

INDIA IN TRANSITIONAL AGE – COPING WITH THE CHALLENGES AND OPPORTUNITIES OF KNOWLEDGE BASED ECONOMY

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ABSTRACT

Globally, knowledge has become the most important factor in Economic Development and knowledge assets are considered essential for economic growth, competitive advantage, human development and quality of human life. Despite the fact that India is a leader in software development, much needs to be done in transforming itself into a knowledge – based Economy (KBE). The objective of this paper is to propose strategies to develop India into a KBE by strengthening the Content Management System (CMS). To start with, the paper gives the KBE capabilities and the types of knowledge to be addressed. The key drives of KBE, as applicable to the Indian economy, have been highlighted. The paper gives clear- cut phase in building the KBE. The challengers faced in KBE development, the strategies formulated to overcome the same, and the performance indicators are listed here. The paper address the question whether India has the potential to be a KBE. In this transition period of transforming India into a KBE, this paper gives a clear idea regarding where we stand and how can we adopt to change. Thus this paper gives a clear idea about challenges and opportunities of Knowledge based Economy.

KEYWORDS: India, Transitional age, Coping, Challenges, Opportunities, Knowledge, Development, Management Information, Communication, Technology

INTRODUCTION

Importance of ‘Knowledge’ for the economy and business has been discussed since atleast 1985, if only sparodically, and received growing attention from the 1960s. The idea that knowledge could and should be managed , however, seems not to have been seriously considered until a decade later. Knoeledge management is a abusiness activity with two primary aspects:

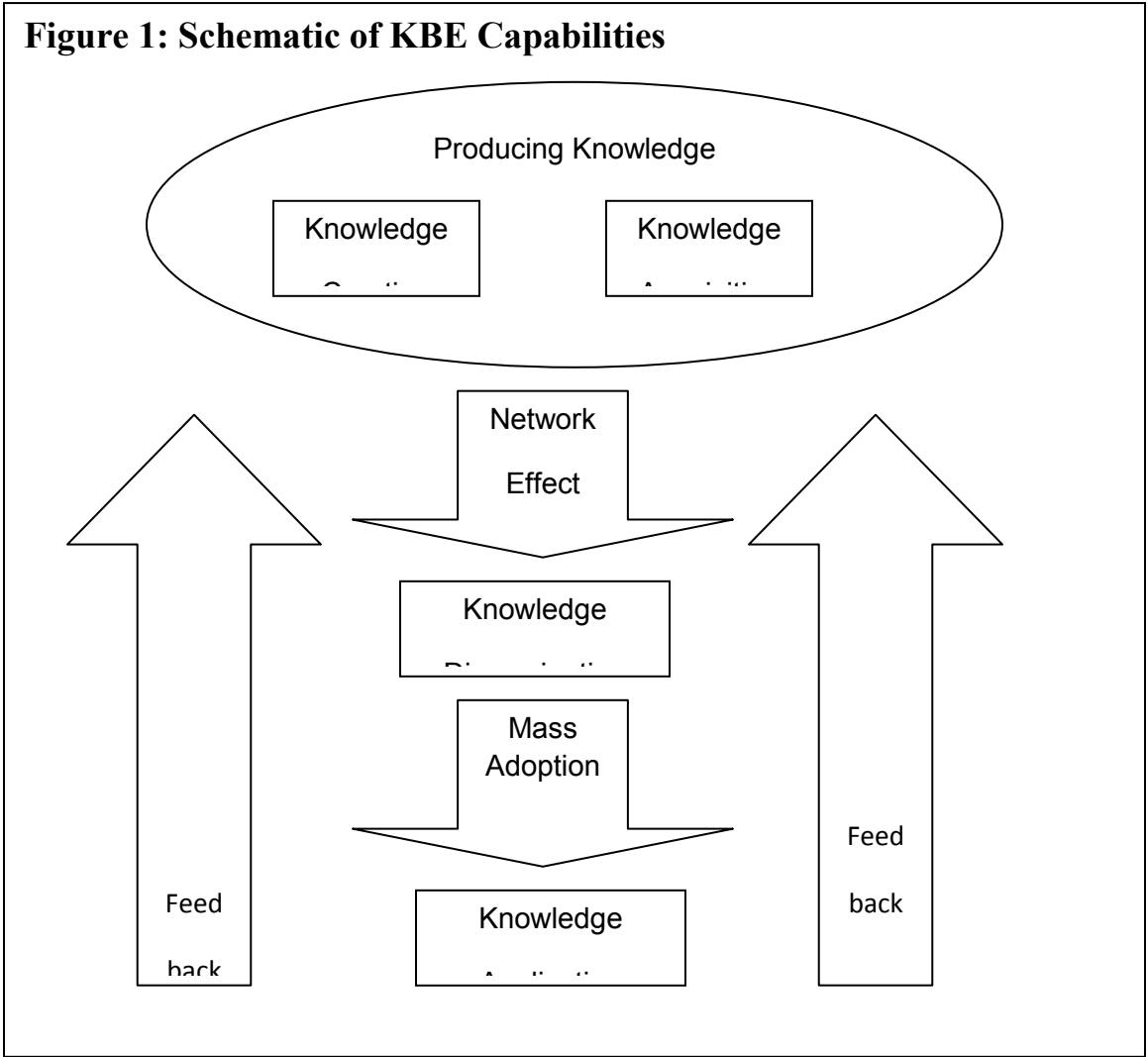
- Treating the knowledge component of business activities as an explicit concern of business reflected in strategy, policy, and practice at all levels of organization.
- Making a direct connection between an organisation’s intellectual assets both explicit (recorded) and tacit (personal know-how) and positive business results.

In practice, knowledge management often encompasses identifying and mapping intellectual assets within the organization, generating new knowledge for competitive advantage within the organization, making vast amounts of corporate information accessible sharing of best practices, and technology that enables all of the above including groupware and intranets.

In late 1990s, the concept of Knowledge as a source of economic development gained popularity, giving rise to the term “Knowledge – based Economics”. These economies consider knowledge as the most important factor for a competitive environment, for the countries competing against each other, or firms vying for excellence, or even teams / individuals competing against each other. transformation of an economy into Knowledge Economy includes the reorganizations of firms, more efficient and dynamic capital markets, and relentless globalization (Rukhsana and Suleman, 2003).

Traditional “Production Functions” focused mainly on labour, capital, materials and energy, knowledge and technology were supposed to have external influence on production. Now analytical approaches are being developed so that knowledge can be included more directly in production functions. Investments in knowledge can increase the productive capacity of the other factors of production as well as transform them into new products and processes (OECD 1996). Since these knowledge investments are characterized by increasing (rather than decreasing) returns, they are the key to long – term economic growth.

The organisation for Economic Cooperation and Development (1996) Summarize that the term KBE results from a fuller recognition of the role of knowledge and technology in economic growth. Knowledge in the form of human / intellectual capital has always contributed to the economy of a country. But only over the last few years its relative importance has been recognized, and is growing ever since. The recent shift of paradigm from BPO (Business Process Outsourcing) to KPO (Knowledge Process Outsourcing) demonstrates its importance. However, there is no authoritative definition of what a KBE really is (Heng et al. 2002). But in general, it involves the identification, creation, assimilation, validation, storage and distribution of knowledge, such that it could be used to improve effectiveness and promote innovation. APEC (2000) defines KBE as “an economy in which the production, distribution and use of knowledge is the main driver of growth, wealth creation and employment across all industries”. The schematic of KBE capabilities is presented in Figure 1.



Four Types of Knowledge Address by any KBE

The four basic types of knowledge can be collectively summarized as :

- **Know – what** refers to knowledge about “facts” (OECD 1996), e.g., how many people live in Karnataka and number of internet users in Karnataka. Here, knowledge is close to what is normally called information. In some complex areas, experts, (e.g., law practitioners) must have a lot of this kind of knowledge in order to fulfill their jobs.

- **Know – why** refers to scientific knowledge (OECD 1996). This kind of knowledge underlies technological development and product and process advances in most industries. The production and reproduction of know - why is often organised in specialized organisations, such as, research laboratories and universities. To get access to this kind of knowledge, firms have to

interact with these organisations, either through recruiting scientifically trained labor or directly through joint activities.

□ **Know-how** (common knowledge) refers to skills or the capability to do something (Dixon 2000), e.g., capability of a skilled worker operating complicated machine tools. Know – how is typically a kind of knowledge developed and kept within the border of an individual firm. One of the most important reasons for the formation of industrial networks is the need for firms to be able to share and combine elements of know – how.

□ **Know – who** involves information about who knows what and who knows how to do what (Lundvall and Johnson, 1994). It involves the formation of special relationships, which make it possible to get access to experts and use their knowledge efficiently. For any modern organisation, it is important to use this kind of knowledge in response to the acceleration in the rate of change. The know – who kind of knowledge is internal to the organisation to a degree than any other kind of knowledge.

The Key Drivers of KBE

Following two key drives are responsible for the transformation from ‘skill – based economy’ to KBE (Rukhsana and Suleman, 2003)

□ **Globalization** : This is the most obvious driver, as the volume of global trade and products have expanded manifolds. India is one of the countries, which has welcomed globalization and reaped it rich benefits. The developments in Information Technology have increased the pace of the events, bringing new product to markets from all over the world, increasing the global watch and reach of the organisations. We have witnessed a sweeping trend in automobile, pharmaceuticals, electronics etc., and The developments in Information Technology have increased the pace of the events, bringing new products to markets from all over the world and at the same time maintain a high level of quality.

□ **Proliferation of Information and Communication Technologies (ICT):** Second prominent development taking during this time is the increase in ICT. These ICT’s (particularly Intranets / Internet) have provided new channels and means of acquiring knowledge and opened new doors of promising opportunities like e-business. Sharp decrease in cost of computer hardware and software, plus improvement in software development have been responsible for increasing number of firms using computers in their business process. The “New Economic” system emerging in global arena presently has a growing share of “E- enabled and E-business”.

Need for Knowledge Mngement:

Why do we need to manage knowledge? Ann Macintosh of Artificial Intelligence Applications Institute has identified some of the specific business factors, including:

- Market places are becoming increasingly competitive and the rate of innovation is rising
- Reductions in staffing create a need to replace informal knowledge with formal methods
- Competitive pressures reduce the size of the work force that holds valuable business knowledge
- The amount of time available to experience and acquire knowledge has diminished
- Early retirement and increasing mobility of work force lead to loss of knowledge
- There is a need to manage increasing complexities as small operating companies are trans-national sourcing operations
- Changes in strategic direction may result in the loss of knowledge in a specific area.

In brief, knowledge and information have become the medium in which business problems occur. As a result, managing knowledge represents the primary opportunity for achieving substantial savings, significant improvements in human performance.

Phases in Building the KBE

It is important to have a clear understanding of the various phases in building the KBE. The three distinct phases are as follows:

Phase 1: Development of Content Management System

A typical Content Management System (CMS) includes people, process, and technology. Content can include database, documents, presentations, or e-mail ; virtually any artifact of transactions or dialogue or creative work, inside or outside the organisation. Content could also include audio / video files, and animated graphics. Increasingly, content management may also need to address external content (newsfeeds, subscriptions to data and analysis, and publications) and content from the extended enterprise (Suppliers, customers, vendors, consultants, and external sales), since users would want to access internal as well as external content from the same system and with the same queries, yet want to know the source and creditability of content because it is one way they determine if content is useful or trustworthy.

Objectives of an Efficient Content Management System

The American Product Quality Center (2001) defines following key objectives in relation to the CMS:

- Identify the need for a CMS
- Audit existing content to determine what needs to be managed
- Understand user requirements.
- Identify sources of Internal and external content
- Develop process of author, validate, and refresh content.
- Identify users that would benefit from the content.
- Develop applications for the content.
- Analyze costs associated with content management

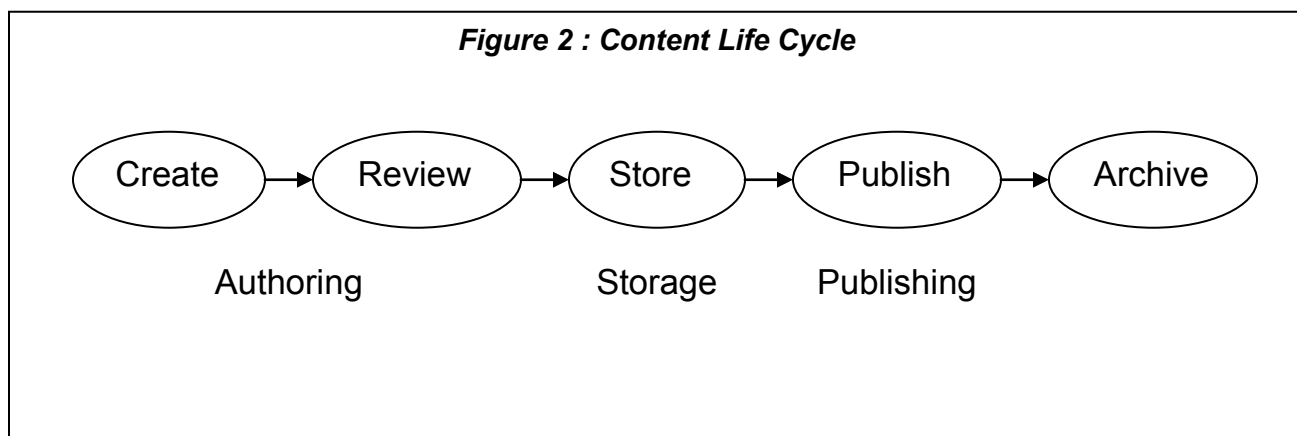
Types of CMS

There are various forms of CMSs that are available and the organisations will have to choose the one most appropriate to them. following are the most widely used CMSs.

- **Digital Asset Management (DAM)** : Systems that manage rich media assets, often including digital audio and video clips, for retrieval and re – purposing in media production environments (Rosenblart 2001). These systems are sometimes also called Media Asset Management (MAM).
- **Web Content Management (WCM)** : Tools that provide page template design, editorial workflow and publishing environments specifically for websites and other forms of Internet content delivery.
- **Enterprise Content Management (ECM)**: Systems, that facilitate management of corporate documents and other types of information for use, internally as well as externally, with a company’s business partners, customers, regulators and the general public (Rosenblatt 2003).

Functions of a CMS

Functions of a CMS be placed into four categories: Authoring, Workflow, Storage and Publishing as shown in Figure 2 (Ort 2000 ; Vidgen et al. 2001). These four categories also represent the Content Life Cycle (Browning and Lowndes, 2001). ACMS manages the path from authoring to publishing using a scheme of workflow and by providing a system for content storage and integration.



- Authoring is the process by which many users can create content within a managed and authorized environment

- Workflow is the management of steps taken by the content between authoring and publishing.
- Storage is the placing of authored content into a repository. Beyond this it is also the versioning of the content, so that access conflicts between multiple authors cannot arise and so that previous versions can be found and restored if required.
- Publishing is the process by which stored content is delivered.

Phase 2 : Identifying the Challenges and Formulating the Strategies

The SWOT (Strength, Weakness, Opportunities and Threats) analysis is the key for setting any strategy. This forms the key even in establishing a KBE, as there is a need to convert the challenges into opportunities.

Challenges Encountered by a KBE

In India, we basically face the following three challenges in KBE development.

- The Knowledge Performance Challengers** : Promote the creation, adoption, and commercialization of knowledge.
- The Skills Challenge** : Ensure the supply of people who create and use knowledge.
- The Innovation Environment Challenge**: Build an environment of trust and confidence, where the public interest is protected and marketplace policies provide incentives to innovate. Innovation environment is the climate created by government stewardship regimes, that protect public interest and support innovation.

Strategies Formulated to Overcome the Challenges.

\These are some of the strategies devised to overcome the challenges encountered while developing a KBE :

1. The knowledge Performance Challenge :

- Promote the use of broadband internet
- Utilization of ICT for education and teaching development
- Promote translation of books, journals from abroad
- Develop basic telecommunication infrastructure
- Reform the basic educational level to develop curriculum and teaching procedure that support the scientific thinking
- Promote the media role of ICT knowledge propagation

2. The skills Challenge :

- Develop information and knowledge for using in daily life and raising the quality of society
- Create incentive for researcher career
- Quality and service development
- Establish the excellency center
- Develop human resources in other fields that is concerned with ICT development.

3. The Innovation Environment Challenge :

- Develop software industry by government / private sector
- Make master plan for human resources development
- Promote test center for ICT product
- Promote investment in hardware industry by private sector
- Support the research work that can be applied to e-commerce industry
- Promote the use of ICT in the production process to the industrial sector
- Assign the ministry in charge for ICT planning, promoting, development and operation.
- Standardize the government database
- Efficiency and safely use of information network
- Government office development, including set up of e- Government

Phase 3: Indicators that Help Measure the Performance of the KBE

That which cannot be measured cannot be improved. So performance measurement constitute an important phase in the successful building of KBE. Following are the key factors, which need to be measured to evaluate the performance of KBE (OECD 1996):

1. Measuring knowledge inputs: Principal indicator being i) Expenditures on Research and Development (R&D) ; ii) Employment of engineers and technical personnel; iii) patents ; and iv) International balance of payments for technology.

2. Measuring knowledge stocks and flows :

- a. Indicators used to measure knowledge stock – annual R&D inputs
 - b. Indicators used to measures knowledge flows.
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- Embodied diffusion, or the introduction into production process of machinery , equipment and components that incorporate new technology ; and

- Disembodied diffusion, or the transmission of knowledge, technical expertise or technology in the form of patents, license or know – hows.

3. Measuring knowledge outputs: Principal indicators being -

- Estimate R&D intensity (ratio of R&D expenditures to gross output.)
- Estimate knowledge intensity (ratio of total week worked in an industry by workers with university degrees to gross output).
- Assessing social and private rates of return (Mansfield et al. 1977)
- Estimate rates of return of R&D

4. Measuring knowledge networks : Indicators being -

- The distribution of knowledge among universities, public research institutions and industry ; and
- The distribution of knowledge within a market between suppliers and users (Smith 1995)

5. Measuring knowledge and learning : Indicators being -

- Assessing social rates of return is to measure the impact of education expenditure and attainment levels in society at large on economic growth.
- Measuring private rates of return has tended to look at changes in human skills and competencies at the individual or firm level and the impacts on firm performance.

Does India Have the Potential to Transform from a Skill – based to KBE?

The ICT has already developed and successfully implemented in India but its growth has been limited to certain metropolitans and focal points of software parks. Uniform distribution of ICT has not yet been achieved in India. India already has many highly educated and qualified people who are making their mark, domestically or globally in the filed of engineering, IT and research and development. Furthermore, knowledge professionals from India have been always in demand compared to other developing nations. Figure clearly shows the distribution of knowledge professionals in Indian IT industry.

Some of the factors that distinguish Indian knowledge professionals from the workforce of the other developing nations are :

- English language proficiency
- Higher software development skills

Figure 3 Distribution of Workforce in Indian IT Industry

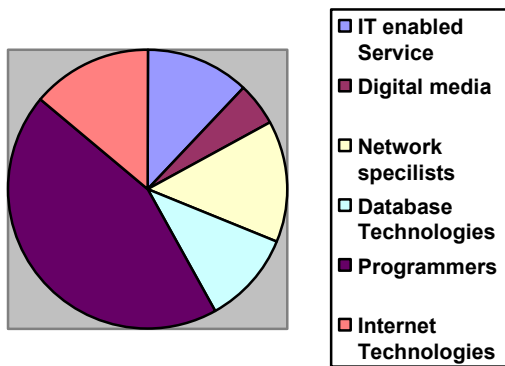


Table 1: India at a Glance				
Structure of Economy	1983	1993	2002	2003
Growth in %				
Manufacturing	16.3	16.1	15.6	15.6
Service	37.6	42.8	50.7	50.7
Average Annual Growth				
Manufacturing	6.1	6.0	6.5	6.9
Service	6.7	8.2	8.1	8.9
Source : World Bank 2005				

- Approved Technical qualifications
- Quality consciousness
- Globally connectivity
- Ability to work with multi – cultural teams

Table 1 clearly depicts growth in service sector over the past years. Marginal growth has been observed in the manufacturing sector compared to the gradual growth in the service sector.

Benefits of Developing KBE

These are some of the benefits of transforming from a skill – based to knowledge - based economy (Aggarwal 2002) :

1. Increased productivity
2. Reduced inventories
3. Electronic Commerce
4. Emergence of Small Manufacturing Enterprises
5. Low Transaction Costs
6. Shorter Product life cycles
7. Reduced marketing and distribution costs
8. Paperless office
9. Change in employment patterns:
 - More jobs in service sector
 - Demand for knowledge workers
 - Bridging the gender gap: More women in IT and related jobs, thereby reducing the traditional gender divide
 - Globalization of workforce : Corporations increasingly outsourcing their operations, hence, reduced concentration of workforce in urban areas
 - Tele – working : Emerging of mobile workforce, and location independent jobs
 - Non – regular employment: Rise in part – time employment.
 - Reduced routine work
 - Increased creativity and specialized work
 - Performance based evaluation
 - Crumbing of hierarchical personnel systems.

Knowledge Management in the Technological Era:

The traditional paradigm of information systems is based on seeking a consensual interpretation of information based on socially dictated norms or the mandate of the company bosses. This has resulted in the confusion between ‘knowledge’ and ‘information’. However knowledge and information are distinct entities!! While information generated by the computer systems is not a very rich carrier of human interpretation for potential action, ‘knowledge’ resides in the user’s subjective context of action based on that information. Hence, it may not be incorrect to state that knowledge resides in the user and not in the collection of information, a point made two decades ago by West Churchman, the leading thinker on information systems.

Karl Erik Sveiby, the author of *The New Organisational Wealth: Managing and Measuring Knowledge-based Assets*, contends that the confusion between ‘knowledge’ and ‘information’

has caused managers to sink billions of dollars in technology ventures that have yielded marginal results. He asserts that the business managers need to realize that unlike information, knowledge is embedded in people... and knowledge creation occurs in the process of social interaction. On a similar note, Ikujiro Nonaka, the renowned professor of knowledge, has emphasized that only human beings can take the central role in knowledge creation. He argues that computers are merely tools, however great their information processing capabilities may be. A recent Harvard Business Review special issue on Knowledge Management seems to lend credence to this point of view. This issue highlighted the need for constructive conflict in organizations that aspire to be leaders in innovation and creation of new knowledge.

Conclusion

Knowledge is clearly the primary source of wealth in the high – tech industries (e.g., the computer and software industries) and other knowledge – intensive industries (e.g., pharmaceuticals), but it is fast becoming the primary source of wealth in more traditional sectors of the economy as well (Stata 1989) It is estimated that knowledge now accounts for approximately three- fourths of the value – addition in the manufacturing sector (Stewart 1997). The knowledge in CMS is not the words on the page. Instead, the knowledge is gained via the processes and opportunities used to capture organizational knowledge. This is further enhanced by the CMS ability to support knowledge discovery via the use of metadata and deployment of effective navigation. Finally, it is the people aspects and not technology that are the sources of the knowledge. Hence, CMS serves as an effective enable for knowledge management activities within the organization. This paper presents a systematic approach for implementing Content Management System (CMS) in any organisation (manufacturing / service) with specific details, such as its needs, benefits, considerations for implementation, etc. The paper also explains the conceptual model of a CMS. As Liberalization, Globalisation and Privatization (LPG) is sure to provide the opportunities for the organizations to grow, Content Management system (CMS) would have the way to success with an efficient data management system. In this new era when BPO is becoming KPO (Knowledge Process Outsourcing), CMS has a significant contribution to make in the KBE, particularly in a country like India whose economy is directly tied to its knowledge capital. The paper highlights the challenges encountered in transformation from skill – based to knowledge – based economy along with strategies to overcome these challenges. Performance indicators have also been enumerated, so as to facilitate progress monitoring of the transformation into knowledge – based economy.

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