

Innovation through Strategic Integration of Expert System and Knowledge

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Abstract: In the past decade there has been a vital explosion of interest in the field known as expert systems (or, alternatively, as knowledge-based systems). Expert systems (ES) have quickly evolved from an academic notion into a proven and highly marketable product. ES provide powerful and flexible means for obtaining solutions to a variety of problems that often cannot be dealt with by other, more traditional and orthodox methods. Nowadays their use is being proliferated to many sectors of our social life, while their applications are proved to be critical in the process of decision support and decision making.

Knowledge base is central to a successful Expert System. Updating and maintaining the knowledge enhances the capability of the inference Engine which in turns improvises the tool used for Expert System (ES). ES can be useful if it has knowledge depth and knowledge dept is the ability to extend existing knowledge and infer new knowledge. ES must house a true translation of knowledge acquired from a group of human experts who fully cover the problem domain. If Experts cannot represent the entire knowledge domain, the defection risk is greater since the probability of missing information is high.

The preliminary research makes an attempt to understand about the importance of KMS(knowledge Management Systems) to the Indian banking industry, the benefits that the Indian public banks can gain from running KM systems and drivers for effective implementation of KM mechanisms across the Indian public banks. This was undermined by the need to survive in an information-driven economy. Then the study was extended to the Banks. In this context, an effective KM programme is needed as an appropriate tool to control business focus - helping banks to address a clear, concrete and imperative problem through the design of KM activities through the ES.

Key Words: Knowledge Management, Expert System, knowledge Management Systems

1. Introduction: Brief history of Knowledge Management and Expert Systems:

Expert System (ES) emerged, as a branch of AI, from the effort of AI researchers to develop computer programs that could reason as humans. The first work in ES development began in the early 1950s by the Rand-Carnegie team of Newell et al., who developed the General Problem Solver (GPS) to solve problems of elementary logic, chess and high school algebra problems. In the late 1950s McCarthy invented LISP programming language, which is the dominant language used in artificial intelligence and expert systems. Similar efforts followed in the 1960s by Ledburg et al., who developed DENDRAL in the field of chemistry. Despite the advances in micro computing, the efforts of ES development continued without a major breakthrough. In the 1980s, ES began to move from researcher labs to the market. Restricted domain ES applications began to multiply with the emergence of user-friendly and affordable ES development shells. ES simply became a standard part of end-user computing similar to word processors, spreadsheets, and data managers.

"In the emerging economy, a firm's only advantage is its ability to leverage and utilize its knowledge,"
Larry Prusak (Executive Director) IBM Institute for Knowledge-Based Organizations (IKO)

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"Knowledge management is more of a strategy supported by technology that can show a quantifiable, and sometimes substantial, return on investment," Greg MacSweeney

In the 1970s, greater industrial interest in developing expert systems took place, while PROLOG was also developed and used for logic programming applications. On the other hand, artificial intelligence was perceived later as a direct threat to human (and expert) status. Various authors have considered ES as revolutionary solutions to problems in almost every area of human activity, which would produce an inevitable skeptical backlash (Martins, 1984; Simons, 1985).

2. Basic components of Expert Systems

ES are one of the most commercially successful branches of artificial intelligence (AI). Welbank (1983) defines an expert system as follows:

ES is a computer system containing a well-organized body of knowledge which emulates expert problem solving skills in a bounded domain of expertise. The system is able to achieve expert levels of problem solving performance, which would normally be achieved by a skilled human when confronted with significant problems in the domain (BCS, Expert Systems Specialist Group). An ES consists of three main components, which include the knowledge base, the inference engine and the user interface.

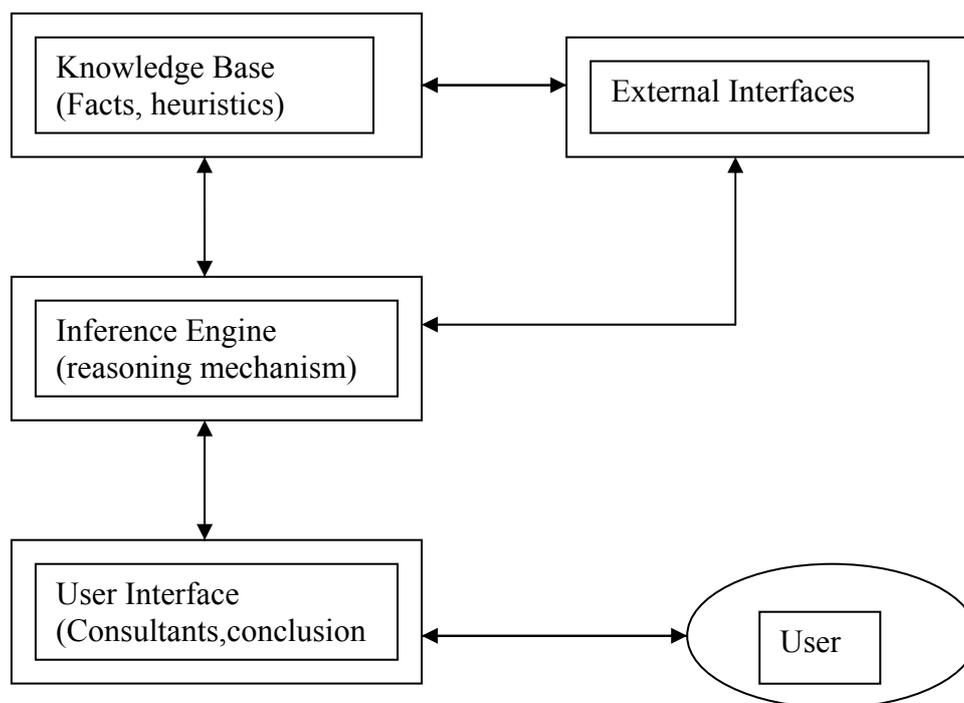


Figure 1: Expert System architecture

The knowledge base is the heart of the system and contains the knowledge needed for solving a specific problem. The knowledge may be in the form of facts, heuristics (e.g. experiences, opinions, judgments, predictions, algorithms) and relationships usually gleaned from the mind of experts through specific knowledge acquisition methods (e.g. interview) - in the relevant domain. Knowledge can be represented using a variety of representation techniques (e.g. semantic nets, frames, predicate logic) (Ignizio, 1991; Mital and Anand, 1994), but the most commonly used technique is "if-then" rules, also known as production rules.

The inference engine is employed during a consultation session, examines the status of the knowledge base, handles the content of the knowledge base and determines the order in which inferences are made. It may use various inference methods. Many inference engines have the capability for reasoning in the presence of uncertainty.

3. Theoretical foundations

KM is seen as a significant component of a business strategy that has the ability to provide an organization with opportunities to manage new market challenges. Additionally, as Teece (1998) argues, knowledge can form the basis for sustained competitive advantage. The number of organizations claiming to work with KM is growing progressively Grover and Davenport, 2001; Martensson, 2000; Moffett *et al.* , (2002), and it can be seen that this interest in managing knowledge stems from several reasons. Firstly, KM has proven benefits and has been adopted by 80 per cent of the world's biggest organizations (KPMG Consulting, 2000). Secondly, core competencies are ostensibly based on KM, and therefore rely on the skills and experience of the people who do the work; but the fact that these may not exist in a physical form in the future, increases the attractiveness of KMSs (Manville and Foote, 1996). Thirdly, the recent changes in business direction emphasizes the importance of greater understanding of knowledge-intensive work, and how people think, learn, and use knowledge (Brown and Duguid, 2000; Damasio, 1994, 1999; Klein, 1998; Nonaka and Takeuchi, 1995; Wiig, 1994). And fourthly, organizations with greater knowledge can combine traditional resources and assets in new and distinctive ways, thereby providing greater value to customers (Teece *et al.* , 1997). From the KM literature, it can be seen that there are multifarious of guidance concerning KM implementation, and explicit guidelines and approaches are well-developed in this regard. Employee know-how is one component of organizational knowledge and a crucial strategic resource (Wiig, 1997). This means that organisations must learn the weaknesses, strengths and movements of their direct competitors; and how their customers perceive their products; and they must simultaneously find a way to tap into this knowledge base in order to conserve and increase their core competencies.

4. Research approach and methodology

This preliminary research is planned to conduct in India, using the banking industry as the core context, and Public and Private sector banks featured in the study. From a research methodology perspective, face-to-face interviews were used as a suitable data collection method. This approach involved over (25) senior executives, human resources (HR), planning and developments (P&D), 2 IT service providers to these banks and other business areas. This diversity of participants (actors) was necessary to gain a holistic appreciation of the totality of their experiences in their functional or professional group and helped generate a wide and comprehensive variety of opinions, views and issues. The participants involved in this research, and the size and annual business (by revenues) of organizations. The primary research was based on the qualitative techniques. The basic techniques that were used for this research are observations, in-depth interviews, and focus groups. The research planned to adopt the face-to-face interview technique, within an overall exploratory case study approach. The data collected were subsequently compiled, extracted and analyzed, the results of which were then broadly summarized along various themes in relation to KM.

5. Study findings:

1. The interviewees with percentage of (93 per cent) indicated that knowledge asset is the most valuable resource for the banks in today's environment, which means a creative approach to KMS is urgently required for the banks to improve the banks efficiency, and to meet international banking standards. The respondents also indicate that the "intangible" (i.e. knowledge/intellectual capital assets) in the banks should be processed and managed. 2. The participants' responses indicate that the banks under study have a clear understanding of the value of their employees, especially the "experts". About 78 per cent indicated agreement that the banks should be extremely aware of the importance of providing their expert bankers with challenging work to retain their knowledge to the banks database (a KMS is a necessary element). 3. With respect to the questions dealing with the "knowledge perspective" it appeared that some people were not familiar with the term or concept of a "knowledge management". About 16 per cent were familiar with the term, 65 per cent neutral, and 19 per cent were unfamiliar. There was some ambiguity over the terms "knowledge management" and "information technology" some of the interviewees indicate term "information technology" as a mean of KM, whereas others said "intellectual capital" some others said that KM is a processing of organizational knowledge, HR management, organization learning, and only few others said they do not know about the concept of KM. 4. It was also evident that the respondents did not feel that the banks were ready to transform itself into KM-based-banks. Only 12 per cent agreed that the banks were ready to be transformed into KMS

(19 per cent were neutral, 69 per cent disagreed). Most of the interviewees agreed that their banks have a limited attention to such KM programs, and so generally little or no KM objectives were formulated. There was no formal KMS implementation over all banks. One participant from the one of the bank believes that KM objectives should be set from the start and the banks should know the expectation to achieve with KMS as well as to improve information-handing capacity before starting any KM initiatives. These goals had to be understood by the entire bank at the different levels.⁵ About 87 per cent of the interviewees said there is no KM program in place, 7 per cent said not considering any KM program, 3 per cent said the program is under consideration, and 3 per cent said they have the KM activities.⁶ Most of the banks are not aware of KMS 38 per cent, inability to implement KM, 22 per cent, insufficient organization processes, 11 per cent, insufficient knowledge about KMS, 9 per cent, financial limitation, 5 per cent, and 15 per cent others, such as insufficient technology, insufficient employees' skills, lack of guidance and methodologies, KMS limitation, KMS is not important. ⁷ This question was meant to see the vision of the KMS strategy, it is important for organizations to identify clearly the direction in which the organization is headed; 76 per cent indicated that the banks need to have very clear strategies for acquiring, transferring and using knowledge among their expert employees. This strategy could also assist as a checklist to ensure that the knowledge management program covers all key elements of the banks. ⁸ The vast majority of the respondents agreed that, to be truly successful in business today (79 per cent agreed) and in the future (81 per cent agreed), one needs to see the world from a knowledge perspective. About 91 per cent said the bank has knowledge lost, 77 per cent said there is lack of knowledge "knowledge not available" 88 per cent said the bank suffers from error duplications, (65 per cent) said data and information are not interpreted well, (82 per cent) said other issues like lack of: competitors' information; customers' information; alliances and international organizations' information; and internal and external environments' information.⁹ The survey interviews showed that many benefits can be obtained by KMS in the all Banks, particularly, when supported by government and senior management. Although many of the benefits of KMS are some time intangible and difficult to quantify and obtain there are a sharing view on the fact that the benefits of KMS can be translated by a successful KMS implementation. It is also important in terms of KM implementation to identify the existing gaps within the CKIAs and KMS before suggesting any KM framework for implementing KM within the Banks, and with regard to the areas that can enable KMS across banks, it is important to assess the banks' readiness for these. The main role of environmental analysis is to detect, monitor, and analyze those current and potential trends and events that will create opportunities or threats to KMS implementation. This preliminary study provides answers to some fundamental questions related to KM and its implementation. These answers should be used as basis for the secondary research.

6. Conclusion

Organizations that desire to grow and stay competitive must develop mechanisms for acquiring relevant knowledge, and exchanging it accurately, consistently, concisely and in a timely manner with all who need it. Furthermore, numerous KM approaches can be adopted to serve these purposes; and it is also important and necessary for organizations to adopt and implement KMS to survive competition and gain competitive advantage for themselves in a knowledge economy. Organizations need better control of the knowledge they already have, and currently, many organizations are unaware of what knowledge they possess that can be gainfully employed. A KMS has the capacity to make an organization better and help people do their jobs better. KMS could allow Banks to meet the national and international requirements, but they also recognized that Banks are still at the beginning of the long journey towards implementation, and therefore, were some time away from fully benefiting from a KMS. It can be suggested that implementation of KM mechanisms can result in services and process improvement, and the creation of a centralized communication system for the banking industry. The significant role that a KMS might play in all Banks was acknowledged by most of the interviewees, it was also appreciated that the present environment and circumstances at the Banks are not ready to engage in any KM initiatives since more support is required more support from the banks in terms of their structure, people, technology, goals and objectives and internal and external environment.

7. Limitations and caveats

Further research is necessary to assess the CKIAs in practice within the banks, because the realization of an effective KMS requires an appropriate level and integration of organizational commitment, change management practices, IT systems and other KM enablers. The aim of the secondary research should be to determine how the effective use of the CKIAs can support or enhance a well-defined KM implementation strategy.

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