Total Knowledge Management (TKM): Enhancing Competitiveness Through Knowledge Management Systems*

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The idea of ‘knowledge’ is ancient, yet modern. It has found expression in many ways and forms. In Gita we find differentiation between vigyan or the empirical knowledge and gyan or the atmik or the knowledge of self. At the holistic level, Total Knowledge implies both vigyan and gyan. However, when we talk of ‘Total Knowledge Management’, we are looking at the management of knowledge at the self, society and enterprise level. It may be indicated that in the Western idiom, total knowledge has a restricted meaning in terms of only two components viz. codified knowledge and tacit knowledge. Total knowledge is a combination of the ‘explicit’ and the ‘tacit’. This definition of total knowledge is also at the vigyan level. For pragmatic reasons we restrict the idea of Total Knowledge to ‘vigyan’ level as indicated earlier. Accordingly the idea of ‘Total Knowledge Management’ deals with managing the “Total Knowledge” comprising the explicit and tacit knowledge. In the knowledge economy the competitive advantage of enterprises depends upon its Total Knowledge Management Systems and linking it up with strategic architecture. We provide some conceptual frameworks to understand the processes involved in Knowledge creation and development. Application of these ideas at the enterprise level to enhance enterprise competitiveness is then explored. Implications for the academia in its role in knowledge creation and development is also discussed.

Even within the Japanese framework, total knowledge has a similar notion and limitation. Nonaka and Takeuchi provide us the concepts of ‘explicit knowledge’ and ‘tacit knowledge’. Explicit knowledge is similar to the codified knowledge. Tacit knowledge as defined by Nonaka and Takeuchi is the “knowledge embedded in individual experience”. Nonaka and Takeuchi also provide us insights into the nature of interaction process between these two components of knowledge. Total knowledge is a combination of the ‘explicit’ and the ‘tacit’. This definition of total knowledge is also at the vigyan level. While the holistic idea of total knowledge must involve the vigyan and the gyan levels, for pragmatic reasons we restrict the idea of Total Knowledge to ‘vigyan’ level as indicated earlier. Accordingly the idea of ‘Total Knowledge Management’ deals with managing the “Total Knowledge” comprising the explicit and tacit knowledge. In the knowledge economy the competitive advantage of enterprises depends upon its Total Knowledge Management Systems and linking it up with strategic architecture.

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In the subsequent discussion in Part 1 we provide some conceptual frameworks to understand the processes involved in knowledge creation and development, in Part 2 we provide the application of these ideas at the enterprise level to enhance enterprise competitiveness and in Part 3 we explore the implications for the academia in its role in knowledge creation and development.

**Part 1**

**Frameworks of Knowledge Creation and Development**

In this section, we provide the following five frameworks to understand the knowledge building processes:

(i) A Taxonomy of Approaches to Knowledge Building.

(ii) Knowledge Generation Matrix.

(iii) The Wine and the Bottle Metaphor to Knowledge Building.

(iv) Wisdom Equation.

(v) The “Re”-see View of Knowledge Building

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**A Taxonomy of Approaches to Knowledge Building**

Sharma 3 provides a framework for various approaches to knowledge building. Taking a lead from Burrel and Morgan, he develops a matrix based on the belief in nature of reality, in terms of 'ordered' and 'not ordered' and the basis of knowledge creation in terms of objective and the subjective methods. Accordingly, this framework classifies various epistemological approaches in the following four categories:

1. **‘Ordered-Objective’ Approach** — This represents the ‘Newtonian world view’, wherein reality is considered as ordered, and this reality can be captured objectively. Till recently, this worldview dominated social sciences, in general, and management field, in particular.

2. **‘Ordered-Subjective’ Approach** — In this view the reality is considered as ordered, however, different patterns could be distilled by different persons. Thus, in this approach the basis of knowledge could be subjective. The phenomenological research is an illustration of this approach.

3. **‘Not Ordered-Objective’ Approach** — In this worldview the reality is considered as not-ordered. However the aim is to study it objectively. The recent developments in the theory of chaos, could be considered as illustration of this approach.

4. **‘Not Ordered-Subjective’ Approach** — In this worldview the reality is considered as not-ordered, and it could be experienced subjectively. The Eastern mysticism would fall in this approach of knowledge building.

All the four approaches to knowledge building can provide different insights, and therefore, are useful for increasing the existing stock of knowledge in social sciences and enterprise management. It may be indicated that this framework can also be extended to the well-known ideas of the ‘explicit’ and the ‘tacit’ knowledge. In this case, one side of the matrix would be based on explicit-tacit typology and the other side would be based on the objective and subjective ways of gaining insights for knowledge building. Thus, we have following four combinations:

1. **Objective-Explicit** (Knowledge is explicit in nature and has been gained through Objective methodology).

2. **Subjective-Explicit** (Knowledge is explicit in nature and has been gained through Subjective methodology).

3. **Objective-Tacit** (Knowledge is tacit in nature but has been gained through Objective methodology).

4. **Subjective-Tacit** (Knowledge is tacit in nature but has been gained through Subjective methodology).

We can also use the classification of quantitative and qualitative methodologies as a supplement to the objective-subjective classification. In the context of enterprises, all the four approaches are use-
ful in articulating the ideas about knowledge management.

Knowledge Generation Matrix

In the field of social sciences and management, knowledge is continuously generated at two levels viz. by the scholars and researchers and by the people in their day-to-day empirical context. We refer these two processes as knowledge generation by pundits and knowledge generation by people. Knowledge generation by people is based on their ‘empirical intelligence’ and it finds expression in popular metaphors, local proverbs and phrases. Knowledge generation by pundits is based on conceptualization in the form of analytical models, frameworks, and concepts. For the development of any discipline, a ‘tested’ body of knowledge is required. This is possible provided there are conceptual frameworks and analytical models. Knowledge generation by pundits follows this methodology.

In organizational context, the equivalent of knowledge generation by people is knowledge creation by practitioners and equivalent of knowledge generation by pundits is knowledge creation by scholars. Given this understanding of knowledge creation, there could be a four-fold classification of knowledge in the form of concepts and ideas:

1. Known to practitioners and known to scholars.
2. Known to practitioners and unknown to scholars.
3. Unknown to practitioners and known to scholars.
4. Unknown to practitioners and unknown to scholars.

This classification system could be presented in the form of a matrix somewhat similar to the analytical framework of ‘Johari Window’. We can call it ‘knowledge generation matrix’ or the ‘knowledge window’. This matrix is presented in Figure 1.

![Knowledge Generation Matrix](image)

Ideas known to practitioners and conceptualized by scholars find their way into standard textbook material. Ideas known to practitioners but not known to scholars are the ideas that are not taught at the Harvard Business School or any other management school. Ideas unknown to practitioners but known to scholars through their insights and subsequent conceptualization may be lying in scholarly journals inaccessible to practitioners. The ideas terrain that is unknown to practitioners and unknown to scholars represents the ‘black box’ and it offers new horizons for innovative thinking and creativity and has the greatest potential for paradigm breaking knowledge. Many times ideas inside this ‘black box’ could be available in the form of ‘received wisdom’, reflected in the intuitive insights of workers, customers, and others interacting with the organization. From their intuitive insights, new knowledge could be created. Herein lies the importance of knowledge generation by people based on their ‘empirical intelligence’. Indeed, the difference between knowledge generation by pundits resulting in creation of formal knowledge and knowledge generation by people needs to be appreciated. Thus the Total Knowledge concept should include the subaltern knowledge, i.e., knowledge residing in the heads of the people in the form of informal knowledge.

The Wine and The Bottle Metaphor to Knowledge Building

“Old wine in new bottles” is the most widely used expression. This indicates that the wine and the bottle metaphor is a useful idea to understand the process of knowledge building. On the basis of this
metaphor, we have the following four types of knowledge classification:

(1) Old wine in old bottle.
(2) Old wine in new bottle.
(3) New wine in old bottle.
(4) New wine in new bottle.

When presented in the matrix format, we get the wine-bottle matrix. 'Received Knowledge' in a discipline represents the old wine in old bottle, e.g., text-books. Old wine in new bottle implies certain modifications and re-formulations without a substantive change in the original premises. New wine in old bottles, implies presentation of new ideas in formats or metaphors known to people. For example, many times new ideas are explained using known metaphors. 'Arrow of Time' in Physics is an illustration of the same, wherein new concepts of 'time' are metaphorically communicated with a known metaphor of 'arrow'. New wine in new bottles implies new concepts and ideas are presented in new metaphors and new language. Feminism can be cited as a recent illustration, as it provided a radical worldview through new concepts, metaphors, and language. It may be observed that with lapse of time, new wine could become the old wine. For example, ideas of feminism have now settled and have become part of the old wine. Similar thing has happened to many other social movements and revolutions which were at one point of time, new wines in new bottles.

Paradigm shifts in knowledge management occur when new knowledge is presented in new bottles. The metaphor of 'Tree of Knowledge' by Maturana and Varela could provide us new insights, because at times ‘new wine’ could be prepared from the new shoots of ‘old vine’. Thus, ‘new wine’ could be from ‘old vines’ or old tree of knowledge as well as from ‘new vines’ or the new tree of knowledge. In this respect, many examples could be cited from the management field and social sciences. Even natural sciences offer many examples of knowledge creation from old and ancient sources. Parallels between quantum physics and Eastern mysticism offer us many such illustrations. In ‘Management Subhashitani’, this author has shown interesting parallels between many Sanskrit Subhashitani and informal knowledge available in popular metaphors and idioms with the formalized modern management concepts. It turns out that many modern management concepts were essentially ‘old wine’ in new bottle, i.e., English language.

In addition to the above, we could also have ‘re­efined wine in refined bottles’ wherein there is some improvement in both the ‘old wine’ and ‘old bottle’, though the improvement may not be radically new. In creating new wine in new bottles the language metaphors change and an entirely new language of concepts, ideas, and words could emerge. Words that do not find place in dictionary are created to articulate the description of the new wine in new bottles. The essence of new knowledge building lies in creation of such words and concepts.

It may be indicated that the wine-bottle matrix presented here has a parallel in the “meaning matrix” developed by Von Krogh et al. for “under­standing the language games, encompassing words, concepts and their meaning”. In the meaning matrix, meaning could be Traditional or New and words / concepts could be Traditional or New. Krogh et al use this framework to understand the ‘epistemology of globalizing firms’ in the form of language games they tend to engage in. In our view the wine-bottle matrix could also provide an understanding of the ‘epistemology of enterprises’ and contributions of the enterprises to knowledge building and the ‘language enrichment’. In ‘learning organizations’, Senge explains, there is a continuous production of words and concepts to define the new experiences. In view of this author, such organizations are not merely driven by ‘knowledge workers’ but are also influenced by ‘worker’s knowledge’. Thus the metaphor of ‘workers as knowledge centres’ provides the key to the development of ‘Organizational Knowledge’ (OK).
Wisdom Equation

The discussion so far leads us to many ways to knowledge creation. However, broadly speaking, knowledge generation could be achieved through two routes viz. the route of reason and the route of intuition. Both routes complement each other and the combined impact of the knowledge generation through reason and intuition is reflected in wisdom. This idea can be expressed in the form of ‘wisdom equation’ given below:

\[ W = R + I \]

wherein \( W \) stands for wisdom, \( R \) for reason and \( I \) for intuition and + is a mathematical operator. This equation represents the merger of the two routes to gain deeper understanding of reality around us.

Sharma\(^9\) in *Quantum Rope* provides several interpretations of the wisdom equation, however, the following interpretations are useful from the viewpoint of knowledge management:

1. Wisdom equation is a synthesis of reason and intuition. It suggests that these two play a complementary role in knowledge creation and ideas development.

2. Wisdom equation indicates that reality is ‘omnjective’, a term coined by Talbot\(^10\) to indicate fusion of objective and subjective, indicating knowledge is also omnjective in nature.

3. Wisdom equation indicates that Total Knowledge is sum of the explicit and tacit knowledge.

4. Wisdom equation is indicative of the knowledge generation from two sides of the brain, viz. the left and the right indicative of the rational and intuitive faculties leading to creation of explicit and tacit forms of knowledge.

Goswami and Goswami\(^11\) suggest ‘quantum integration’ of science and spirituality, which could be considered as another interpretation of the wisdom equation and the concept of ‘Total Knowledge’. Thus, wisdom equation not only helps us in understanding the idea of ‘Total Knowledge’ but also points to various ways of interpreting reality.

The "Re"-see View: ‘Normal Science’ and The ‘Re-see Way’*

Kuhn’s\(^12\) work on ‘Structure of Scientific Revolutions’ provided us an interesting idea viz. the idea of paradigm shift. His analysis of paradigm shifts in science also provided us a new outlook on science and its methodology. In creation of paradigm shifts, intuition has critical role to play. An anomaly provides a creativity trigger and thereby leading to direct perception of a new way of viewing the phenomenon. This opens a new door leading to a paradigm shift. Kuhn provides several examples of ideas that created paradigm shifts in science, thereby creating new revolutions in science.

The rishi route to reality or the rishi methodology, also represents the essence of paradigm shift. Hence, we re-interpret rishi methodology in modern context as Re-see methodology wherein a phenomenon is seen in a new perspective leading to new insights which can then be put to rigours of the scientific testing. In science, there are many such examples wherein the scientific discoveries have come via the intuitive or the re-see route. Indeed, many scientific discoveries have first appeared in dreams and subsequently were put to test through usual scientific methodology. Watson ‘saw’ the double helix in his dream and Kekule ‘saw’ benzene structure in his dream. Dimitri Mendeleev also said that he ‘saw’ the periodic table in his dream and wrote it down as soon as he woke up. Ramanujan became a ‘man who knew infinity’. Einstein imagined himself to be moving at the speed of light before formulating his theory of relativity. All these examples are illustrations of paradigm shifts through the “re”-see route to reality.

As the history of science shows, many times intuition is at the foundation for new paradigm shifts. Indeed, it could also be considered as primary foundation of science on which the super structure of science is built. This is because it opens new doors

*The idea of “Re”-see or the Rishi methodology has been developed by the author in his book, *Quantum Rope: Science, Mysticism and Management* (New Age International Publishers, New Delhi) 1999.
to viewing reality and thereby providing new explanations and new refinements through mathematical equations and formulations. While initial revelation could come through intuition the insights so achieved could then take the form of equations. Thus, scientific approach could also be viewed in terms of the following process:

Revelation / Intuition → Equation

There are many examples in science, indicating that many times ideas in science have emerged from intuition or the rishi route. The most interesting one is the similarity between the Kundalini structure and Watson's double helix discovery. One was discovered through the rishi route and the other through the dream route.

Thus, it can be said that rishi methodology is at the heart of scientific methodology. It is because of this reason, we could call Einstein as rishi-scientist and Shankara and Aurobindo as scientist-mystic. It may be indicated that 're'-see methodology creates ideas for the future, for which empirical evidence may or may not exist in the framework of the past and present. Indeed, empiricism has its limitations as it cannot verify the ideas of future, because ideas of future cannot be tested on the basis of empirical data of past and the present. They may only be tested in future, when future becomes the past. Hence, 're'-see methodology at times may sound like science fiction — a contradiction of terms science and fiction.

Part 2

Enterprise Knowledge Management: Knowledge of the Knowledge Domains

In Part 1, we presented five frameworks on knowledge creation and development. In this section we explore the implications of these frameworks for the corporate enterprises. It may be indicated that Krogh, et al' provide us the idea of 'Corporate Epistemology', which addresses itself to the core questions: "What is knowledge, how does it develop and what are the conditions to develop". Our frameworks presented in Part1, could also help the managers in development of 'Corporate Epistemology' as well as Enterprise Knowledge Management Systems through knowledge of the 'knowledge domains' of the business.

In the control system literature, the levels of control system framework of the managerial process have been identified by Anthony and Dearden13, viz. strategic planning, management control, and operational control. These could also be referred to as Strategic Thinking and Management, Management Planning and Control, and Operations Management in consonance with three levels of decision-making. These also constitute the three overlapping and interconnected knowledge domains of the Enterprise Knowledge Management Systems (EKMS).

Strategic thinking and management, management planning and control and operations management, all the three critical aspects of management process are inter-linked through information value chain and the knowledge value chain. Information value chain is not a physical entity but a 'virtual' entity that drives the physical entities of the business process. In consonance with three levels of managerial process, there are following two levels of Enterprise Knowledge Management Systems:

1) Intuitional Knowledge Systems.

2) Structured Knowledge Systems.

The strategic thinking and management, primarily uses the intuitive knowledge to create competitive advantage. In contrast to this in 'Management Planning and Control' and in 'Operations Management', there is a greater reliance on the structured knowledge system of the enterprise. The two together support the 'Information Value Chain' of the organization, as both kinds of knowledge systems bind the three levels of managerial process and lead to 'value amplification' in the 'total value chain' of the organization. The amplification effect of the strategic information reflected in strategic thinking and management could be phenomenal as it could lend to phenomenal changes in the business process. Fig-
Figure 2 — Three levels framework of managerial process and information value chain

The three sub-systems are also inter-linked through information value chain. The value-adding capacity of the information chain enhances the overall profitability of the enterprise. Hence the need for an understanding of the information value chain of the organization with a view to identifying the value additions through proper information. Information value chain also focuses our attention on the macro-micro void or the information gaps in the form of missing links between the corporate and field units. Since organizations are driven by information, they need to be supported by Business Information Grid (BIG) which, in turn, is based on the information value chain. In addition to Business Information Grid, functioning of the organization needs to be supported by its Business Knowledge Grid (BKG) that includes the intuitional knowledge system and structured knowledge system and relates to strategic thinking, management control and operations management. The Business Knowledge
Grid brings into sharp focus the knowledge domain of the concerned business segment. If an organization is in steel business, its Business Knowledge Grid would include the knowledge on steel making. Business Knowledge Grid of a tea company would include the art and science of tea making.

Given above understanding about the functioning of the enterprises, we can see the relevance of the five frameworks in enhancing the competitive advantage of enterprises through better Knowledge Management Systems. The taxonomy of knowledge building indicates the four approaches to understanding the functioning of enterprises. Strategic thinking implies looking at the enterprise and environment not only through the ‘objective-ordered’ cell but also through the ‘subjective-not ordered’ cell or the ‘subjective-tacit’ cell. Further, it also implies looking at the ideas that are neither known to practitioners nor known to researchers. These ideas may come from existing or potential customers and others who may be outside the enterprise boundaries. These are the ideas that could create ‘strategic shifts’ through paradigm shift in organization’s mind-set. At the strategic level, it is the “re”-see methodology that is useful in creating new strategic architecture in organization’s profile. Hence, Enterprise Knowledge Management implies application of Rishi methodology in conjunction with the information value chain to enhance the value addition capabilities of enterprises and thereby improve the competitive advantage. For ‘strategic intent’, see Hamel and Prahlad, to find an expression, Rishi (Re-see) route to reality could offer a new insight.

Part 3
Implications for Academia and Research Organizations

Having discussed the five frameworks of knowledge building, their implications for enterprise knowledge management, we explore the implications for the ‘knowledge industry’, i.e., academia and research organizations. In Figure 3 we present a four steps framework of knowledge building in knowledge industry. In this framework, knowledge building exercise is conceptualized in four steps viz. routine type of knowledge building, analytical type of knowledge building, creative and path finding knowledge building, and paradigm breaking knowledge building. In this diagram, we also have a fifth step, transcending all other steps. This is the Rishi or the re-see step metaphorically represented by Buddha or the enlightened one. As one achieves the enlightenment, ideas of the future easily flow through one’s mind. In the field of science, Ramanujan, Einstein, Stephen Hawking among others represent this state of enlightenment.

In the routine type approach to knowledge building, there is reproduction of the ‘received knowledge’ through para-phrasing methodology and empirical repetitions. It is a typical cook-book or the recipe approach of knowledge compilation and reproduction. The analytical approach to knowledge building primarily aims at puzzle solving within a known paradigm. Creative and pathfinding knowledge building aims at creation of new and novel ideas and the paradigm breaking knowledge building aims at radically new perspectives. Table 1 presents distinguishing characteristics of these four steps to knowledge building. It may be indicated that the paradigm breaking knowledge building occurs by seeing through the anomalies as well as through subjective insights by “looking at the spaces that no one has looked before”. Original contributions to knowledge building come essentially through these methods. They open new doors and windows for further development of the concepts and ideas.

Conclusion

To sum up, in this paper we provide five conceptual frameworks for enhancing our understanding of the ‘Total Knowledge’ and ‘Total Knowledge Management’. We explore their implications for Enterprise Knowledge Management to improve competitiveness of enterprises. We also explore the implications for knowledge building in the knowl-
Table 1—Key aspects of the four steps typology of knowledge building in knowledge industry

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<th>Routine type</th>
<th>Analytical</th>
<th>Creative and path-finding</th>
<th>Paradigm breaking</th>
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<tr>
<td>Reproduction of</td>
<td>Case studies</td>
<td>Creation of mini-paradigms</td>
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<td>Compilation of known</td>
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<td>Para-phrasing and</td>
<td>'Puzzle solving' within a paradigm*</td>
<td>Creation of a new 'tributary' of knowledge</td>
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<td>Knowledge compilation and reproduction</td>
<td>Knowledge creation and knowledge building</td>
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* In Kuhn's sense
knowledge industry, because there is always a close interaction between the industry and the academia. We conclude by stating that 'corporate epistemology' should include in its repertoire the "re"-see methodology for charting out new strategic paths. This could enhance their strategic gearing capacity resulting in enhanced competitiveness.

References:
5 Maturana H & Varela F J, The Tree of Knowledge (M A Shambhala, Boston) 1987.

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