital to the achievement of a knowledge management strategy; and measurement, benchmarking, and motivations are essential to hasten the learning process and to push for cultural change. In brief, knowledge management programs can produce imposing gains for individuals and organizations if they are determined, tangible, and action-oriented.

**Research**

KM surfaced as a scientific domain in the earlier 1990s. It was primarily backed exclusively by consultants when Skandia employed Leif Edvinsson of Sweden as the world's first Chief Knowledge Officer (CKO). Hubert Saint-Onge (previously of CIBC, Canada), started scrutinizing KM long before that. The goal of CKOs is to control and maximize the imperceptible assets of their organizations. Progressively, CKOs became attracted to practical and theoretical features of KM thus forming a new research field. Since its founding, the KM discipline has been steadily moving towards academic growth. First, there is a tendency toward higher collaboration among academics; mainly, there has been a drop in solitary-authored publications. Second, the function of practitioners has altered and their contribution to academic research has dramatically declined.

An extensive range of concepts on the KM discipline exist; methods vary by author and school. As the discipline develops, academic discussions have augmented in both theoretical and practical KM, involving the following perspectives:

* **Techno-centric**with an emphasis on technology, ideally those who improve knowledge sharing and formation
* **Organizational**with an emphasis on how an organization can be planned to ease knowledge processes best.
* **Ecological**with an emphasis on the interaction of people, knowledge, identity, and environmental issues as a complicated adaptive system similar to a natural ecosystem.

Irrespective of the school of thought, principal elements of KM include people, processes, technology (or) culture, structure, and technology, based on the specific perspective. Different KM schools of thought consist of lenses in which KM can be seen and elucidated, comprising:

* Social network analysis
* Community of practice
* Intellectual capital
* Science of complexity
* Information theory
* Constructivism

The applied importance of academic research in KM has been interrogated with action research recommended as having more significance and the need to interpret the results exhibited in academic publications to a practice.

**Dimensions**

Distinct outlines for differentiating between different types of knowledge exist. One proposed outline for classifying the dimensions of knowledge differentiates between implicit knowledge and explicit knowledge. Implicit knowledge signifies adopted knowledge that an individual may not be deliberately aware of, such as how he or she achieves specific tasks. At the reverse end of the spectrum, explicit knowledge denotes knowledge that the individual holds deliberately in mental focus, in a form that can simply be transmitted to others. Similarly, gratified and interactive perceptions of knowledge and knowledge management were described as two fundamentally different epistemic perspectives. The content perspective proposes that knowledge is simply stored because it can be codified, while the relational perspective identifies the related and interpersonal aspects of knowledge which can make knowledge hard to share separate from the specific location where the knowledge is established.

**The Knowledge Twirl as portrayed by Nonaka & Takeuchi.**

Initial research proposed that a successful KM effort requires changing internalized implicit knowledge into explicit knowledge to portion it, and the same effort must allow individuals to accept and make personally expressive any organized knowledge reclaimed from the KM effort. Consequent research into KM suggested that a difference between implicit knowledge and explicit knowledge denoted a generalization and that the concept of explicit knowledge is inconsistent. Precisely, for knowledge to be formulated explicit, it should be interpreted into information (i.e., symbols outside of our heads). Afterward, Ikujiro Nonaka advised a model (SECI for Socialization, Externalization, Combination, and Internalization) which reflects an increasing knowledge process contact between explicit knowledge and implicit knowledge. In this model, knowledge obeys a cycle in which implicit knowledge is obtained to become explicit knowledge, and explicit knowledge is re-adopted into implicit knowledge.

A second projected framework for classifying the dimensions of knowledge differentiates between fixed knowledge of a system outside of a human discrete and personified knowledge representing a scholarly competence of a human body’s endocrinal and nervous systems.

A third projected outline for classifying the dimensions of knowledge differentiates between the investigative creation of new knowledge (i.e., innovation) against the transferor development of instituted knowledge in a group, community or organization. Cooperative environments such as communities of practice or the practice of social computing tools can be applied for both knowledge formation and transfer.

**Strategies**

Knowledge may be retrieved at three phases: previously, during, or subsequently KM-linked activities. Institutions have strived for knowledge capture motivations, including making gratified suggestions mandatory and including rewards in performance dimension plans. A substantial argument exists over whether incentives have an effect or not in this field and no consent has emerged.

 One strategy for KM includes actively managing knowledge (push strategy). In such a case, individuals struggle to openly encode their knowledge into a shared knowledge source, such as a database, as well as recover knowledge they need those other individuals have given to the source. This is normally known as the Codification method to KM.

Another strategy for KM includes individuals creating knowledge requests of specialists related to a specific issue on an ad hoc foundation. In such an example, expert individual(s) can provide their visions to the specific person or people requiring this. This is usually known as the Personalization method to KM.

Codification emphasizes gathering and stocking codified knowledge in formerly designed electronic databases to make it reachable to the organization. Codification can therefore denote both implicit and explicit knowledge. In disparity, the personalization strategy aims at boosting individuals to share their knowledge eagerly. Information technology plays a less significant role, as it is only assumed to ease communication and knowledge sharing amongst members of an organization.

Further knowledge management strategies and instruments for companies comprise:

* Rewards (as a way of inspiring for knowledge sharing)
* Storytelling (as a way of conveying implicit knowledge)
* Cross-project edification
* After-action assessments
* Knowledge mapping (a map of knowledge sources in a company available to all)
* Communities of practice
* Expert directories (to enable knowledge seekers to access the experts)
* Best practice transfer
* Knowledge fairs
* Proficiency management (methodical evaluation and strategizing of capabilities of distinct organization members)
* Immediacy & architecture (the physical situation of employees can be either favorable or hampering to knowledge sharing)
* Master-trainee relationship
* Joint technologies (groupware, etc.)
* Knowledge bases (bookmarking engines, databases, etc.)
* Assessing and narrating intellectual capital (a mode of creating explicit knowledge for firms)
* Knowledge agents (some organizational members undertake responsibility for an explicit field and perform as the first reference on whom to confer on an explicit subject)
* Inter-project knowledge conveying
* Social software (blogs, wikis, social bookmarking, etc.)

**Motivations**

There are a few claims as to the incentive leading organizations to undertake a KM effort. Typical considerations pushing a KM effort include:

* Making obtainable augmented knowledge content in the growth and delivery of services and products
* Attaining shorter new product development cycles
* Easing and handling innovation and organizational learning
* Influencing the expertise of people across the organization
* Growing network connectivity between internal and external individuals
* Handling business environments and letting employees get relevant visions and concepts appropriate to their work
* Resolving inflexible or wicked problems
* Management of intelligent capital and knowledgeable assets in the personnel (for example the expertise and savvy owned by key individuals)

Discussion occurs on whether KM is more than a fleeting fad, though a cumulative measure of research in this domain may help to counter this question, besides creating consensus on what components of KM help ascertain the success or failure of such efforts. Knowledge sharing continues to be a challenging issue for knowledge management, though there are no clear agreement barriers that may comprise time matters for knowledge works, the degree of trust, lack of operative boost technologies, and culture.

**KM Technologies**

Knowledge Management (KM) technology can be split into the succeeding common classifications:

* Groupware
* Workflow
* Enterprise Portals
* eLearning
* Scheduling and planning
* Telepresence

**Groupware** signifies technologies that alleviate cooperation and partaking of organizational information. One of the initial very effective products in this category was Lotus Notes. Notes offered tools for eased discussions, document sharing, organization-broad uniform email, etc.

**Workflow tools** permit the representation of processes related to the creation, use, and maintenance of organizational knowledge. For example, the process to make and apply forms and documents in an organization

**Content/Document Management systems** are systems created to automate the process of making web content and documents inside an organization. The numerous roles needed such as editors, writers, graphic designers, and producers can be modeled along with the several tasks in the process and authentication standards for changing from one stage to another. All this information can be applied to automate and regulate the process. Business vendors of these tools started either as tools to principally support documents (e.g., Documentum) or as tools considered to back web content (e.g., Interwoven) but when the Internet progressed, these roles merged and most vendors now perform both roles, management of web content and documents. As Internet standards became accepted progressively inside most organizations’ Intranets and Extranets, the difference between the two essentially disappeared.

**Enterprise Portals** are websites that combined information through the whole organization or for groups inside the organization such as project teams.

**eLearning** technology allows organizations to create modified training and education software. This can comprise lesson plans, observing growth against learning objectives, online classes, etc. eLearning technology allows organizations to considerably cut the training cost and tutoring their members. As with the utmost KM technology in the business domain, this was highly valuable for companies that hire knowledge workers; extremely trained staff with areas of profound skill for example the workforce of a consulting company. Such companies expend a substantial amount on the constant education of their employees and even have their internal full-time schools and internal education staff.

**Scheduling and planning.** Setting up and planning tools automate the making and upkeep of an organization's schedule: arranging meetings, informing people of a meeting, etc. An eminent scheduling tool is Microsoft Outlook. The planning opinion can be incorporated with project management tools like Microsoft Project. Some of the initial successful applications of KM technology in the business world where the development of tools, such as online editions of company yellow pages with a listing of communication information and related knowledge and work history.

**Telepresence technology** allows people to have virtual meetings instead of having being in similar place. Videoconferencing is the clearest example.

Workflow for instance is a substantial feature of a content or document management system and majority of content and document management systems have gadgets for sprouting business portals.

One of the vital trends in KM technology was the implementation of Internet standards. Original KM technology products for instance Lotus Notes described their proprietary formats for email, documents, forms, etc. The increasing growth of the Internet forced most vendors to leave proprietary formats and accept Internet formats such as HTML, HTTP, and XML. Additionally, open-source and freeware tools for the inception of blogs and wikis now allow capabilities that used to entail pricy commercial gadgets to be accessible for diminutive or no cost.

**Knowledge Transfer**

**3.1 What is Knowledge Transfer?**

It is primarily significant to observe the differences between the two forms of knowledge. Knowledge can be explicit, which gives itself to transfer strategies like procedures, formal desk manuals, and other codified processes. Knowledge can as well be implicit, which gives itself to transfer approaches such as coaching, mentoring, communities of practice, and so forth. Explicit knowledge is more simply computed and skilled, and can hence be more readily seized. Implicit knowledge, however, includes personal characteristics, soft skills, subjective situational judgments, and the development of cooperative partnerships. Since this type of knowledge is more instinctive and originated from experience, it is less eagerly concentrated and taken into arranged process structures. Since these features are vital for leaders, they are strongly suggested to dedicate more concentration to the shifting of implicit knowledge.

In organizational theory, knowledge transfer is the functional problem of moving knowledge from one segment of the organization to another. Similar to knowledge management, knowledge transfer pursues to create, organize, capture or deliver knowledge and confirm its accessibility for future users. It is believed to be more than just a communication problem. If it were merely that, then a memorandum, an e-mail, or an assembly would complete the knowledge transfer. Knowledge transfer is more complicated because (1) knowledge exists in organizational members, tasks, tools, and their subnetworks, and (2) considerable knowledge in organizations is implicit or difficult to articulate.

Though knowledge transfer in organizations includes transfer at the personal level, the problem of knowledge transfer in organizations exceeds the individual level to comprise transfer at higher levels of analysis, such as the product line, group, department, or division. Knowledge transfer in organizations shows itself through variations in the knowledge or performance of the beneficiary units. Thus, knowledge transfer can be determined by determining variations in knowledge or variations in performance.

**Background**

Knowledge transfer is defined as the process through which one unit, for example, a group, department, or division is impacted by the experience of another. It has further been pointed out that the transfer of organizational knowledge, that is routine or best practices, can be viewed through variations in the knowledge or performance of beneficiary units. The transfer of organizational knowledge, like best practices, can be rather hard to achieve.

Three associated concepts are knowledge utilization, research utilization, and implementation, used in the health sciences to explain the process of carrying a new idea, practice, or technology into reliable and suitable usage in a scientific setting. The learning of knowledge utilization/implementation (KU/I) is a comprehensive effect of the movement on evidence-based medicine and study resolving that health care practices with demonstrated efficiency are not steadily used in practical sceneries.

Knowledge transfer inside organizations and between nations also increases ethical reflections, particularly where there is a disparity in power relationships, such as employer and employee, or in the levels of comparative need for knowledge resources, for example, in developed and developing worlds.

Knowledge transfer includes, but involves over, technology transfer

**Knowledge Transfer amongst Private and Public Fields**

With the change of advanced economies from resource-based to knowledge-based production, many state governments have progressively accepted knowledge and innovation as substantial pushing forces of social development, economic growth, and job creation. In this framework, the upgrade of knowledge transfer has gradually become a subject of public and economic policy.

The fundamental assumption that there is a prospective for augmented partnership between industry and universities is also emphasized in much of the present innovation literature. Specifically, the Open Innovation approach to emerging business value is based on the notion that Universities are a vibrant source for accessing external ideas. Likewise, Universities have been considered to be the great, mainly unknown, and underexploited, resource support to the creation of wealth and economic keenness.

Universities and other public sector research organizations (PSOs) have accrued much-applied undergo over the years in the transfer of knowledge over the rift between the fields of publicly made knowledge and the private abuse of it. Many colleges and PSROs have improved processes and policies to detect, defend and develop intellectual property (IP) rights, and to guarantee that IP is effectively transferred to private firms, or consigned to new companies designed for the objectives of exploitation. Routes to commercialization of IP created by PSROs and colleges consist of a joint venture, licensing, new company establishment, and royalty-based assignments.

Organizations such as AUTM in the US, The Institute of Knowledge Transfer in the UK, SNITTS in Sweden, and the Association of European Science and Technology Transfer Professionals in Europe have delivered a channel for knowledge transfer professionals transversely the public and private sectors to find the best practice and develop operative tools and methods for the management of PSRO/college created IP. Online Communities of Practice for knowledge transfer experts are also evolving to ease connectivity for example The Global Innovation Network and the knowledgePool.

**Knowledge Transfer in Landscape Ecology**

Knowledge transfer in landscape ecology means a set of activities that upsurge the understanding of landscape ecology to support the application of this knowledge. Five factors that affect knowledge transfer from the opinion of forest landscape ecology comprise; the generation of research capacity, the budding for application, the consumers of the knowledge, the setup capacity, and the method by which knowledge is conveyed.

**Types of Knowledge**

Knowledge is a leading aspect of our post-industrial society, and knowledge workers include an enterprise. If knowledge is the foundation for all that we do nowadays, then acquiring a sympathetic of what types of knowledge exist inside an organization may consent us to adopt internal social structures that will enable and back learning in all organizational fields. Blackler widens on a classification of knowledge types that were proposed by Collins in 1993, being: embraced, embodied, encultured, embedded, and encoded. It is significant to observe that these knowledge types could be suggestive of any organization, not only those that are knowledge-founded substantial.

**Embrained Knowledge** is that which is reliant on conceptual skills and reasoning abilities. It should be considered practical, high-level knowledge, where objectives are achieved through continuous credit and revamping. Tacit knowledge could also be embrained, even though it is mostly subconscious.

**Embodied Knowledge** is action-focused and comprises contextual practices. It is more of a social gaining, as to how individuals interrelate in and understand their environment generates this implicit type of knowledge.

**Encultured Knowledge** is the course of attaining shared empathy through socialization and enculturation. Language and negotiation turn out to be the descant of this type of knowledge in a business.

**Embedded Knowledge** is implicit and exists in systematic routines. It links to the relationships between roles, formal procedures, technologies, and emergent routines within a composite system. To introduce any specific line of business, knowledge transition assists a lot.

**Encoded Knowledge** is information that is communicated in signs and symbols and decontextualized into codes of practice. Instead of being an explicit type of knowledge, it pacts further with storage, transmission, and interrogation of knowledge.

**Challenges**

Factors that complicate knowledge transfer includes:

* The incapability to identify & articulate collected or highly instinctive competencies, tacit knowledge concept
* Geography or distance
* Restrictions of Information and Communication Technologies (ICTs)
* Absence of a shared/superior social individuality
* Language
* Areas of skill
* Internal discords
* Generational disparities
* Union-management interactions
* Motivations
* The application of visual depictions to transfer knowledge (Knowledge visualization)
* Problems with sharing beliefs, heuristics, assumptions, and cultural norms.
* Prior exposure or experience with something.
* Misconceptions
* Defective information
* Organizational culture is non-conducive to knowledge sharing
* Motivational issues
* Lack of confidence
* Capability

The diffusion of innovations theory was pioneered by Everett Rogers; giving a research-centered pattern for how and why entities and social networks accept new ideas, practices, and products. The concept of diffusion similarly explores the spread of ideas among cultures in anthropology.

**Process**

* Classifying the knowledge bearers within the organization
* Inspiring them to share
* Scheming a sharing tool to facilitate the transfer
* Implementing the transfer plan
* Assessing to confirm the transfer
* Using the knowledge transferred
* Monitoring and Appraisal

**Practices**

* Mentorship
* Guided experience
* Simulation
* Guided experimentation
* Work surveillance
* Paired work
* Community of practice
* Descriptive transfer
* Practices

**Incorrect Usage**

Knowledge transfer is frequently used as a substitute for training. Also, information should not be mistaken for knowledge, nor is it possible to transfer experiential knowledge to other people. Information could be supposed of as truths or comprehended data; however, knowledge has to do with flexible and adjustable skills, a person's sole ability to wield and apply information. This eloquence of application is in part what distinguishes information from knowledge. Knowledge is likely both implicit and personal; the knowledge one person possesses is hard to measure, store, and retrieve for somebody else to exploit.

**Knowledge Management Software**

**4.1** Knowledge management software (KM software) is a subsection of Enterprise content management software, which comprises a range of software that focuses on the way information is compiled, stored, and accessed. The concept of knowledge management is founded on a range of practices drained by an individual, a business, or a large company to classify, create, represent and redeploy information for a variety of functions. Software that facilitates an information practice or variety of practices at any portion of the processes of information management can be thought to be termed information management software. A subsection of information management software that underlines a technique to create knowledge from information that is attained or controlled is usually called knowledge management software.

KM software mostly provides a method for entities, trivial groups, or medium businesses to transform, develop new knowledge within the group, and improve customer experience. Knowledge management systems (software) comprise a scope of 1,500 or more diverse methods to gather and include information to then build knowledge that can be searched through specific search tools including conception creating tools and or visual quest tools that introduce information in a linked manager not initially abstracted by those assembling or keeping the information database.

**4.2 Key aspects of KM software typically include:**

* Combination of content from both internal and external sources
* Arrangement of content using taxonomies
* Search
* Proficiency location
* Views / Dashboards

As a business today is flattering increasingly international, the capability to access information in various languages is now a condition for some organizations. Reported success reasons for a KM system involve the ability to integrate completely with existing core systems and the scalability of the system to develop within the organization.

**Range**

KM software extends from small software suites for a person to use, like brainstorming software, to awfully certain enterprise software appropriate for usage by hundreds of staffs. Usually, KM software gives a major resource for employees working in customer service, telephone support industries, or sections of large firms.

KM software, generally, allows the combination of formless information sources, such as individual word-processed documents and .pdf formats, email, invoices, graphic illustrations, website links, unstructured notes, and other information supporting collections, such as a simple thought, through to a mixture of millions of contacts from a website, and through that mixture allows the searcher to acquire knowledge that otherwise would not have been revealed. As Internet access speeds augmented, many on-demand products have developed and are now the top providers of KM software.

**Visual quest**

One of the exits from the practically standard keyword search method are those group of companies evolving visual search techniques. Various common visual search methods include:

* **Tree Traversal:**  Where a folder is opened and internally, the display of that folder are additional sub-folders. The folders are rifled in a specific order, precisely once, in a systematic way. This tree traversal method depends on the identification of folders to deliver a rich sufficient indication as to what is kept in the subsequent folder or rank of folders.
* **Classification Navigation:** A classification or theme chart is the categorization of things or conceptions, besides the values affecting such sorting. In KM software, classifications are frequently used as a way of visually organizing the obtainable information by labeling it with pertinent topics and visually denoting them as folders and sub-folders within the taxonomy. Users, therefore, navigate the classification and choose the topic, or blending of topics to operate the exploration on.
* **Tag Cloud Exploration:** When text data has been labeled with some topics it can be visually denoted as a Tag Cloud, where the position of each tag is denoted as font size and color. The most prominent topics can be identified and picked this way.
* **Matrix/Heat Map Search:** The classification of information into topics enables visualization and scrutiny of the information flow. A joint topic search can be shown as principles in a Matrix, and a Heat Chart is a visual illustration of that data, displayed in colors.

**4.3** A knowledge community is a community concept, stanching from the convergence of knowledge management as an area of study and social swap theory. Previously known as a discourse community and having progressed from forums and web forums, knowledge communities are currently known as a community of training or virtual community of training. As in any area of learning, there are several points of view on the stimulations, organizing ideologies, and consequent structure of knowledge communities.

**Perspectives**

As a web or virtual concept, knowledge communities can be said to have progressed from web forums, bulletin board systems, and online discourse communities in the 80s and 90s. When edged with the slits of social networking sites impending online at the turn of the times, knowledge communities can be defined as another method of social media. The main difference between social network sites and knowledge communities is, that social network sites normally lack restraint or a result orientation.

Developing from social exchange theory, a well-founded viewpoint is to view knowledge communities as a kind of exchange. The inspirations for partaking in the exchange vary. The exchange stays open based on the observed value of knowledge among community members.

Knowledge communities can similarly be regarded as a technique by which to perform organizational or process innovation. KCs are always set up to make an alteration to a system, an organizational or social by classifying, creating, denoting, and distributing data, information, and knowledge in and through a community context on the excuse that more substantial value will be made via a knowledge value chain.

From an organizational viewpoint, knowledge communities help to keep the robust ties and feeble ties of the organization with various diverse communities; they help serve quality back into the organization (through more timely feedback and descriptive analysis of negotiations), push organization reliability and haste knowledge transfer and knowledge consumption, as well as do knowledge enlistment (e.g., by giving a conversation space to link gaps between research and practice).

**Organizational Behavior and Structure**

Knowledge communities rear and enable continuing associations and a Knowledge Ecosystem where concepts are replaced constantly. Knowledge rate is produced during the transactional features of the exchange. Current knowledge can be produced (e.g., research merged with ideas from the domain or other research) or new knowledge made via exchanges. KCs use a diversity of two-way communication tools (e.g., through article commenting, discussion board, rating, webinar, poll) to nurture discussion and the swap of ideas.

The organizational building of knowledge communities differs extensively based on support and purpose. Contribution, temperance, and content governance within knowledge communities are normally distributed among a core set of community members who become community mediators/organizers. At a minimum, members of knowledge communities usually involve a mix of subject matter experts, facilitators, moderators, and the general public or a target populace.

Although information within a knowledge community is typically encouraged to be open and public, individuals can maintain information privately as well. Public information inside knowledge communities is occasionally protected by Creative Commons Licenses and is provided credit to the creators. Knowledge communities are seen as a link between traditional issuing mockups and an exposed access system.

**Pitfalls**

Knowledge communities and communities or practices endure from the same drawbacks as all communities. To a few, the mission-propelled orientation can be a critic of creativity. To others, the exchange aspects stench over the commodification of culture, and, by combining experts or concurring persons, KCs and CoPs can frequently be less varied than traditional communities. Perhaps the general response has been the appearance of social links. It is, however, important to mention that social networks and knowledge communities are correlated, but not similar.

**Knowledge Building Communities**

A Knowledge Building Community (KBC) is a community wherein the principal goal is knowledge formation rather than the building of particular products or the attainment of tasks. This concept is fundamental in Knowledge structure theory. If knowledge is not understood for a community, thus there is no knowledge building. Instances of KBCs include

* Classrooms
* Academic research teams
* Modern management firms
* Modern corporate R&D groups
* Wikipedia (Wikimedia Foundation composed with its millions of Wikipedians)

**Knowledge Building Communities in Classrooms**

The core strain for knowledge-building communities has been investigated on developing KBCs in classrooms. Changing a classroom into a KBC needs a significant move in classroom values and also in student and teacher personalities. In this framework, students describe themselves via their learning objectives and collaboratively follow them. Students are regarded as intended learners, working at the advantage of each capability. Knowledge advances are not limited by a teacher’s knowledge.

Specifically, KBC is the objectification of knowledge relics. More exclusively, if in a normal class, ideas, questions, and discussions are individual and ethereal concepts, in a KBC classroom, they are public relics that have a lasting presence in a digital format, typically in the classroom database. Hence, they can be analyzed, talked about, pointed at, and increasingly improved over time. These negotiations, remarks, knowledge relics, and knowledge advances are all observable and improvable in Knowledge Forum.

To be effective, the members of the Knowledge-building community should realize the following:

* Motivate work on forming progresses to what the community previously identifies.
* Accept a general philosophy of inclusion.
* Share willingly what they do not know.
* Respect each other's viewpoints and hesitant understandings.
* Express divergence in a positive style.

The RIBA Knowledge Communities are web-maintained punitive groups. They ease the sharing, capturing, and applying of professional knowledge linking to architecture and the developed environment.

The RIBA Knowledge Communities enterprise is a knowledge community platform elaborated by the RIBA. It is a non-profitable cooperative resource, open to all built environment professionals and anyone with related knowledge to share. Its motive is to link and engage these professionals in the improvement of their specific topics of interest.

People get very excited when speaking regarding their topic and the excel provision the RIBA as an organization can deliver is to allow that knowledge move over these professional sets.

**Communities**

There are currently RIBA Knowledge Communities for the subsequent subject topics:

* Sustainability: for developed environment professionals to confer the viable production of architecture and to involve by the RIBA Sustainable Futures Group.
* Integrated Project: Performing to involve an interdisciplinary expert based on the advancement of BIM, CAD, and the joint delivery of specialized information amid all parts of the constructed environment.
* Education Building Design: Serving to provide excellent higher education and additional education school plan and providing a forum for this dialogue.
* Students of Architecture: aimed at architecture students to share experiences, news, and events while being relative to architectural research and advance.
* Rules and Standards: to include members in the production of creating regulations and standards and to back the ongoing work of the combined BRE CIAT RIBA Technical Task Force.
* Traditional Architecture: The RIBA Traditional Architecture group’s interplanetary to distribute their research and to take the skill of their affiliates.
* International: for the RIBA’s International subdivision to initiate a knowledge bank all over the world.
* Small Practice: Providing a step for architects in small rehearsal to share their knowledge whereas taking the opportunity to be a portion of the discussions for the RIBA Small Practice Group papers.
* Development and Disaster Relief: to discover the variance that inventive design and construction can cause in the lives of some of the highly vulnerable people on earth.
* Urban Greening: to make the pre-conditions essential for trees to be regarded as an inherent part of development at the initial abstract and design stages of any scheme.
* Structure
* The RIBA: Knowledge Communities website is sponsored by the RIBA Research & Development subdivision as an architectural knowledge management enterprise. The communities are organized about the prevailing RIBA committees. These groups are charged with making and starting an agenda for the development of their respective subjects linked to the developed environment.
* Champion an appointed RIBA: Knowledge Champion performs as a focal point for the domination of their corresponding RIBA Knowledge Community. They are nominated based on their proficiency and effective participation in the community’s field of knowledge.
* Expert Peer Group/Committee: The Peer Group comprises nearly 5-8 individuals. They are preferred for their competence and dynamic contribution to their community's domain of knowledge. The group assigns responsibilities in relationship with the community Moderators and community members for boring errands and responsibilities besides unique activities.
* Community Facilitators will help the creation and preservation of the communities. They are the key administrative concentration for the effort of the community. They obtain assistance from the RIBA Research & Development and support Knowledge Champions and Expert Peer Groups.
* Community Members: Knowledge Communities are structured as groups of architects and some experts who are dedicated to a cooperation inside specialist spans of design, edifice, and management.
* Applications
* The RIBA: Knowledge Communities site delivers applications projected to involve the members in their topics of interest, these comprise:
* Personal weblog
* Community discussion media
* Community episodes calendars
* Contacts
* Members almanac
* Resources (uploading documents to stake with some community members)
* Labels
* RSS fodders

The RIBA Knowledge Communities is driven by Elgg (software) which is an open-source networking program. The applications are installed as plugins, which are downloadable from the Elgg community website or developed by PHP developers.

**Knowledge Market**

5.1 A knowledge market is a machine for spreading knowledge resources. There are two opinions on knowledge and how knowledge markets operate. One opinion uses a legal concept of intelligent property to make knowledge a distinctive rare resource, so the traditional commodity market machine can be used directly to deliver it. An optional model is based on dealing with knowledge as a public good and therefore encouraging open sharing of knowledge. This is often signified as attention economics. Currently, there is no consent among researchers on the comparative merits of the two approaches.

**History**

A knowledge economy consists of the concept of swapping knowledge-based products and services. Therefore, as discussed by Stewart, knowledge is different from physical products. For instance, it can be in more than one place concurrently, vending it does not reduce the supply, buyers only buy it once, and once sold, it cannot be recollected. Additionally, knowledge causes more knowledge in a never-ending cycle. Supportive knowledge markets are starting to arise. As would be probable, they are so diverse in form from traditional markets.

Knowledge markets have been diversely defined as an instrument for allowing, sustaining, and simplifying the enlistment, sharing, or swap of information and knowledge among providers and users.

The transactional method accepts that knowledge-based products or services are obtainable for distribution, that someone needs to use them, and that the main emphasis of the market is to link the two.

This viewpoint is apt when the market has restricted or no attention or domination through either the making or usage of the content being exchanged, as is the situation for most outdated markets. A provider-user viewpoint is similarly suitable for developing social networking ideagoras, in which the prime purpose of the market is to meet prevailing solutions with problems and problems whose solutions can be found.

From a production viewpoint, procedures for making wealth over the use of intellectual capital. At the marketing end of the variety, several authors, including Bishop, May, and Tapscott, label the architecture and processes needed to thrive in a digital thrift.

Knowledge markets may likewise be successive. Simard defines a cyclic endwise knowledge-market ideal including nine stages that inserted, advance, or extract a cherish into knowledge products and services along a knowledge services worth chain. The initial five stages are interior to a knowledge organization creation and transmission; whereas the last four stages are external mediators, clients, and citizens. Since the cherish chain is periodic, it can be utilized to model either a stock, post-creation appraisal or a request, pre-construction appraisal process to knowledge markets.

**Knowledge Services**

Knowledge services is a developing notion that combines knowledge organization, knowledge management, and knowledge markets. Knowledge services are sequences that deliver content-based that is data, information, knowledge; organizational outputs e.g., advice, facilitation, and answers, to encounter external user needs. Knowledge services are provided via knowledge markets.

Internal knowledge has also been labeled services as a management method that combines strategic learning, information management, and knowledge management into an enterprise-wide function. Service-oriented architectures for the private sector have been developed with an attention to changing traditional retail trades by developing enterprise-wide strategies that provide customer services. RocSearch (2006) seizes a wider external view, denoting an emerging knowledge services industry that goes outside traditional cost and time leveraging benefits of the conventional referring sector.

Simard et al. (2007) evolved a full systems pattern of knowledge services for government S&T organizations. The pattern starts with producing new content and concludes with sector results and personal benefits. The model is impartial to content, organizations, or issues. It is devised at a departmental level but is climbable both upwards and downwards. The main driver is a department’s legal authority; a subordinate driver is the requests of clients and residents. The model can operate from either a supply or demand method to knowledge markets. There are two levels of resolution, performance dimension and categorizing service-associated activities.

The four types of knowledge services include generating the content, developing products, providing support, and allocating solutions. 24 Knowledge services are shown as a circular value chain comprising nine phases that entrench, improve, or remove value from knowledge-built products and services. The phases are: create, transmute, achieve, utilize internally, relocate, improve, utilize professionally, utilize individually, and assess.

It has been described as an ironic to reach service delivery spectrum that is sectioned into categories of recipients, with related levels of delivery, interactions, channels, and content complexity. The categories, from ironic to reach, are: sole (once only), composite (science), practical (engineering), simplified (popular), specialized (professional), and mandatory (everyone).

From the perspective of knowledge markets, it has been noted that people exchange for information, use it as a tool of power, or swap it for information of greater value. A knowledge marketplace analogy is used to describe the barter of knowledge among individuals and groups. However, it has been indicated that information markets will not resemble textbook competitive markets with many dealers tendering similar products but missing the capability to influence prices. Knowledge markets are also described as a group of associated circular knowledge-service value chains that operate collectively as a sector, to entrench, improve and remove value to produce sector upshots and individual benefits.

Fee-centered knowledge markets commodify knowledge by being rested on classical market systems that work well for traditional goods. The purchaser posts an application, usually in the mode of a question, and puts a value for the valid answer. Similarly, the suppliers of knowledge can post their tenders to have the question responded.

Experts-Exchange was the first fee-centered knowledge market utilizing a virtual currency. It afforded a marketplace where purchasers could offer recompense to have their questions answered.

**5.2 Knowledge Policy**

Policies are examples of government and all bureaucracies. Policies deliver a set of rules and methods to lead how large organizations encounter their responsibilities. Organizational knowledge policies explain the institutional aspects of management, knowledge creation, and use within the framework of an organization's order or business model. Social knowledge policies level between improvement in the knowledge economy to advance global efficiency with social values, such as unity, equity, and the welfare of citizens.

**Knowledge Policies**

Knowledge policies are befitting a steadily crucial module of the Information Society and the knowledge economy. These policies deliver institutional fundamentals for making, managing, and applying organizational knowledge besides social foundations for harmonizing global efficiency with social instruction and cultural values. Knowledge policies can be seen from several viewpoints: the obligatory linkage to technological evolution, relative rates of technological and institutional transformation, as management or supervisory process, hindrances caused by cyberspace, and as an organizational policy tool.

From a technological viewpoint, Thomas Jefferson in 1816 stated that laws and institutions should keep a step with the development of the human mind. Institutions should improve as new inventions are made, new facts are revealed as ideas and settings alteration. Fast-advancing to the late 20th century, Martin in1985 stated that any society with a top level of computerization must constitute its laws and safeguards so that computers can regulate other computers. In 2000, Tim Berners-Lee stated that both policy and technology must be created with sympathy for the insinuations of each other. Finally, in 2001, Sparr pointed out that rules will arise in cyberspace as even on the border, innovators require property standards, rights, and rules of just playing to defend them from pirates. Government is the sole entity that can impose such rules, but they could be advanced by others.

From a rate of alteration point of view, McGee and Prusak in 1993, stated that when an organization alters its civilization, information policies are amid the last thing to alteration. From a market viewpoint, Martin in 1996 however, pointed out that though cyberspace tools change very quickly, laws amend very gradually, and those other enterprises will utilize this gap for viable advantage. Likewise, Sparr (2001) observed that governments have the attention and means to administer new areas of technology, but those old laws usually do not cover developing technologies and new laws take time to make.

Several authors have shown that it will be very hard to observe and control cyberspace. Negroponte in 1997 used a comparison of restricting the freedom of bit emission is like the Romans trying to halt Christianity, although early data presenters might be eaten by Washington lions. Brown (1997) queried whether it will even be likely for governments to observe compliance with rules in the detail of exponentially growing encoded traffic within private networks. As cybernetic surroundings become dominant in commercial activity, observing electronic markets will become progressively difficult. From a business point of view, Flynn noted that employee use of corporate computer resources caused liability risks and endangered security and that no organization could afford to involve in electronic communications and e-commerce improvised.

A main feature of cyberspace is that it is a cybernetic rather than a real place. Therefore, a rising share of social and commercial electronic action does not have a national physical location, raising a crucial question of whether governments can even regulate national policies or organize international policies. Equally, Berners-Lee explained that the key standard of Trademark law, split-up in site or market, does not operate for World-Wide Web domain names as the Internet spans all geographic borders and has no notion of a market area.

From an organizational perception, Simard stated that if traditional policies are used directly in a digital setting, the Canadian Forest Service could befit sidelined in an active knowledge-based economy. Subsequently, the CFS grew and executed an Access to Knowledge Policy that nurtures the migration of the CFS to giving free, open access to its knowledge assets, whereas recognizing the necessity for cost recovery and the need to enact limits on access in some cases. The policy includes a framework of objectives, staff responsibilities, guiding principles, and policy directives. The orders comprise ownership and use; rights, roles, and responsibilities; levels of access and accessibility; cost of access and service to clients.

**A Knowledge Management Method to E-Learning**

**6.1 ABSTRACT**

The digital gap between developed and developing countries is growing fast. However, several developing countries are determined to lessen this gap by elevating their societies over the induction of ICT-built enterprise deeds. Knowledge management and E-learning are samples of such ICT-supported activities. Knowledge management applications are meant to provide organizations with tools to administer their business knowledge, though the focus of e-learning has constantly been on managing the supply of academic knowledge. Efforts to incorporate both areas of research are deficient. This paper introduces a knowledge management method for e-learning applications. It emphasizes the combined characteristics of the two ideas and suggests a KM sight of e-learning. The goal is to modernize the move of educational content among the shareholders of a distinctive e-learning environment. The intended approach has been executed in the Kingdom of Saudi Arabia which is an emerging country where various cultural concerns have to be considered.

**1. INTRODUCTION**

The wealth of a nation no more rests on its ability to obtain and exploit raw materials but on the abilities and brainpower of its citizens and the competencies with which organizations control and develop those abilities. This comprises not only organizational knowledge but educational learning also. E-learning applications denote a model shift in learning standards. They have arisen as a result of the fast infiltration of technology in the provision of education. The tangible promise of technology in education rests in its potential to improve the learning skill of learners. Nevertheless, though the topic of e-learning has been exposed to substantial investigation in several Western countries in the last two decades, there is no motive to deduce those outcomes from these countries may apply to other regions. For instance, the knowledge of E-learning in Arab countries is so partial and this can be credited to financial, technical, and social issues. However, the levels of impeding issues vary from one developing country to another. Many developing countries like the Kingdom of Saudi Arabia (KSA) are giving greater care to advancing education in general because education delivers high living standards because of human capital. Consequently, the Saudi authorities are supporting public and private educational institutions to boost learning by integrating ICT into education. The goal is to equip individual citizens with advanced learning technology.

This goal is corresponding to the declaration made by Beynon in 2006 that the affiliation between individual learning and societal development is substantial when considering education relative to developing countries. Concerning E-Government Readiness which involves ICT infrastructure and other systems of measurement, the UN Global E-Government Readiness Report has stirred up Saudi Arabia's position from 80 in 2003 to 70 in 2008. As stated by Sedgwick in 2001, education in the KSA is gender-separated and is separated into three discretely managed systems: general education for boys, education for girls, and customary Islamic education for boys. Al-Bayan model school for girls, which is the request area of the approach, is a private secondary school. It was instituted in 1988 with the vision to be distinctive in delivering quality e-learning programs in the KSA.

The knowledge of Al-Bayan Girls’ School is an innovator in a country where the basic educational model is fundamentally traditional. This paper intends to offer the e-learning approach started by Al-Bayan. This approach intends to obey a knowledge management attitude to E-learning. The paper is arranged as follows: Section 1 stresses the E-learning notion, viewing the urgency of its acceptance, particularly in developing countries. Section 2 presents the knowledge management approach, while the connective relations between the two topics are tendered in Section 3. Section 4 defines the technical restrictions forced by regional cultural issues. Section 5 offers scenarios of our approach as accepted by Al-Bayan Girls’ School. Section 6 completes the valuation of the Al-Bayan experience, and Section 7 deliberates the deductions for this case study.

**6.2 E-LEARNING**

The computer-aided educational systems have been advanced as an inspiration to employ computer skills in numerous education fields and upgrade the activities of learners. This technical provision to learning is concisely defined as e-learning. Alternatively, it denotes learning circumstances where technology performs a key role in the provision of educational content. Primarily, the e-learning content is provided via a variety of technologies for example CD-ROM and computer-based training, television, and videotape. Hence, the developments in communication technologies and the advancement in the use of the Internet have enormously redesigned e-learning competencies as the Internet allows better communication between apprentices, dons, and the instructive content. The Internet correspondingly allows learning materials to be obtainable from anywhere across the web or Intranet. In addition to the ordinary face-to-face conversation, tutors and learners can also be connecting each other using chat, e-mail, or discussion forums. Such a highly internetworked environment makes students active seekers more willingly than passive recipients of knowledge. This enhanced connectivity also enables education to transpire in places where it usually does not, broadens resources (information) where there are scarce, extends the learning day, and avails the learning place as it links people, communities, and resources to encourage learning. In many developing countries, Internet-based e-learning environments are projected to offer chances to various socially omitted communities where social and cultural hindrances avert them from acquiring knowledge through outdated learning circumstances.

**KNOWLEDGE MANAGEMENT**

Outlining knowledge management (KM) is preferably like pursuing a meaning for international terrorism. Everybody can dialog about it but no one can explain it accurately. Otherwise, there is no global meaning of what knowledge management is. This could mostly be credited to the variances in old philosophers’ disputes about what constitutes knowledge. Several KM explanations can be obtained in the literature. This may perhaps be validated by the multidisciplinary experiences of KM researchers.

The specialties of KM researchers cover management sciences, artificial intelligence, software engineering, sociology, etc. Hence, in a broad perceptive, knowledge management can be outlined as the procedure of storing, codifying, capturing, classifying, and sharing knowledge. The broad scope of KM is to enable organizational learning where knowledge workers are maintained to exploit and share their experiences. The goal is to store, capture and improve the transfer of skills within an organization. For these promises to be fulfilled, different KM strategies have been inducted. The main KM strategies to be used by early adopters of the principle are:

1. The process-centered approach mostly comprehends KM as a social interaction process. In this method, knowledge is precisely attached to the person who developed it and is shared primarily through person-to-person interactions. The main aim of information technology in this method is to assist people providing knowledge, not to hoard it. This method is also described as the personalization approach.

2. The product-centered approach emphasizes knowledge documents, their formation, storage, and reprocess in computer-centered firm memories. This method is also denoted as the content-centered or codification approach.

This section highlights the similarities and shared objectives of the knowledge management and e-learning techniques and ways to supplement the cause of e-learning through the integration of KM performances.

**4. CONNECTIVE RELATIONS AND THE TEAMWORK SOLUTION**

In the last decade, both KM and e-learning have skilled many innovations but are still mainly independent. Conventionally, KM has been related to the corporate sector; while e-learning has been customarily applied more broadly together with the academic and vocational training sectors. Since both concepts are aimed to be very diverse approaches to different topics, it is believed that these approaches have a mutual ground in terms of their objectives and techniques. Essentially, the broad scope of KM is to ultimately lead to founding what could be viewed as the organizational brain or precisely called the organizational memory system (OMS). Alternatively, the scope of e-learning is to facilitate individuals’ brains in building and acquiring prescribed educational knowledge.

If the e-learning concept is viewed in a conceptualized way, other KM activities which are engrained in the e-learning process can be easily identified. Originally, since its initiation, e-learning has been viewed as the process of maintaining an electronic repository of resources, accessible by learners and instructors. This goal has a shared field with the description of KM as the procedure of methodically and vigorously managing and gearing the stores of knowledge in an organization. A similar e-learning errand also synchronizes the codification strategy of KM. Nonetheless, knowledge management is more than generating a knowledge archive and invoking retrieving mechanisms. It is also intended at delivering logistics for knowledge transfer (personalization strategy). E-learning is also likely to render communication channels not only between students and the content but also between students themselves, instructors, and parents. Therefore, KM techniques can be applied to provide logistic methods for the transfer of educational knowledge. This involves easing learners’ supervision and intercommunications management between students and tutors. Notice that this view is also replicated in defining KM as receiving knowledge from those who have it to those who require it.

So, the efficiency of integrating the knowledge management approach in e-learning rests in giving tailored learning cycles that match the numerous mental and social abilities of distinct learners. Learning is intensively reliant on the personality and progression of individuals and it must not be uniformly expected. Delivering customizable knowledge cycles is also in proportion to the objectives of the current constructivist model of learning. This learning model is learner-centered and it depends on the learner’s knowledge building and collaborative learning. As stated by Marshal, the constructivist model stresses three main ideas. Firstly, there is no single accurate expression of knowledge. Secondly, people learn out of effective search when search exposes discrepancy between skill and current knowing. Finally, learning happens within a social setting. KM techniques denote the means through which all these aspects can be realized. Based on the above-mentioned disparities and shared features between KM and e-learning, a new e-learning model that engages KM techniques to create and handle customized e-learning cycles has been proposed. This cohesive approach is executed by Al-Bayan Girls’ School. It is envisioned to fulfill the vision of this school to become a crucial e-learning benefactor in the KSA. However, as in several developing countries, IT-based solutions are afflicted by social and cultural norms. Though comparable culturally-motivated limits are appropriate to our application domain, preliminary investigations showed that the executed approach prospered in entrusting female learners in a society that enforces some limits on the educational process. Restrictions associated with cultural issues are concisely deliberated in the following section.

**5. SOCIAL AND PROCEDURAL CONSTRAINTS**

Not only financial or technical issues contribute to the less keen acceptance of the e-learning perception in developing countries. Social issues similarly play a key role in causing this problem. Chaula in 2006 credited the unproductive adoption of e-learning in developing countries to solutions introduced in the developed countries whose cultures vary considerably from the developing world. This matter is also related to the KSA where various cultural and social matters form up the society. According to Wurm in 2008, the ultimate aspect of Saudi society is the contrast between technological modernity and traditional religious values. Perhaps, the Internet which is the pillar of e-learning was first introduced in the KSA in 1999. The choice was made after a lengthy national debate about the social menaces related to it. As stated by Al-Saggaf and Weckert in 2004, the Saudi authorities were unwilling to accept Internet technology because they had grave fears about the advent of unwanted material on home computer screens and also because of other cultural, religious, and political motives. Based on the United Nations report, The KSA government has capitalized heavily on firewalls and security systems to block access to several websites believed aggressive to the local culture or spiritual values. All these cultural protections signify a bigger challenge for comparable societies. But as knowledge has befallen a social process, IT-supported cooperative learning will shortly suit the mainstream educational model. For example, modern learning models such as constructivism inspire collaboration not only between apprentices and instructors, but similarly inspire collaboration and knowledge sharing between learners themselves. Although technology has prompted knowledge sharing simpler than ever, organizational culture could not promote sharing. In the KSA, gender segregation is the mainstream rule in education. Education is being applied as a form of societal control. There is no interaction between unmarried and unrelated men and women.

All business organizations, governmental institutions, and educational institutions for example schools and universities are gender-separated. Hence, any type of cyber-based interaction is considered a societal threat, and technology might be used to avoid cultural walls. This issue is the main challenge for many IT applications suggested in related societies. In the case of Al-Bayan, despite many off-the-shelf e-learning solutions, considering cultural issues, the management of the school trusts that a customized e-learning solution is more viable. It has been asserted in the software stipulations presented to the developer of the customized e-learning bundles that any shape of unrestrained cyber connection should not be merged. Communications are only rationed to interactions between learners, tutors, and the content afforded by the school.

**6. IMPLEMENTATION SCENARIOS**

Originally, Al-Bayan’s e-learning solution was structured to provide for the curriculum connected to ratings K7-K10. The preliminary stage began with digitalizing all curriculum materials as set by the Ministry of Education, KSA. To understand the KM-based e-learning method for Al-Bayan, a set of learning cycles was well-defined. The goal is to set up workflow management inside the e-learning framework. Firstly, the teacher makes the Tablet PC-built course content with tutorials and exercises. The student subsequently uploads the content and tasks to the installed MS Class Server.

Afterward, teachers operate the school network to present sessions for various classes. The content is disseminated during the class and the students can communicate and deliberate the educational material with each other or with the instructor. The instructor can open the screen of any student and launch a one-to-one dialogue. Otherwise, the teacher can also broadcast any individual student’s screen to all students in the class and establish a group debate. Students can similarly access the content source off-campus. Students can retrieve assignments and submit the answers to the Class Server. Later, teachers download and mark the assignments and send a response to students. All communication between learners and teachers is conducted through a devoted MS Exchange server.

**7. INITIAL ASSESSMENT**

Since education in KSA is gender-separated, the e-learning resolution accepted by Al-Bayan averts students from getting into the Internet. This control is made because of the anxiety that students would be able to connect with the opposite gender. A similar restriction is also intended to avert students from accessing sites that are believed by the authorities as depraved and unsuited to their cultural values. Although these cultural precautions denote a great challenge, even controlled editions of e-learning settings are assumed to provide better learning opportunities for the citizens in developing countries. This involves providing education to socially and culturally accepted communities. Despite the forced constraints made on learners’ interactions, a survey was conducted to evaluate the effect of the presented environment on learners and parents. It comprised the technical and practical viability of the system. The survey attained 170 responses and the questionnaire tool comprised of the following parts. Parents’ positive opinion toward technology is a very significant aspect to support the realism of e-learning solutions. About 76% of the defendants considered the system as supportive to their daughters in contrast to the traditional educational system. Only 4% of the respondents viewed the introduction of an e-learning environment as not cooperative. In developing countries where ICT edification is predominantly low, offenders’ views are sometimes impressed by conventional imitations on the usage of technology.

About 8.67% of the respondents criticized the e-learning material uploaded late. Barring instant messaging is one of the main respondents’ anxieties. There was huge debate concerning the benefits and drawbacks of Instant Messaging (IM). Some intellectuals in 2007 feared that Instant Messaging impacts task interruption and also the potency of revealing sensitive information. Others trust that IM improves workers' productivity by letting them multitask more efficiently. However, in KSA where it is hard to evaluate the severity of the social problems, IM is believed to be a catalyst for social problems. Concerning Al-Bayan, the cultural problem is the main motive behind imposing this control. More than 30% of the respondents stated their discontent regarding barring instant messaging as a way of interaction between learners.

**Investigating Failure-Factors of Applying Knowledge Management Systems in Businesses**

**ABSTRACT:**

Currently, organizations have understood the significance of knowledge and knowledge management. The organizations recognize that machines, equipment, and building cannot amount to the most significant properties of the organization. It is obvious that the most significant property of every organization is organizational knowledge and the right management of it will cause core proficiencies for the organization and also success against the contestants. Knowledge and knowledge management both are vital for an organization, but are all knowledge management exertions in the organization effective? If knowledge management exertions fail in an organization, what are the key failure reasons for this existence? This paper tries to respond to this question by scrutinizing a failed case study in applying a knowledge management system.

**Introduction**

Knowledge is influenced, particularly in the Internet era. For this reason, companies are attempting to identify exactly what their customers need and how to get it to them before the struggle does. Whatsoever it is called collaboration, knowledge management decision support, or something else, it is the base that is supporting today's business strategies. The management of the academic capital of the organization has become progressively vital in the knowledge-based society. Both business and public organizations know the importance of being active learning organizations and thus there is a raising need for those who have the proper training and skill in the Knowledge Management role. Knowledge management makes a new working environment where knowledge and skill can simply be shared and also supports information and knowledge to show and move to the correct people at the correct time so they can perform more competently and successfully. Knowledge management is also referred to as a systematic, goal-oriented application of events to direct and control the palpable and intangible knowledge resources of organizations, to apply existing knowledge within and outside of these organizations to allow the formation of new knowledge and create value, advancement, and improvement out of it.

The Gartner Group in 1998 cited that Knowledge Management encourages a unified approach to capturing, identifying, sharing, retrieving, and evaluating businesses' information assets. These information assets include databases, policies, documents, and procedures as well as the un-captured implicit skill and experience kept in a person's head. Certain researchers pin the disaster degree of knowledge management schemes at 50%. But Daniel Morehead, director of organizational research at British Telecommunications PLC in Reston says the degree is nearer to 70%. Most knowledge management schemes just don't stroke their specified goals and objectives. So that 70% does not mean they fail, it means that they do not achieve what they set off to do. Liam Fahey, an assistant professor at Babson College in Wellesley, articulates the higher downfall rates can be credited to knowledge management (KM) initiatives that depend too deeply on technology.

In 1971, Churchman has stressed that to regard knowledge as a compilation of information is to steal from the concept of all of its life; he postulates that knowledge exists in the user and not in the collection. Likewise, in 1995, Nonaka and Takeuchi suggested that knowledge, not like information, is about principles and dedication. On a balancing note, Davenport and Prusak in 1998 have explained knowledge as originating from intellects at work: Knowledge is a fluid combination of an edged experience, contextual information, values, and skilled insight that delivers a framework for assessing and integrating new experiences and information. In organizations, it frequently becomes rooted not only in repositories or documents but also in organizational processes, routines, practices, and norms.

Knowledge is at the core of knowledge management. In literature, many studies have been proposed concealing the role of knowledge in promoting the performance of management. Nevertheless, there are few studies about inspecting the main failure reasons in the field of knowledge management and this subject stimulated the writers of this paper to emphasis on it. Via literature appraisal about knowledge management failure reasons, Malhotra cited that, the previous discussion has emphasized that knowledge management systems fail due to two extensive reasons. First, knowledge management systems are regularly explained in terms of inputs such as information technology, data, best practices, etc., that by themselves might be scarce for efficient business performance. For these inputs to affect business performance, the impact of interfering and moderating variables such as creativity, attention, commitment, motivation, and innovation, has to be better tacit and accounted for in the design of business models. Second, the efficiency of inputs and how they are strategically employed are vital issues always left undisputed as anticipated performance results are realized, but the value of such performance results may be worn by the dynamic shifts in the business and viable environments.

Operating with prime companies and government institutions, the IBM Institute for Knowledge-Centered Organizations has acknowledged several important barriers that organizations normally encounter when executing knowledge management programs. These barriers are:

* Failure to link knowledge management exertions with the organization’s strategic goals.
* Creation of sources without addressing the need to control the content
* Failure to comprehend and link knowledge management into individuals’ daily effort activities.
* An overstress on proper learning efforts as an instrument for sharing knowledge
* Concentrating knowledge management efforts only inside organizational limits.

Though these are not intended to be an exhaustive list, they represent problems that can hamper the efficiency of a knowledge management exertion, costing organizations time, money, resources, and maybe, most importantly, their aptitude to impact meaningful business fallouts.

**An Overview to Calibro Company**

Calibro is a giant European pharmaceutical company established in Switzerland with research laboratories across the world. The general goal of executing a knowledge management system in Calibro was to deliver a collaborative functional environment for disseminated research staff working on new medicine development. The strategy was that it would include the Knowledge Store and a sequence of e-rooms. The Knowledge Store would grip documents of mutual interest to the researchers. The e-rooms were places for debate groups to meet. It was expected that this venture would intensify knowledge sharing and collaborative working through the firm, mainly across national borders, and that this would lead to quicker drug development among the 1000 scattered research staff. This project was called Baleine Bleue (BB).

**The Initiative for Knowledge Management System**

The enterprise for Project BB was caused by a chance discussion in 1997 at an internal session between a principal of one of the massive research labs, Pascal Delacarte, and Sandy McDonald, a novel fellow of staff who had lately been employed to the Interior Communications Division of the company from a great US law company. In the law company, Sandy had some contribution to intranet development as a portion of its knowledge management strategy. She persuaded Pascal that the prevailing technical structure at Calibro could be exhausted further if a few efforts were placed into spinning it into a platform for the improved organization of current resources, as well as the creation of new amenities for collaboration between staff at the diverse research centers across the world. Pascal was fascinated by this because he had just read an appraisal of Working knowledge in a management magazine. He was also very captivated to hear from Sandy that it was likely to have a knowledge management system and assumed that this would overcome many complications with the information setup at Calibro. For instance:

* Various alleged internally advanced web resources had been designed with initial eagerness, but were later deserted and finally discarded.
* There were several dead relationships on the structure.
* In instances where virtuous information matter survived it was often hard to find because (a,) it was ill indexed and/or (b) resources were seized on private servers. This was a specific issue if the originator of the material encouraged departments or departed the company.
* Even access to further official company resources, like clinical trial information and the chief customer information database, was hard due to poor consciousness of its accessibility and meager indexing.
* There was an enormous variety in formats of the information held.
* To date, senior management had shown less attention to knowledge management.

**The BB Scheme Team**

Sandy McDonald was strong to make her spot in the company as a new worker with optimistic ideas and she convinced Pascal to back one of his subordinate research staff, Karl Schwartz, to Internal Communications to support her design of a prototype knowledge management system. A project student in Interior Communications, Paul North, who had been surveying for an appropriate piece of work that would connect with his degree in Marketing, also merged into the team. They named the project Baleine Bleue (BB) and began their effort by a recitation on KM and listening some commercial instructing courses. Sandy was confident that it would not take lengthy to have a model up and running and did not think it essential to stipulate a schedule for the work. There was no discrete budget. The project itself was financed completely through Internal Communications and Karl's salary remained to be settled out of the amount of Pascal's research lab.

**Enlisting Support for The Scheme**

Since none of the BB panel had been in the company for long, they applied an organizational chart to classify who to talk to about the projected work. Because of cost limits, they were only able to convene directly with people based in Geneva. To inspire research staff in other sites to contribute to the preparation of the knowledge stockpile and e-rooms, a project website was created with discussion space on the company intranet, an advertisement was made applying the e-mail delivery list for drug improvement staff. The response from the people encountered head-on was that they were happy to offer comprehensive speculative support to BB, but when asked to pledge to the development of the system they were unwilling to do so.

Most mentioned lack of time and the intensity of other priorities. Some were resilient to the prospect of modification to their work performances.

The BB team was upset that there were few successes on the project website and not a single access to the dialogue space. There were certain rather damaging reactions to the e-mail declaration of the project. Some people were worried that this had come from nowhere and was doubtful that the initiative seemed to be initiated by people in marketing. They could not comprehend why management had not made the statement. Some even said that though the present means of implementing collective work were not absolute, they were practical. Despite these hindrances, however, Sandy was resolute to track her idea over.

**Development of The Model**

As an effect of linking some corporate KM training lessons, the BB crew was met by KM solution vendors providing standard KM applications. Sometimes was capitalized in assessing the obtainable software. However, it continued to be the favorite of the BB team to advance a system in-house. This was mostly based on cost, and also because no standard package seemed to match the prerequisites of Calibro. Karl took control of developing the infrastructure for the Knowledge Store, to incorporate the e-rooms later.

It was at this time that Sandy understood that she did not have a satisfactory technical ability set to support this share of the work. The project took much longer than expected. Meanwhile, Paul struggled to make a sensation of test documents to be stacked into the Knowledge Store. He had problems convincing people in the labs to give him material that could be installed on the model system, and, when he did succeed to get the material, his shortage of subject knowledge made it hard for him to solve the most suitable location for the resources. Sandy recommended that classification should be accepted for all ingredients: possible end-users contended that if the system permitted free-text exploring, there would be no need for classification.

**Demonstration of The Prototype**

The BB team, therefore, understood that the project was much larger than initially imagined. If they were to execute their knowledge management system, much more support is required from the business. The prototype needed to be demonstrated as soon as possible that had a functioning tool. This would fascinate more boost to the project. Nine months from Pascal and Sandy's initial conversation, presentations of BB were organized locally and drug development staff showed some attention. They sought to use the Knowledge Store when it contained valued content. Since then, they have continued to use their existing instruments for storing and obtaining information. Since the e-rooms were not ready to prove, it was not likely for the drug improvement staff to remark on their ability.

**The End Of BB**

Barely after the representations, Karl declared that he had decided to resume research work and quit starting a new job at another drug firm. Pascal rejected to back another member of staff to Internal Communications. This put Sandy and Paul on their own, with only three months left of Paul's assignment. When Paul resumed university in the autumn, the prototype was still not completely functional. For Sandy did not have the abilities, time, or eagerness to continue the project on her own. It was deserted.

**Scrutiny of Knowledge Management Disaster Factors in Calibro**

As explained in the preceding section, the first idea of applying the knowledge management system in Calibro firm was a session that the manager of Calibro had engaged in it and also studied a book concerning knowledge management. Despite the manager’s decision to implement knowledge management in his company, he didn’t learn more and has no profound understanding of the subject. These subjects caused that he didn’t back the project at diverse times and particularly at some landmarks where the project required direct support from management. So, it can be said that the lack of commitment and support of management had a significant role in the failure of the knowledge management project in Calibro. Likewise, this topic that the management was not acquainted with knowledge management dimensions led to potential failure.

The other reason for failure was choosing someone for heading the knowledge team that was not complicated enough to achieve the knowledge project. The manager of Calibro did a mistake by this erroneous selection despite that the knowledge management leader showed an inclination to manage the project, he did not have skill in knowledge management and this caused many problems during the execution of the project. The designated leader could not manage and control the project efficiently and also could not permit it safely through disasters and solve the jams.

Regrettably, the employees who were nominated as the knowledge management team members did not have the capability for this duty. They were also insensible and did not have complexity and knowledge about the dimensions of knowledge management. It should not be neglected that the diversity and the number of employees who were implicated directly in the project were not enough. Likewise, there was only one person who was designated from the company for the team, and he had no authority high rank in the company. Thus, the nominated team was not familiar with the organization and its internal relations, and seldom was the project execution faced with crises. Also, the lack of high-profile personnel with authorities in the company made the knowledge management team less potential for steering the organization.

Incorrect planning and improper prediction about the dimensions of the project were the other significant failure reasons for the project.

Because executing a vital project such as a knowledge management system requires capital, it is essential to allocate a discrete and appropriate budget for it. But in Calibro this was not done and the project commenced and continued by the existing budget of Calibro laboratories. This challenged the project with financial setbacks because an independent budget had not been assigned to it.

Lack of collaboration between organization staff and the knowledge management team is another factor in the project’s failure. When the staff understood that top management did not support the project directly and also did not know the project was a high priority, they did not collaborate with the project.

Similarly, organizational culture played a vital part in knowledge management ventures in the institutions, but in Calibro, the appropriate culture was not ready. The employees were also concerned about the changes during knowledge management systems execution and top management and the team leader did not have any program to overcome the struggle counter to the alteration. This aspect was the supplementary reason for the knowledge management system disaster in Calibro Firm.

Whilst the existing systems of Calibro had not been studied fully, the knowledge management team was challenged with many difficulties during the formation of knowledge storage bases and sources particularly when they understood unconventionality between new systems and present systems. For resolving these complications, it was essential to consume surplus money and time, so this aspect similarly contributed a significant role in knowledge management disaster.

The ten most important failure reasons of knowledge management system execution are briefed below:

* Lack of acquaintance of top management with dimensions of KM and its requirement
* Choosing a simple and inexpert person for leading the KM team
* Inappropriate choice of knowledge team members
* Incorrect planning and inappropriate forecasting for the project
* Lack of discrete cost for knowledge management venture
* Structural culture
* No funding and assurance of top management
* Resistance against the modification
* The incapability of the KM team for unique organizational relations
* Unconventionalities between present systems and new systems

**Database Management System**

8.1 A database is a systematized collection of data. The data are classically ordered to model features of practicality in a way that provides processes demanding information. For instance, modeling the accessibility of rooms in hotels in a way that helps to locate a hotel with vacancies.

Database management systems (DBMSs) are specifically designed software applications that interrelate with the client, some applications, and the database itself to seize and scrutinize data. A general-purpose DBMS is a software system created to consent the definition, querying, creation, update, and administration of databases. Famous DBMSs include MySQL, Microsoft SQL Server, Oracle, PostgreSQL, SAP, and IBM DB2. A database is not mostly moveable across various DBMSs, but diverse DBMSs can interoperate by applying standards such as ODBC and SQL or JDBC to permit a single application to function with more than one DBMS. Database management systems are usually classed depending on the database model that they support; the most common database systems since the 1980s have all maintained the relational model as denoted by the SQL language.

**Terminology and Overview**

Officially, the database denotes the data themselves and sustaining data structures. Databases are designed to operate huge quantities of information by entering, storing, retrieving, and handling that information. Databases are established so that one set of software programs delivers all clients with admission to all the data.

A database management system (DBMS) is a set of computer software giving the interface between users and a database. Because they are so intently related, the term database when applied informally often denotes both a DBMS and the data it operates.

Away from the realm of professional information technology, the word database is occasionally applied informally to denote any group of data (a spreadsheet, a card index). This item is related only with databases in which the magnitude and handling prerequisites require the application of a database management system.

The contacts provided by most prevailing DBMSs comprise four main groups:

* Data description – Describing new data infrastructures for a database, eliminating data infrastructures from the database, altering the infrastructure of prevailing data.
* Update – Implanting, altering, and erasing data.
* Retrieval – Attaining information either for end-user inquiries and narrates or for proceeding by applications.
* Administration – Recording and supervising users, imposing data security, supervising performance, sustaining data integrity, concerning with concurrency control, and improving information if the system flops.

A DBMS is liable for sustaining the integrity and protection of stored data, and for retrieving information if the system crashes.

Both a database and its DBMS must conform to the principles of a specific database model. Database system denotes jointly to the database, database model, and database management system.

Substantially, database servers are devoted computers that keep the authentic databases and operate barely the DBMS and related software. Database servers are mostly multiprocessor computers, with substantial memory and RAID disk arrays utilized for firm storage. RAID is applied in data recovery if any of the disks crash. Hardware database accelerators, linked to one or more servers through a high-speed channel, are also used in huge volume transaction processing environments. DBMSs are got at the core of most database applications. DBMSs might be created around a custom multitasking kernel with integral networking provision, but current DBMSs characteristically depend on a standard operating system to deliver these functions. Since DBMSs include a substantial economical market, computer and storage vendors usually consider DBMS necessities in their development plans.

Databases and DBMSs can be categorized based on the database pattern that they provide such as interactive or XML, the type of computer they operate on, from a server clump to a mobile phone, the query language(s) applied to access the database such as XQuery or SQL and their internal architecture, which impacts performance, resilience, scalability, and security.

**Applications**

Databases are used to provide internal processes of organizations and to reinforce online contacts with customers and suppliers.

Databases are applied to sustain administrative information and more dedicated data, for instance engineering data or economic patterns. Specimens of database applications comprise computerized library systems, computerized parts inventory systems, and flight reservation systems.

**Multipurpose and Special-purpose DBMSs**

A DBMS has developed into a complex software system and its development normally needs thousands of person-years of development struggle. Some all-purpose DBMSs such as Oracle, Adabas, and DB2 have undergone upgrades since the 1970s. All-purpose DBMSs intend to meet the requirements of as various applications as possible, which increases the complexity. Nevertheless, the fact that their development expense can be extended over a large number of users entails that they are usually the most lucrative approach. Hence, an all-purpose DBMS is not constantly the optimal solution: in some cases, an all-purpose DBMS may initiate unnecessary overhead. Therefore, there are several examples of systems that practice special-purpose databases. A mutual example is an email system: email systems are created to enhance the management of email messages and do not require important portions of an all-purpose DBMS functionality.

Various databases have application software that accesses the database instead of end-users, without revealing the DBMS edge instantly. Application programmers may utilize a wire protocol immediately, or probably via an application programming interface. Database inventors and database administrators interrelate with the DBMS through devoted interfaces to create and uphold the applications' databases and thus require some more knowledge and consideration about how DBMSs function and the DBMSs' exterior interfaces and tuning parameters.

**History**

Following the technological advancement in the areas of processors, computer storage computer memory, and computer networks, the capabilities, dimensions, and presentation of databases and their corresponding DBMSs have developed by orders of magnitude. The improvement of database technology can be alienated into three eras depending on the data pattern or structure: directional, SQL/interactive, and post-interactive.

The two-essential initial navigational data models were the hierarchical model, typified by IBM's IMS system, and the CODASYL model, executed in several products such as IDMS.

The interactive model, initially projected in 1970 by Edgar F. Codd, deviated from the tradition by asserting that applications should quest for data by content, instead of pursuing links. The interactive model uses a collection of record-style charts, each utilized for a dissimilar type of object. Merely in the mid-1980s did computation hardware befitted sufficiently powerful to permit the broad deployment of interpersonal systems (DBMSs plus applications). By the early 1990s, though, interpersonal systems were subjugated in all extensive data processing applications, and as of 2014, they continue to dominate excluding niche areas. The dominant database language, standardized SQL for the interpersonal model, has manipulated database languages for other data patterns.

Object databases were established in the 1980s to overwhelm the troublesomeness of object-relational resistance mismatch, which led to the creation of the term post-interpersonal and also the improvement of hybrid object-interactive databases.

The subsequent generation of post-interactive databases in the late 2000s befitted known as NoSQL databases, announcing fast key-value stores and document-oriented databases. A challenging next-generation called NewSQL databases tried new executions that reserved the relational/SQL model while targeting to match the high performance of NoSQL related to commercially available interpersonal DBMSs.

**The 1960s, Navigational DBMS**

The institution of the term database concurred with the accessibility of direct-access storage from the mid-1960s onwards. The term connoted a disparity with the previous tape-centered systems, letting shared collaborating be used rather than regular batch processing.

As computers increased in speed and competence, several all-purpose database systems appeared; by the mid-1960s several such systems had come into commercial usage. Attention to a normal initiated to nurture, and Charles Bachman, the author of one such product, the Integrated Data Store (IDS), instituted the Database Task Group within CODASYL, the group in control of the creation and calibration of COBOL. In 1971 the Database Task Group provided their standard, which commonly became known as the CODASYL approach, and soon many commercial products based on this approach arrived on the market.

The CODASYL approach depends on the manual steering of a related data set that was created into a large network. Applications could attain registers by one of the three approaches:

* The use of the main key, known as a CALC key, is normally executed by hashing.
* Navigating relations from one register to another.
* Scanning all the registers in a consecutive order

Advanced systems added B-Trees to deliver alternative access routes. Various CODASYL databases similarly added a very direct query language. However, in the final count, CODASYL was very complicated and needed important training and effort to generate valuable applications.

IBM too had its DBMS in 1968, called Information Management System (IMS). IMS was an improvement of software compiled for the Apollo schedule on the System/360. IMS remained normally comparable in notion to CODASYL, but used a severe hierarchy for its model of data steering instead of CODASYL's network model. Both notions later became known as navigational databases owing to the technique data was retrieved, and Bachman's 1973 Turing Award demonstration was The Programmer as Navigator. IMS is categorized as a ranked database. IDMS and Cincom Systems' TOTAL databases are categorized as network databases. IMS remains in usage as of 2014.

**The 1970s, Relational DBMS**

Edgar Codd operated at IBM in San Jose, California, in one of their branch offices that were mainly implicated in the upgrading of hard disk systems. He was unfortunate with the directional model of the CODASYL approach, particularly the absence of a pursuit ability. In 1970, he penned several papers that delineated a new method of database creation that ultimately ended in the innovative an Interactive Model of Data for Large Common Data Banks.

In the paper, he defined a new system for storage and functioning with big databases. Instead of accounts being stored in a certain sort of related list of free-form records as in CODASYL, Codd's concept was to exploit a table of fixed-length registers, with each table exploited for a diverse type of object. A linked-list system would be very incompetent when storing scant databases where some of the data for anyone's record could be left blank. The interpersonal model resolved this by dividing the data into a series of regularized tables with voluntary elements being stirred out of the core table to where they would take up room only when needed. Data may be easily inserted, deleted, and amended in these tables, with the DBMS doing whatever care is required to exhibit a table prospect to the application or user.

**In the relational model, related records are linked together with a "key".**

The interactive pattern also permitted the content of the database to develop without continual rewriting of relations and pointers. The relational part comes from objects referencing other objects in what is known as a one-to-multi relationship, like a traditional hierarchical model, and a multi-to-multi relationship, like a navigational model. Thus, a relational model can state both hierarchical and navigational models, as well as its innate tabular model, allowing for pure or joint patterning in terms of these three patterns, as the application requires.

A mutual utilization of a database system is to trail information concerning users, their name, login information, phone numbers, and various addresses. In the navigational method, all of these data would be sited in a single record, and idle items would simply not be sited in the database. In the relational method, the data would be regulated into a user table, a phone number table, and an address table, for instance. Records would be made in these optional tables only if the phone numbers or addresses were availed.

Relating the information collectively is the key to this system. In the interactive pattern, some information was used as a key, exclusively describing a particular record. When information was being gathered about a user, information kept in the optional tables would be found by probing for this key. For example, if the login name of a user is unusual, phone numbers and addresses for that user would be noted by the login name like its key. This simple re-connecting of related data back into a sole collection is approximately that outdated computer languages are not designed for.

Just as the navigational method would need programs to the hoop to collect records, the relational method would need hoops to store information about anyone's entry. Codd's solution to the required looping was a set-oriented language, a proposal that would later generate the universal SQL. Applying a branch of mathematics named tuple calculus, he proved that such a system could provide all the operations of standard databases besides delivering a plain system for obtaining and recurring sets of data in a single process.

Codd's paper was selected by two persons at Berkeley, Eugene Wong, and Michael Stonebraker. They began a project known as INGRES with funding that had already been assigned for a geographical database project and student programmers to design code. In 1973, INGRES developed its first test products which were usually ready for extensive use in 1979. INGRES was comparable to System R in many ways, besides the application of a language for data access, called QUEL. With time, INGRES stepped into the evolving SQL standard.

IBM carried out one implementation test of the interactive pattern, PRTV, and a production one, Business System 12, conjointly now obsolete. Honeywell transcribed MRDS for Multics, and currently, there are two new executions: Alphora Dataphor and Rel. Most other DBMS executions typically called relational are essentially SQL DBMSs.

In 1970, the University of Michigan initiated the development of the MICRO Information Management System based on D.L. Childs' Set-Theoretic Data pattern. Micro was utilized to administer very massive data suites by the US Department of Labor, the U.S. Environmental Protection Agency, and scientists from Wayne State University, the University of Alberta, and the University of Michigan. It operated on IBM mainframe computers applying the Michigan Terminal System. The system continued in production until 1998.

**Integrated Method**

In the 1970s and 1980s efforts were made to develop database systems with incorporated software and hardware. The fundamental philosophy was that such integration would deliver advanced performance at a lesser cost. Models were IBM System/38, the first tendering of Teradata, and the Britton Lee, Inc. database device.

Additional process of hardware delivery for database management was ICL's CAFS accelerator, a hardware disk controller with programmable quest proficiencies. In the long term, these exertions were usually ineffective because professional database machines might not keep a step with the fast development and progress of all-purpose computers. Thus, most database systems currently are software systems operating on all-purpose hardware, using all-purpose computer data storage. However, this concept is still followed for some applications by certain companies like Oracle (Exadata) and Netezza.

**In the late 1970s, SQL DBMS**

IBM began working on a prototype system lightly based on Codd's notions as System R in the early 1970s. The initial version was prepared in 1974/5, and work then began on multi-table systems in which the data might be alienated so that all of the data for a register did not have to be kept in a single large amount. Consequent multi-user versions were verified by customers in 1978 and 1979, by which time a harmonized query language, SQL, had been added. Codd's notions were founding themselves as both practicable and superior to CODASYL, asserting IBM to advance an accurate production version of System R, called SQL/DS, and afterwards, named Database 2 (DB2).

Larry Ellison's Oracle launched from a different chain, based on IBM's papers on System R, and thrashed IBM to market when the first version was introduced in 1978.

Stonebraker went on to use the lessons from INGRES to design a new database, Postgres, which is currently known as PostgreSQL. PostgreSQL is frequently used for global mission-critical applications.

In Sweden, Codd's paper was similarly delivered and Mimer SQL progressed as of the mid-1970s at Uppsala University. By 1984, this project was strengthened into an independent business. In the early 1980s, Mimer presented transaction handling for high strength in applications, a concept that was subsequently executed on most additional DBMSs.

Alternative data pattern, the entity-relationship pattern, appeared in 1976 and obtained popularity for database development as it underlined a more acquainted description than the former relational model. Afterward, entity-relationship concepts were retrofitted as a data modeling concept for the relational model, and the disparity between the two has become immaterial.

**In the 1980s, on the Desktop**

The 1980s escorted the age of desktop computing. The new computers enabled their customers with spreadsheets as Lotus 1-2-3 and database software as dBASE. The dBASE artifact was trivial and informal for any computer client to know beyond the box. C. Wayne Ratliff the designer of dBASE affirmed that dBASE was distinct from programs such as BASIC, C, FORTRAN, and COBOL as many dirty works had already been done. The data management is done by dBASE rather than by the client, so the client can concentrate on what he is doing, instead of having to complicate with the grimy particulars of inaugural, reading, and concluding files, and handling space sharing. dBASE was one of the highest-selling software designations in the 1980s and early 1990s.

**In the 1980s, Object-oriented**

The 1980s, along with an escalation in object-oriented programming, saw progress in how data in several databases were managed. Programmers and designers started to consider the data in their databases as objects. That is, if a personal data were in a database, that person's features, such as their phone number, address, and age, were now regarded to belong to that person rather than being redundant data. This lets for relationships between data to be relative to objects and their qualities and not to discrete fields. The term object-interactive impedance disparity described the awkwardness of interpreting between automated objects and database tables. Object databases and object-interactive databases tried to solve this problem by delivering an object-oriented language that programmers can apply as a substitute to purely relational SQL. On the programming part, libraries known as object-relational mappings (ORMs) try to solve the same problem.

In the 2000s, NoSQL and NewSQL

The next generation of post-interactive databases in the 2000s befitted to be NoSQL databases, jointly with fast key-value stocks and document-orientated databases. XML databases are a kind of designed document-oriented database that lets querying based on XML document features. XML databases are generally applied in initiative database management, where XML is being utilized as the device-to-device data interoperability normal. XML databases are typically commercial software systems that comprise MarkLogic, Clusterpoint, and Oracle XML DB.

NoSQL databases are frequently very fast, do not need fixed table schemas, evade joint operations by storage of denormalized data, and are created to scale horizontally. The most common NoSQL systems comprise Couchbase, MongoDB, Memcached, Riak, Redis, Apache Cassandra, Hazelcast, CouchDB, and HBase, which are entirely open-source software stuffs.

Recently, there was a high request for immensely dispersed databases with high partition acceptance but based on the CAP theorem, it is unbearable for a distributed system to concurrently deliver reliability, accessibility, and partition acceptance assurances. A distributed system can include any two of these assurances at the same time, but not all three. For that purpose, various NoSQL databases are using what is known as eventual consistency to deliver both availability and partition tolerance guarantees with a decreased even of data reliability.

NewSQL is a class of modern interactive databases that aim to provide the same ascendable execution of NoSQL systems for online operation processing workloads while still using SQL and upholding the ACID guarantees of a traditional database system. Such databases consist of ScaleBase, EnterpriseDB, Clustrix, VoltDB, and NuoDB.

**Database Management System II**

**9.1** A database is an organized set of data. The data are normally systematized to model features of certainty in a way that provides processes requiring information. For instance, modeling the obtainability of lodgings in hotels in a way that sustains discovering a hotel with opportunities.

**9.2 Research**

Database know-how has been an effective research subject since the 1960s, both academically and in the research and development clusters of companies, like IBM Research. Research activity comprises theory and the development of models. Prominent research topics have comprised models, query languages and query optimization methods, the atomic transaction concept and related concurrency control techniques, RAID, and more.

The database research area has various devoted academic journals namely, Data and Knowledge Engineering-DKE, ACM Transactions on Database Systems-TODS, and annual conferences like ACM SIGMOD, VLDB, ACM PODS, IEEE ICDE.

**Examples**

One way to categorize databases includes the sort of their contents, for example: bibliographic, statistical, document-text, or hypermedia stuffs. Contrarily is by their application domain, such as, accountancy, films, music compositions, finance, manufacturing, or assurance. Thirdly, it is by some procedural aspect, like the interface type or database structure. This section registers a handful of the adjectives applied to brand diverse categories of databases.

* An in-memory database is a databank that mainly exists in the main memory but is classically supported by non-volatile computer data stowage. Core memory databases are quicker than disk databases, and so are frequently used where reply time is dangerous, for example in telecommunications network equipment. SAP HANA stage is a very hot subject for an in-memory database. In May 2012, HANA operated on servers with 100TB core memory operated by IBM. The company’s co-founder demanded that the system was adequately large to operate the 8 largest SAP customers.
* An effective database contains an event-driven architecture that can counter circumstances both inside and outside the database. Possible purposes comprise security monitoring, statistics, alerting, authorization and gathering. Many databases deliver functional database aspects in the form of database activities.
* A cloud database depends on cloud technology. Mutually, the database and the majority of its DBMS subsist remotely, in the cloud, whereas its applications are mutually improved by programmers and later upheld and used by the application's clients via a web browser and Open APIs.
* Data stores archive data from functioning databases and frequently from external sources such as market research firms. The warehouse turns out to be the central source of data for application by managers and some clients who may not have admission to operational data. For instance, sales data might be combined to weekly totals and changed from internal product codes to operate UPCs so that they can be related to ACNielsen data. Some essential and basic components of data warehousing include analyzing, retrieving, transforming, mining data, loading, and managing data to avail them for further use.
* A deductive database merges logic programming with a relational database, for instance by employing the Datalog linguistic.
* A distributed database is one by which mutually the data and the DBMS cover multiple computers.
* A document-oriented database is created for storage, retrieval, and management of document-oriented, or half-structured data, information. Document-oriented databases are one of the core types of NoSQL databases.
* An embedded database system is a DBMS that is firmly incorporated with application software that needs access to saved data so that the DBMS is concealed from the application’s end-users and needs slight or no continuing repair.
* End-user databases contain data evolved by individual end-users. These include collections of documents, presentations, spreadsheets, multimedia, and other files. Various products are available to boost such databases. Some of them are much easier than complete DBMSs, with more basic DBMS functionality.
* A combined database system includes numerous distinct databases, each with its DBMS. It is managed as a single database by a combined database management system (FDBMS), which incorporates various autonomous DBMSs, probably of diverse types, whereas it would as well be a heterogeneous database system, and delivers them with an integrated abstract view.
* Sometimes the term multi-database is applied as a synonym to integrated database, although it may denote a less integrated group of databases that collaborate in a single application. In this case, classically middleware is used for delivery, which usually comprises an atomic commit protocol (ACP), for example, the two-phase commit protocol, to permit distributed transactions through the participating databases.
* A graph database is a type of NoSQL database that applies graph structures with edges, nodes, and properties to denote and store information. General graph databases that can stockpile any graph are discrete from specialized graph databases such as network databases and triplestores.
* In a hypertext or hypermedia database, any word or a text denoting an object, e.g., another text, a picture, an article, or a movie, can be hyperconnected to that object. Hypertext databases are mostly valuable for establishing large quantities of disparate information. For instance, they are valuable for establishing online encyclopedias, where users can suitably skip around the text. The World Wide Web is therefore a bulky dispersed hypertext database.
* A knowledge base (shortened KB, kb) is a distinct type of database for knowledge management, delivering the means for the organization, computerized collection, and recovery of knowledge. Likewise, a set of data indicating problems with their solutions and associated experiences.
* A mobile database can be supported on or coordinated from a mobile computing device.
* Operational databases store full data about the operations of an organization. They usually process comparatively high volumes of updates by transactions. Examples comprise customer databases that record credit, skills data about employees, contact and demographic information about a corporate's clients, personnel databases that grip information for example; salary, benefits, enterprise resource planning systems that register facts about product modules, shares stocktaking, and monetary databases that retain path of the organization's capital, accounting, and fiscal dealings.
* A parallel database pursues to increase performance through parallel tasks such as loading data, evaluating queries, and building indexes.

The main parallel DBMS architectures which are caused by the core hardware structural design are:

* Shared memory structure, wherever manifold processors portion the core memory space, also other data storage. Portioned disk structure, where every processing entity has its main memory, but all units portion the additional storage.
* Shared nothing architecture, wherever every processing entity has its core memory and other storage.
* Probabilistic databases employ uncertain logic to draw implications from indefinite data.
* Real-time databases administer transactions very fast for the result to come back and be performed instantly.
* A spatial database can stock the data with multidimensional characteristics. The inquiries on such data comprise location-based queries.
* A temporal database has built-in time features like a time-based data pattern and a time-based version of SQL. More precisely, the temporal aspects usually consist of transaction time and valid time.
* A terminology-oriented database develops upon an object-oriented database, always modified for a specific field.
* An amorphous data database is proposed to store in a controllable and secure way various objects that do not apt naturally and suitably in mutual databases. It may contain email messages, journals, documents, multimedia objects, etc.

**Design and modeling**

The initial assignment of a database architect is to create a conceptual data model that replicates the structure of the information to be kept in the database. A common method to this is to advance an entity-relationship model, always with the support of drawing tools. Another popular method is the Unified Modeling Language. An effective data model will precisely echo the probable state of the external world being exhibited: for instance, if individuals can possess more than one phone number, it will let this information to be seized. Designing a good conceptual data model needs a good sympathetic of the application domain.

Creating the conceptual data model occasionally includes input from enterprise procedures or the scrutiny of workflow in the institution. This can support creating what information is required in the database, and what can be omitted. For instance, it can benefit when determining whether the database wants to embrace momentous data in addition to current data.

Having made a conceptual data model that pleases users, the next phase is to interpret this into a schema that executes the related data structures inside the database. This process is named logical database architecture, and the output is a rational data pattern stated in the form of a schema. While the conceptual data model is separate from the choice of database knowhow, the rational data model will be articulated in terms of a specific database model upheld by the chosen DBMS.

The most prevalent database model for all-purpose databases is the relational model, or more specifically, the relational model as denoted by the SQL language.

The process of producing a logical database design by this model applies a systematic method called normalization. The aim of normalization is to certify that each elementary fact is only logged in one place, so that supplements, updates, and removals instinctively sustain consistency.

The concluding phase of database design is to make the resolutions that affect performance, recovery, scalability, security, and the like. This is known as physical database design. A significant goal during this phase is data independence; meaning that the resolutions taken for performance optimization purposes should be imperceptible to clients and applications. Corporal design is motivated mostly by performance requirements and needs a good knowledge of the anticipated workload and access patterns, and deep sympathy for the aspects rendered by the selected DBMS.

Another feature of corporal database design is safety. It comprises both describing admission control to database stuffs in addition to describing security levels and techniques for the data itself.

**Models**

**Collection of five categories of database standards**

A database pattern is a form of a data model that decides the logical structure of a database and determines in which manner data can be prearranged, stored, and controlled. The most prevalent instance of a database standard is the interactive pattern or the SQL estimation of interactive, which employs a table-based format.

Mutual logical data models for databases contain:

* Ranked database pattern
* Network pattern
* Interactive pattern
* Entity-correlation pattern
* Improved entity-relationship pattern
* Object pattern
* Document pattern
* Object–attribute–value pattern
* Star scheme

An object-interactive database combines the two associated structures.

Physical data patterns include:

* Reversed index
* Plane file

Other patterns include:

* Associative pattern
* Multidimensional pattern
* Multivalued pattern
* Semantic pattern
* XML database

**Database Management System III**

**10.1** **External, Theoretical, and Core Views:** A database is a structured collection of data. The data are characteristically structured to model features of reality that support processes needing information. For instance, modeling the obtainability of accommodations in hotels in a way that provides getting a hotel with opportunities.

**The Traditional View of Data**

A database management system delivers three views of the database data:

* The external level describes how each group of end-users views the arrangement of data in the database. A separate database can have slightly number of sights at the external even.
* The conceptual stage merges the numerous external views into a compatible global view. It offers the fusion of all the external sights. It is beyond the scope of the various database clients and is somewhat of concern to database application developers and database administrators.
* The internal phase is the internal arrangement of data within a DBMS. It is involved with cost, scalability, performance, and other operational matters. It deals with the storage design of the data, using storage structures such as directories to improve performance. Rarely does it store data of individual sights, calculated from generic data, if performance validation exists for such idleness. It equalizes all the external views' performance requirements, probably conflicting, to enhance overall performance through all activities.

While there is classically merely one abstract or rational and corporal or inner sight of the data, there can be somewhat number of diverse exterior views. This lets users view database information in a more business-linked way rather than from a practical, processing perspective. For instance, a financial department of a company requires the payment specifics of all employees as portion of the organization's expenditures but does not require details about employees that are in the interest of the human resources department. So different departments require different opinions of the organization's database.

The three-plane database structure narrates the concept of data independence which was one of the main initial dynamic forces of the relational model. The notion is that changes caused at a certain stage do not impact the view at a higher level. For instance, transformations in the internal stage do not impact application programs inscribed utilizing abstract plane interfaces, which lessens the impact of making substantial changes to enhance performance.

The conceptual site delivers a stage of in path between interior and exterior. Alternatively, it provides a mutual sight of the database, separate of different external sight structures, and conversely, it extracts away specifics of how the data is stockpiled or managed. Theoretically, every plane, and even every exterior sight, can be introduced by a different data model. Practically, a given DBMS uses a similar data model for both the external and the conceptual levels. The internal level, which is concealed inside the DBMS and relies on its implementation, requires a distinct level of detail and utilizes its forms of data structure types.

Splitting the exterior, abstract, and interior planes was a key aspect of the relational database model implementations that control 21st-century databases.

**Languages**

Database languages are special-function languages, that perform the following:

* Data definition language: describes data types and the relationships between them.
* Data manipulation language: executes tasks such as updating, inserting, or deleting data incidences.
* Query language: accepts exploring for information and computation imitative information.

Database languages are explicit to a specific data model. Prominent examples comprise:

* SQL merges the tasks of data definition, data handling, and query in a definite language. It was one of the initial commercial languages for the relational model, though it departs in some deference from the relational model as defined by Codd that the columns and rows of a table can be ordered. SQL suited a standard of the American National Standards Institute (ANSI) in 1986, and the International Organization for Standardization (ISO) in 1987. The standards have been frequently improved since and are supported with changing levels of compliance by all typical commercial interactive DBMSs.
* OQL is an entity pattern language standard by the Object Data Management Group. It has swayed the plan of other newer query languages as JDOQL and EJB QL.
* XQuery is a typical XML query language executed by XML database systems such as eXist and MarkLogic, relational databases with XML ability such as DB2 and Oracle, and similarly by in-memory XML processors, for example Saxon.
* SQL/XML combines XQuery with SQL.

A database language can likewise integrate features like:

* DBMS-specific Configuration and storage engine administration.
* Computations to amend query results, like counting, averaging, summing, sorting, grouping, and cross-referencing.
* Constraint enforcement like, in an automotive database, only permitting single engine kind per car.
* Application programming interface type of the query language, for programmer suitability.

**10.2 Performance, Security, and Accessibility**

Due to the critical significance of database technology to the smooth managing of an enterprise, database systems comprise complex approaches to provide the required performance, availability, and security and let database administrators to manage the application of these aspects.

**Storage**

Database storage is the packet of the physical manifestation of a database. It includes the internal level in the database architecture. It also holds all the information required to restructure the conceptual stage and external stage from the internal stage when needed. Placing data into permanent storage is usually the obligation of the database engine or storage engine. Though classically accessed by a DBMS via the fundamental operating system, storage properties, and configuration settings are enormously important for the effective operation of the DBMS, and so are strictly sustained by database administrators. A DBMS, when in operation, often has its database existing in several types of storage like memory and peripheral storage. The database data and the supplementary required information, probably in very huge quantities, are encoded into bits. Data is usually located in the storage in structures that look disparate from the method the data appearance in the theoretical and exterior stages, but in ways that attempt to optimize these stages' restructure when required by clients and programs, similarly for computing extra kinds of required information from the data that is, when querying the database.

Several low-level database storage structures are utilized by the stowage engine to reissue the data pattern hence it can be printed to the medium of choice. Methods such as indexing may be employed to enhance presentation. Conventional storage is row-accustomed, nonetheless there are similarly correlation and column-oriented databases.

**Materialized Views**

Always storage idleness is used to upsurge presentation. A joint instance is a storage of materialized views, which comprise frequently needed external views or query results. The disadvantages of materialized views are the overhead experienced when apprising them to retain them harmonized with their original modernized database data and the rate of storage idleness.

**Replication**

Occasionally a database applies storage idleness by database stuffs duplication with one or more replicas to rise data availability, both by improving the performance of simultaneous multiple end-user accesses to the same database object and to deliver resilience in the case of a partial crash of a distributed database. Updates of a simulated object are required to be harmonized across the object copies. In several cases, the whole database is replicated.

**Security**

Database security pacts with all several aspects of defending the database matter, its proprietors, and its clients as well. It ranges from security from intentional unlicensed database uses to unintentional database accesses by unauthorized entities as a person or a computer program.

Database admission control pacts with controlling who is permitted to enter what information in the database. The information can include specific database objects namely; record types, data structures, specific records, some computations over certain objects, or applying explicit admission routes to the previous. Database access influences are set by specially certified personnel that uses devoted protected security DBMS interfaces.

This may be administered straight on a separate basis, or by the task of individuals and privileges to groups, or through the task of individuals and groups to functions which are then approved privileges. Data security avoids unlicensed users from inspecting or updating the database. Using passwords, users are permitted access to the entire database or its subsets called subschemas. For instance, an employee database can hold all the data concerning a personal employee, but a specific group of clients may be accredited to view only payroll data, whereas others are permitted admission to simply work history and remedial data. If the DBMS delivers a way to collaboratively enter and update the database, and interview it, this ability allows for handling personal databases.

Change and access logging records who accessed which features, what was altered, and when it was altered. Logging services let for a forensic database inspection later by keeping a record of access incidences and changes. Occasionally application-level code is employed to record changes instead of abandoning this to the database. Supervising can be scrutinized to detect security violations.

**10.3 Transactions and Concurrency**

Database transactions can be utilized to present some plane of fault acceptance and data veracity after recovery from a crash. A database transaction is an element of function, usually encapsulating many processes over a database a concept maintained in a database and as well some systems. Every transaction has well-outlined boundaries in which program or code implementations are comprised in that transaction.

The acronym ACID defines certain perfect properties of a database transaction: Atomicity, Reliability, Seclusion, and endurance.

**Migration**

A database created with one DBMS is not moveable to another DBMS. However, in some situations, it is required to migrate, move a database from one DBMS to another. The motives are primarily economical that is, different DBMSs possess distinct total outlays of proprietorship or TCOs, practical, and operative. The migration comprises the database's conversion from one DBMS sort to another. The conversion should uphold the database associated application namely, all related application programs intact. Therefore, the database's conceptual and external architectural stages should be upheld in the transformation. It may be anticipated that also some features of the architecture internal level are sustained. A complex database migration may be a complex and costly project by itself, which should be factored into the choice to migrate. This is because tools may exist to help migration between definite DBMSs. Normally, a DBMS vendor delivers tools to help to import databases from other common DBMSs.

**Building, Sustaining, and Modification**

After scheming a database for a utilization, the subsequent phase is structuring the database. Normally, a suitable all-purpose DBMS can be nominated to be applied for this purpose. A DBMS provides the needed user interfaces to be applied by database administrators to outline the required application's data structures inside the DBMS's particular data model. Other client interfaces are applied to take desired DBMS parameters like security-related and storage allocation parameters, to mention a few.

When the database is prepared, all its data assemblies and other required components are outlined, it is typically inhabited with the initial application's data before attaining it operational. In certain cases, the database becomes operational during the emptying of application data, and data is accrued during its operation.

After the database is made, initialized, and populated it needs to be sustained. Many database limits may require altering and the database may require to be adjusted for improved performance; application's data structures may be added, or changed, new linked application programs may be written to improve the application's functionality.

**10.4 Backup and Restore**

Occasionally it is required to bring a database back to an earlier state for various reasons, like when the database is found despoiled due to a software error, or when updated with inaccurate data. To attain this, a backup process is done seldom or continuously, where each desired database state is kept within devoted backup files. When this state is required, that is, when it is obvious by a database administrator to take the database back to this situation, these files are utilized to reinstate that status.

**Other DBMS attributes might comprise:**

* Database records
* Graphics constituent for creating graphs and charts, particularly in a data warehouse system.
* Query optimizer: Makes query optimization on every query to select for it the most effective query plan to be implemented to compute the query result. May be explicit to a specific storage engine.
* Tools for database design, application program maintenance, application programming, database configuration monitoring, database performance analysis, and monitoring, DBMS hardware configuration and related database mapping, storage distribution and database plan supervision, storage relocation, etc.

**Conclusion**

In an extremely viable business environment, organizations are considering for enhanced tools which could deliver them a better opportunity to prosper and to make a strategic benefit in their market. Their main concern consequently is incessant, effective and safe access to their amassed knowledge. Knowledge Management tools and methods are developing, mainly for the use of large organizations, but increasingly small and medium enterprise (SME) are attracted in adopting them. Knowledge is a stage fast Information, and deals with the seizing and the collecting of Information along its stages and rules associated.

Initially, it is significant to state the variances amid the two kinds of knowledge. Knowledge can be unambiguous, which gives itself to move strategies such as accepted desk manuals, techniques, and other organized processes. Knowledge can similarly be tacit, which gives itself to move strategies such as coaching, mentoring, communities of custom and the like. Explicit knowledge is more simply tallied and capable, and can so be more readily apprehended. Tacit knowledge, though, includes personal characteristics, soft skills, development of cooperative partnerships, and particular situational decisions.

The notion of knowledge management is founded on a variety of practices applied by a person, a business, or a big corporation to recognize, represent, create, and redistribute information for a variety of purposes. Software that allows an information practice or series of practices at any segment of the processes of information management can be considered to be termed information management software. A subsection of information management software which stresses a method to develop knowledge out of information that is attained or confined is called knowledge management software.

A knowledge market is an implement for dispensing knowledge resources. There are two concepts on knowledge and how knowledge markets perform. One concept applies a licit theory of intellectual property to fashion knowledge a typical rare resource, so the outdated commodity market implement can be used directly to dispense it. A substitute model is centered on handling knowledge as a public worth and thus reassuring free sharing of knowledge. This is frequently denoted as attention economy.

The digital gap between developed and developing countries is growing rapidly. Nevertheless, a number of developing countries are trying to narrow this rift by elevating their societies by introducing ICT based business bustles. Knowledge management and E-learning are samples of such ICT supported bustles. Knowledge management applications are intended to offer organizations with implements to administer their business knowledge, whereas the emphasis of e-learning has constantly been on handling the delivery of academic knowledge.

In conclusion, Database technology has been a dynamic research subject since the 1960s, both academically and in the exploration and development sets of companies (for instance IBM Research). Research activity comprises concept and development of prototypes. Prominent research topics have comprised models, the atomic deal concept and associated concurrency control methods, probe languages and probe optimization approaches, RAID, and more.

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