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Organizational Knowledge and Knowledge Management - A New Framework

Atul Sen* 🆔

Defence Research & Development Laboratory, Defence R&D organisation, Ministry of Defence, Hyderabad, India

Abstract

The transition of firms from the Resource-based view (RBV) to the Knowledge-based view (KBV) where knowledge is viewed as the principal resource for value creation and sustainable competitive advantage created a renewed interest among researchers to understand knowledge per se, and the concept of organizational knowledge. This interest has further been fueled by the advent of the concept of Knowledge Management (KM). With some discussions on knowledge, this paper presents a new framework for organizational knowledge and the knowledge flow within the firm. The author has pointed out that most of the research on KM has been with the firm as a business organization (where the focus is on short-term return on investment) and that is the reason many KM initiatives often stop at IT-based initiatives or fail, and fuel the fear that KM is simply just another fad. Many KM models and frameworks present KM best practices without addressing the contextual differences between organizations. In this paper, the author has presented a knowledge perspective of four different types of organizations based on their knowledge manipulation activities and suggests that KM programs need to be custom designed to cater to the different needs of the different types of organizations. The author has also suggested a new KM framework based on the dynamics of knowledge that organizations are facing today. The author developed the two frameworks during the implementation of KM initiatives at the Defence Research & Development Laboratory, Hyderabad, a premier research institution under the Ministry of Defence, Government of India, during the years 1999 to 2003.

Keywords

Knowledge, Organisational Knowledge, Social knowledge, Knowledge Management Strategies, Knowledge Dynamics

1. Introduction

The resource-based view (RBV) focuses on resources and capabilities of the firm and states that differences in the performance of different firms are due to successful organizations possessing valuable resources that others do not have [1-5]. The knowledge-based view (KBV) of the firm is an extension of the resource-based view that states that the most important resource of the firm is knowledge and not the conventional production factors [6-8]. Here, knowledge is considered to be a special strategic resource that does not depreciate in the way traditional economic productive factors do. The nature of most of the knowledge-based resources is mainly intangible and dynamic. Knowledge resources are particularly important to ensure that competitive advantages are sustainable, as these resources are difficult to imitate. They are the foundation for sustainable differentiation [9, 10]. Knowledge-based capabilities are considered to be the most

strategically important ones to create and sustain competitive advantage [11]. Thus, the collective knowledge residing in the minds of an organization's employees, customers, and vendors, is viewed as the most vital resource of today's organizations. Learning how to manage this organizational knowledge therefore may produce many benefits, including leveraging core business competencies, accelerating innovation, improving cycle time, strengthening organizational commitment, and thus building sustainable competitive advantage [12, 13]. As a result, Knowledge Management (KM) became one of the most studied topics during the last three decades. KM is being viewed as an increasingly important field of study that promotes the creation, capture, sharing, application, and storage of organizational knowledge. Kostas [14] opines that the complexity behind KM is partially caused by the challenges in defining knowledge itself. This view created a renewed interest in understanding 'Knowledge'. The author has briefly discussed the concept of knowledge, based on his previous work [15, 16], in sections 2.0 and 3.0.

Most of the research on organizational knowledge refers to it as intellectual capital (IC) [17] or knowledge assets of the organization [18]. According to Nonaka and Toyama [19], *"Knowledge assets are not just the knowledge already created, such as know-how, patents, technologies, or brands, but also include the knowledge to create, such as the organizational capability to innovate. Although current views on knowledge assets tend to focus on the former because they are easier to measure and deal with, it is the later that need more attention because they are the source of new knowledge to be created, and therefore a source of the future value of the firm"*. Schiuma [20] has discussed this subject in great detail. IC consists of three types of intellectual capital: human capital (the knowledge of employees), relational capital (the knowledge of vendors, suppliers, customers, other stakeholders, and brand image), and structural capital (the knowledge residing in the explicit knowledge assets and infrastructure and in the intangible knowledge assets of the organization such as vision, mission, policies, processes, routines, norms and culture of the organization. Although intangible knowledge assets are difficult to be evaluated in financial numbers, the concept of IC measures the entire knowledge in financial terms, and that is why the word knowledge is replaced by capital. The author has proposed a new framework for organizational knowledge and its growth based on the knowledge flow within the organization. This framework has been discussed in section 4.0.

The author has pointed out that most of the research on KM has been with the firm as a business organization (where the focus is on short-term return on investment) and that is the reason many KM initiatives often stop at IT-based KM initiatives (where results are visible in the short term) or fail and create an impression that KM is simply just another fad. Also, most of the KM models and frameworks present KM best practices without addressing the contextual differences between organizations. To account for these contextual differ-

ences, several researchers have emphasized that KM models and frameworks need to shift their focus from best practice to best-fit approaches [21]. In this context, the author has presented a knowledge perspective of organizations by dividing organizations into four different types of organizations based on their knowledge manipulation activities. This has been discussed in section 5.0. The author further suggests that KM programs need to be custom designed to cater different needs of different types of organizations.

Alavi & Leidner [22] opine that the different views of knowledge lead to different perceptions of knowledge management. The view of knowledge as an object or information suggests a perspective of knowledge management that focuses on building and managing knowledge stocks [23, 24]. Viewing knowledge as a process implies a focus on the knowledge flow and processes of creation, sharing, and distribution of knowledge [25]. The view of knowledge as a capability suggests a knowledge management perspective centered on building core competencies, understanding the strategic advantage of know-how, and the creation of intellectual capital [26, 27].

Heisig [28] identified more than 160 KM models and frameworks from published KM literature and analyzed these models and frameworks to standardize and consolidate the wide range of diffused KM terms and concepts. He discovered six KM processes that KM models and frameworks use most frequently. They are 'Create', 'Identify', 'Share', 'Acquire', 'Use', and 'Store'. Lai and Graham [29] have split the KM processes into two blocks. They grouped creation, acquisition, and utilization processes under 'Knowledge Seeking' and transfer, sharing, storage, and refinement processes under 'Information Management'.

The author has suggested a KM framework based on the dynamics of knowledge that organizations are facing today. The author divides organizational knowledge into four categories as a 2X2 matrix. He further notes that KM programs must address the handling of all four types of organizational knowledge, suggested in the KM framework, for leveraging the full potential of KM.

The author developed the two frameworks during the implementation of KM initiatives at the Defence Research & Development Laboratory, Hyderabad, a premier research institution under the Ministry of Defence, Government of India, during the years 1999 to 2003.

2. Knowledge

Since Plato's time, several thinkers and researchers have tried to define knowledge [30]. However, defining knowledge in a non-abstract and non-sweeping way is extremely difficult. Knowledge easily becomes everything and nothing.

Polanyi [31] explained that all knowledge acquired by an individual is personal knowledge since it is stored in the individual's mind and remains implicit. This personal knowledge can be classified into two categories - Explicit

knowledge and Tacit knowledge. Tacit knowledge is that part of knowledge that remains within the human mind. It is challenging to articulate this knowledge and hence is difficult to capture in hard form. This knowledge develops over a long period and is proprietary to individuals. Problem-solving skills, expertise, belief, intuition, empathy, attitudes, and perceptions are a few examples of tacit knowledge. This is why sometimes, individuals can perform actions without being able to explain them, and they can explain actions without being able to perform them. Explicit knowledge [32] is that part of human knowledge that is easily articulated (codified) and converted into hard forms such as reports, books, manuals, engineering drawings, process sheets, etc. This knowledge can be easily captured, stored, and disseminated efficiently using the latest information technology tools. If properly managed, this knowledge help organizations enhance their product quality and productivity.

A similar typology was introduced by Spender [33, 34], who differentiated between implicit knowledge (produced through action) and explicit knowledge (produced through communication). Li and Gao [35] further discussed different types of knowledge and classified them depending on their degree of codifiability. Implicit knowledge lies in between explicit and tacit knowledge in terms of codifiability.

The author defined Knowledge in his earlier paper as the connectivity (relationship) between two or more Information points in an N-dimensional conscious mind. The author, based on his definition of knowledge [15] expands on Polanyi's concept and gives a reason as to why tacit knowledge cannot be articulated. He suggests that while information points are easy to be articulated in explicit form, connectivity among information points (knowledge) is challenging to express. This is because knowledge arises from interaction among two or more information points. To articulate the connectivity (knowledge), we need first to explain the context (all dimensions of the context) of interconnected information points. Larger the connectivity among information points, greater is the difficulty in its explicit articulation giving rise to higher tacit nature.

As per the author, information points that have a limited number of context dimensions and that are connected with only a few other information points can be partly expressed in explicit form through research, analysis, and imagination. Nonaka and Takeuchi [32] explained this as the conversion of tacit knowledge into explicit knowledge. The author, however, classifies the knowledge with limited connectivity as implicit knowledge as suggested by Spender [33]. Scientific and technical knowledge falls under this category. This is the knowledge from observations and interactions with nature and natural phenomena and is based on scientific queries. Most scientific studies are made on two or three dimensions at a time, so they can be explained in explicit form in relatively easier manner. However this knowledge cannot be understood without understanding its full context and background. That is why this knowledge is likely to be understood only by domain experts. Scientific theories, mathematical formulae, engineering drawings, and technical manuals are a few examples of implicit knowledge expressed in explicit form. The non-explicit part of implicit knowledge is in tacit form and results in domain expertise.

These observations are also similar to structural knowledge, as suggested by Jonassen, et.al. [36]. Although, Jonassen et al. suggested implicit knowledge as purely explicit knowledge, empirical findings indicate that structural knowledge can also be non-explicit [37]. The author's explanation suggests the same. Rata [38] further categorized tacit knowledge into two categories: disciplinary knowledge and social knowledge. Disciplinary knowledge includes scientific and technological knowledge referred as domain knowledge in this paper.

Thus, the author divides the tacit dimension of knowledge suggested by Polanyi [39] and Rata [38] into three parts:

1) Part of implicit knowledge that can be converted into explicit form through research and analysis, in a specific subject domain.
2) Part of implicit knowledge remains with the individuals in tacit form and results in expertise in a specific subject domain.
3) The other part of tacit knowledge exists due to the social observations and interaction of the individual with society and the environment. The author calls this knowledge as social knowledge. Over time, individuals develop immense knowledge about themselves, their environment, social relationships, and social groups. This knowledge guides the responses of the people they interact in everyday life.

This division of knowledge has been further explained with the help of a Venn diagram in Figure 1.
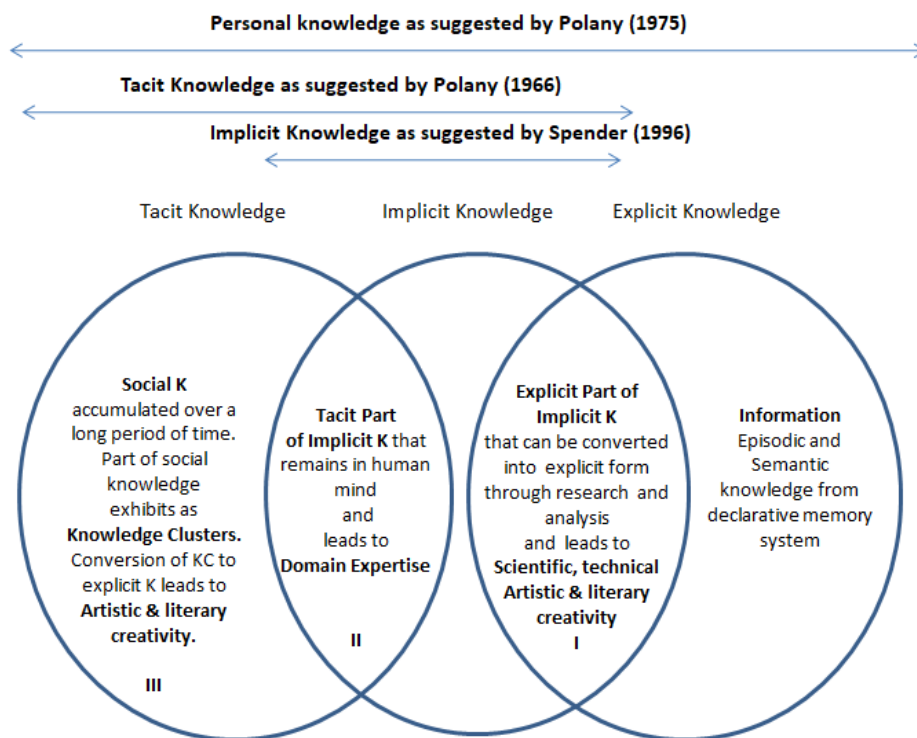
Figure 1. Division of Knowledge [16].

3. Social Knowledge and Knowledge Clusters

Social knowledge refers to the ability to analyze and reason out social situations in relation to social rules which are essential for the development of social skills and social behavior. This plays a crucial role in the understanding of how the world is organized and regulated. The correct understanding and judgment of one's own and others' behavior influence the selection of the behavioral response to a situation. Although knowledge in any form is the result of social interactions, observations, and learning experiences, scientific and technical knowledge is very different from social knowledge. While, scientific and technical knowledge can be verified by scientific reasoning, sound explanations, and satisfaction of certain criteria as scientific truth while most of the social knowledge is poorly understood, lacks formal explanation, and is deficient in scientific rigor. The main reason behind this difference is the characteristics of the acquisition of two types of knowledge. While scientific and technical observations are related to natural systems and natural phenomena, and hence are repeatable, social observations are made on individuals and social systems which are not exactly repeatable. The author provides an explanation for this. The context dimensions in the case of scientific and technical knowledge are limited, (usually two or three dimensions) and remain con-

stant during repeated observations, while in the case of social interactions, context dimensions are plenty and keep on changing in repeated observations. This results in different observations and experiences made in different interactions even with the same social object/system.

The concept of knowledge clusters was proposed by the author in his earlier work "Revisiting the Concept of Knowledge" [15] and further elaborated in his work "K(OIM) - A New Model of Creativity based on the concept of Knowledge Clusters" [16].

The third bucket of tacit knowledge (as mentioned earlier) referred to as social knowledge, can be further divided into two parts. One part is due to our interactions with individuals and society in day to day life, while the other part is due to our continuous interaction with our immediate social environment. Here, data is accumulated by the five senses on varied context dimensions over a long period of time. Because of the large number of observations and many context dimensions, the connectivity among these information points appear as clusters. The author defines them as 'Knowledge Clusters (KC)' [15, 16]. These clusters exhibit attractive and repulsive forces on all cognitive processes and are responsible for the formation of perception, attitude, values, emotions, habits, intuition, beliefs, and other human traits. These clusters also give rise to barriers and inhibit creativity.

The three most important characteristics of knowledge clusters are as follows:

1) Knowledge Clusters consist of social knowledge and

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exhibit attractive and repulsive forces on incoming data and information points. As a result, this incoming data and information get corrupted. This raises the question of the authenticity of the knowledge generated. If data and information used to create knowledge are corrupted, then the knowledge generated is also corrupted or biased. Thus, in the presence of strong knowledge clusters, one cannot acquire true knowledge. Knowledge clusters also affect the entire cognitive process. The intensity and structure of knowledge clusters are usually different in different individuals.

2) Absence of knowledge clusters or controlled knowledge clusters enable one to see the true knowledge without distortions. This result in high creativity and other positive human attributes such as independence of judgment, self-confidence, aesthetic orientation, risk-taking approach, openness to experience, tolerance to ambiguity,

ability to handle complexity, drive, problem sensitivity, flexibility, the ability to analyze, synthesize, evaluate, and reorganize information, and more.

3) Knowledge clusters can be controlled and their effect can be reduced by a conscious mind and people can be trained for it.

4. Framework for Organizational Knowledge

Sen, Atul. et. al. [40] developed the framework for organizational knowledge while implementing knowledge management at the Defence Research & Development Laboratory (DRDL), Hyderabad, a premier research laboratory under the Ministry of Defence, Government of India.
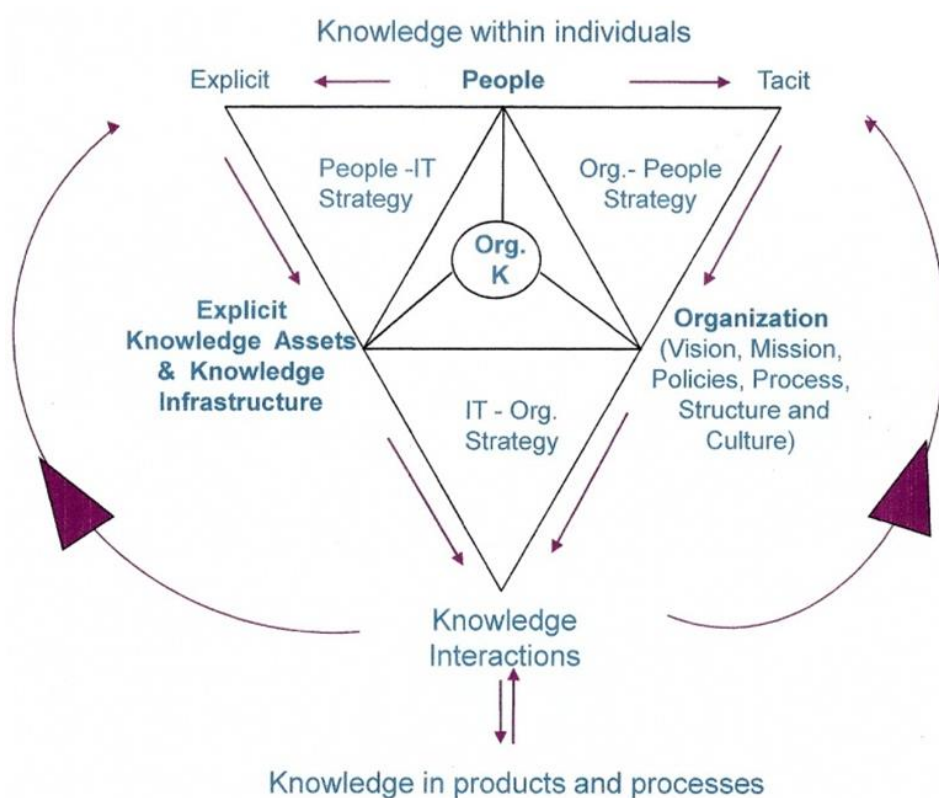

Figure 2. Framework for Organizational Knowledge.

The Figure 2 shows that the entire organizational knowledge can be found in three regions in the organization. Firstly, it is with the people (employees, vendors, suppliers, and customers), in the form of explicit knowledge and tacit knowledge. The second place where the organizational knowledge lies in embedded form is in the organization's vision, mission, policies, processes, structure, culture, and history, which creates an organizational working environment. This form of knowledge is intangible and diffused. The third

place where organizational knowledge is found is in the organization's explicit knowledge assets and knowledge infrastructure. The three buckets have been shown by the nodes of the internal triangle. The big, inverted triangle shows the knowledge flow and the approach for the management of knowledge. The explicit knowledge of the people can be efficiently captured through the knowledge infrastructure and can be converted into explicit knowledge assets which provide different competencies to the organization. The tacit

knowledge of the people can only be managed through the organization's environment which is created through vision, mission, policies, processes, norms, structure, and organizational culture. If the vision and mission of the organization are challenging, people are motivated to interact and share their knowledge resources provided policies and processes of the organization are conducive. Organizational structure and culture play an important role in accelerating the tacit knowledge flow in the organization. Knowledge grows when people's explicit knowledge flowing through knowledge infrastructure (IT and non-IT based infrastructure) and the tacit knowledge flowing through the organizational environment interacts on interaction platforms [41, 42], the third node of the inverted triangle. Through these interactions, based on the SECI model [43], knowledge gets into the products, processes and services of the organisation. The explicit and tacit knowledge of the people and the organization's processes, policies, and culture also get improved /updated with this knowledge flow and rise to higher levels. This cycle of knowledge growth continues perpetually and provides sustainable competitive advantage to the organizations. Thus, knowledge management's first mandate is to create enablers and remove barriers to this knowledge flow.

People-intensive organizations, such as research or service organizations, where processes are flexible and tacit knowledge plays a dominant role, need to follow Organization-People (Personalization) KM strategy. Organizations, where processes are well-defined and repetitive in nature such as production organizations, may follow People-IT (codification) KM strategy. Organizations with highly automated and well-defined processes, where human intervention is minimal, may follow an IT-Organization KM strategy. Deployments of ERP and IT-based KM systems fall under this strategy. In most cases, a KM strategy has to be custom designed with a mix of all the three strategies based on the nature of work performed by the organizations.

5. Knowledge Perspective of Organisations

Knowledge-based theory of the firm considers organization exists to create, transfer and transform knowledge into a competitive advantage for the organization [44]. During all these activities, organizations use prior knowledge to create value. In the process, they also produce new knowledge to improve the existing processes [34]. The author in the present paper extends the idea of the firms to a value chain of knowledge with four different types of organizations.

Figure 3 shows a typical knowledge value chain of the organizations for creation of value by different organizations as proposed by the author.

Block I of Figure 3 represents the scientific organizations involved with the activity of knowledge discovery from nature through scientific quarries, experimentation, and analysis. This is simply basic research where a scientist discovers knowledge through observing nature. The creation of scientific data is also part of this basic research. Mainly universities and fundamental research institutions are involved in this type of activity. This knowledge has little or no direct utility for the society aside from quenching the inherent thirst of human beings for knowing things. However, this knowledge is critical as it provides the seeds for technological innovations. Usually, these organizations are funded by the government, and the value generated is measured by peer groups.

Block II represents the activity of knowing the behavior of a particular scientific phenomenon in detail (applied research) and converting this knowledge into a form (technology) that could be useful for humankind in one or more ways. This is the conversion of scientific knowledge to technical knowledge. This form of knowledge is also not very useful to masses in day-to-day activities. Hence, there is a need for this knowledge to be converted into a user-friendly product by integrating several technologies through knowledge integration. This integration is represented by Block III in the Figure 3. Product development is aimed to meet a particular need of society and hence the concept of customer emerges at this stage. Here the knowledge of human needs, human behavior, and the society (market segment) is very important for developing user-friendly products. Strong interaction with the human system to capture their knowledge (needs and behavior) is essential at this stage. Block I, II, and a part of Block III organizations typically fall under the category of R&D organizations.
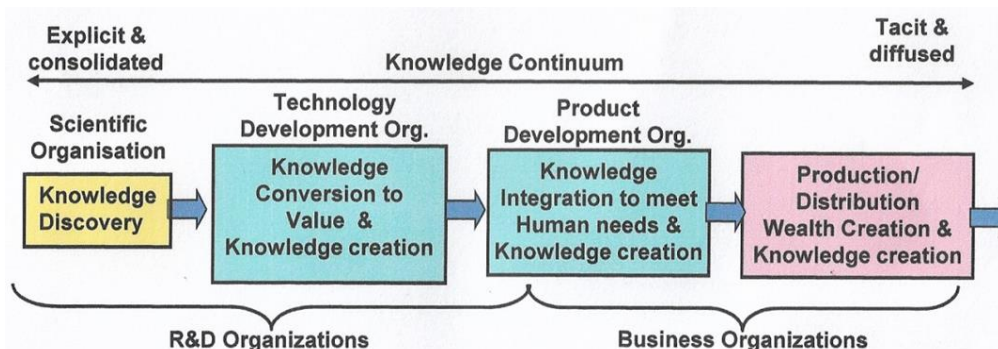

Figure 3. Knowledge value chain of Organisations.

Once a product or service is developed, it needs to be produced in volumes and distributed to the user to maximize the value generated through this value chain. At this stage, the concept of the customer becomes much stronger. This activity is represented by Block-IV and these organizations are termed as business organizations. Business organizations measure the total value created by the organisation as total revenue generated or the societal benefit created by the firm. Thus, the measurement of value at this stage is relatively easy and precise. It is important to note that this measurement of value happens only at the end of the value chain. The value created by other three types of organizations, called R&D organizations, is usually measured in intangible forms which are subjective and hence difficult to measure.

The sustainable competitive advantage of the organization depends upon its ability to use and re-use the new knowledge generated during the process of value creation. It is emphasized that since the knowledge inputs and outputs for each type of organisation are different, the organization structure, the type of human resource, the culture, values, and priorities of the corresponding organizations are different. Recently a new concept of the knowledge organizations has also emerged where knowledge itself is packaged in the form of a product and is sold directly to customers without involving production organizations.

6. The Dynamics of Knowledge- A New Knowledge Management Framework

As per the competence-based view, knowledge assets can be interpreted as the competence building and affecting organizational capabilities that in turn define the abilities and the capacity of an organization. For organizations to be successful, they must take care of and manage their knowledge domains by designing and implementing knowledge assets management initiative [45, 46].

The dynamic nature of knowledge assets has been discussed by few researchers, but the concept of knowledge dynamics suffers from having many interpretations [20, 42]. Bratianu [47] has made a beautiful semantic analysis of the multiple meanings assigned to knowledge dynamics.

In the present context, the author has treated knowledge dynamics as varying patterns of different types of knowledge within an organization. The author suggests that the dynamics of organizational knowledge in recent years is also one of the most important reasons for knowledge management in today's organizations.

The author divides organizational knowledge into four categories (2X2 matrix) as shown in Figure 4. The horizontal axis represents explicit and tacit knowledge, while the vertical axis represents domain knowledge and social knowledge. These four categories of knowledge i.e. the explicit-domain knowledge, the tacit-domain knowledge, the explicit-social knowledge, and the tacit-social knowledge have different dynamics in the context of the changing world business environment.

The author argues that organizations primarily perform two types of tasks. First, they create value for the target customers and second, they transact value to these customers. Creation of value requires both domain knowledge in the area of value creation as well as social knowledge, while the transaction of value to the customer needs more of social knowledge.

The domain-explicit knowledge (Cell-I) provides competencies for the value-creation process of the organization. This consists of explicit knowledge assets and knowledge infrastructure that includes product technology knowledge as well. This knowledge is built by converting internal as well as external tacit knowledge into explicit intellectual assets so that it can be retained and used by the organization whenever required. As per the proposed framework, continuous building of such assets and making them available to the organization for use and reuse is the first job of knowledge Management. Due to the high emphasis on scientific and technological development around the world, this knowledge is currently growing at a very fast pace, and need to be managed efficiently by organizations to keep pace with the latest technology.

The domain-tacit knowledge (Cell-II) is essentially the tacit part of implicit knowledge which leads to expertise [16]. This organizational knowledge is developed by individuals over a long period of time while working in a specific subject domain. This also includes vendors, suppliers, customers, and competitors' knowledge to the extent available to the organization. Without this knowledge, domain-explicit knowledge is of little use as only the people with domain-tacit knowledge can create and use domain–explicit knowledge efficiently. Being tacit in nature, employees carry most of this knowledge with them while leaving the organization. During the late eighties, when the concept of lean and thin organizations was getting popular, management observed that there was a substantial fall in the number of innovations in the firm. This happened due to the forced retirement of old and experienced employees who were rich with domain-tacit knowledge and hence organizations could not use domain-explicit knowledge efficiently. Lately, this knowledge is depleting very fast in the organizations due to high turnover of employees and the small life cycle of products and technologies that result in faster obsolescence of the manpower. So, the second job of KM is to replenish this knowledge in desired subject domains and acquire new knowledge in future technology domains faster than competitors.

Cell-III consists of social-explicit knowledge, such as organizational processes, structure, govt. regulations, consumer needs, market behavior, competition, etc. within and outside the organization. In recent times this knowledge has been changing at a remarkably fast pace. Markets, technologies, consumer needs, and government policies are evolving continuously. This knowledge is mainly required for doing

business i.e. transacting value to the customer. Changes usually bring opportunities and managing this knowledge efficiently not only keeps the organization alert to upcoming opportunities but also leads to reduced transaction costs and higher customer satisfaction. This is the third mandate of knowledge management.
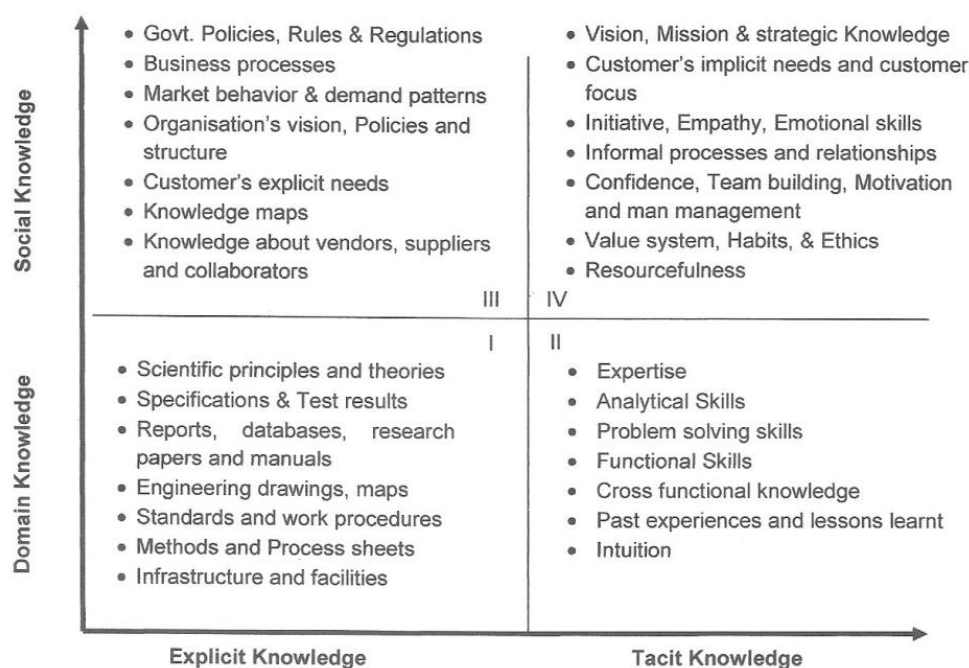

Figure 4. Knowledge in organizations.

Finally, the Cell-IV knowledge represents the Social-Tacit knowledge. Looking closely at this set of knowledge, they are nothing but managerial and leadership traits and skills. The author introduced the concept of knowledge clusters in his earlier work [15, 16] and explained the same in section 3.0 in the present paper. These knowledge clusters affect the entire human cognitive processes and are responsible for the formation of habits, attitudes, perceptions, value systems, beliefs, emotions, motivation, and several other traits in individuals. Creativity, organizational vision, emotional skills and communication skills, risk-taking, team building, man management, managing internal and external relationships, understanding market trends, understanding customer's implicit needs, and many other traits are outcomes of the ability of individuals to control the knowledge clusters. These traits are essential for creating, developing, and operationalizing the organization. Due to significantly short technology life cycles, today's organizations need to work in the future and continuously create new products and services in the minimum possible time. This is done under immense time pressures in order to lead the markets. Without this set of individual traits and skills (that broadly fall under leadership skills), it is impossible for organizations to survive in today's business environment. Although this knowledge had always been important for personal success, recently this knowledge has become necessary for even the very survival of the organizations. That is why; developing leaders to build learning or-

ganizations has been suggested as one of the most important tasks of KM [48].

Holasapple and Joshi [49] define tacit knowledge-based activities (Cell- II and IV) as knowledge manipulation activities that operate on knowledge resources to create value for the organizations. They further state that extent to which the participant's knowledge (Cell-I and II) is available to the organization as an organizational resource depends heavily on the managerial influences (Cell- IV).

The proposed knowledge management framework suggests organizations to design their knowledge management initiatives to handle the dynamics of all four types of knowledge according to their requirements.

Different types of organizations, as explained in section 5.0, have different knowledge management requirements. For example, scientific organizations do not deal with customers, markets, revenue, targets, and time pressures. As such, KM needs in these organizations are minimal. A good IT platform to discuss with domain experts and access to internal and external domain-explicit knowledge (cell-I) could be good enough. Technology development and product development organizations are innovation-driven organizations. A high degree of creativity, risk-taking, and the ability to work in the future, in a highly challenging environment, under extensive time pressures are the typical characteristics of these organizations. Technology development organizations employ highly qualified domain experts, rich with domain explicit

and tacit knowledge (Cell-I &II); hence their KM practices need to be different than product development organizations that employ more creative and social knowledge-rich manpower. Therefore, technology development organizations need to manage domain explicit and domain tacit knowledge (cell-I & II) much more than social explicit knowledge while product development organizations need efficient management of social-explicit knowledge (Cell- III) as well. Production organizations also need to manage more of social- ex-

plicit knowledge as they deal with customers, suppliers, and vendors. Of course, the management of social-tacit knowledge i.e. managerial and leadership knowledge (cell-IV) is a must for all three types of organizations. Table 1 summarizes the KM practices for managing different types of knowledge. Depending on the need of the particular organization, a specific knowledge management program can be designed with suitable KM practices given in Table 1.

Table 1. KM Practices for managing different types of knowledge.

Cell No.	Type of Knowledge	Dynamics of Knowledge	Source of knowledge	Action required	KM practices
I.	Domain-Explicit Knowledge	Changing very fast	1) Internal to Org. 2) External to Org.	1) Document K 2) Share K among employees 3) Store K for reuse 4) Identify K- gaps and acquire necessary K	1) Encourage documentation 2) Organisation Intranet with portals a. Knowledge bases b. Best practices c. Lessons learnt d. Document Management system e. Internal idea recognition system f. Solution board g. Self-profile system for employees and partners h. Technology discussion forums i. Automated Committee formation system. 3) Create recognition and incentive programs for sharing K 4) Patent search 5) Organise and participate in Seminars & Symposium 6) Acquire Patents and Infrastructure 7) Minute innovative content
II.	Domain-Tacit Knowledge	Depleting very fast	1) Employees K 2) Partners, suppliers and vendors K 3) Customer K	1) Capture-K	1) Mentorship program 2) On the job training 3) e-learning with video interactions 4) Participation in review meetings 5) Encourage Book writing by senior professionals. 6) Encourage informal interactions. 7) Apprenticeship programs 8) Succession planning 9) Collaborative projects. 10) Exchange programs. 11) Surveys and feed backs 12) Technology demonstration
III.	Social-Explicit Knowledge	Changing very fast	Employees knowledge	Build and renew K	1) Frequent Trainings in govt. rules, business processes and HR. 2) Interaction with customers and other external agencies. 3) Job rotation and Exit interview 4) Open forums

Cell No.	Type of Knowledge	Dynamics of Knowledge	Source of knowledge	Action required	KM practices
IV.	Social-Tacit Knowledge	Essential for survival of today's organisations	Employees Leadership Knowledge	Build and retain Leadership	1) Identification of potential leaders at an early stage. 2) Leadership development programs. 3) 360 degree soft skills evaluation 4) Succession planning. 5) Mentorship

7. Conclusion

In this paper, the author has presented three new concepts. They are related to organizational knowledge, the knowledge value chain of the organizations, and a new KM framework. The first one is a unique framework for organizational knowledge and knowledge flow within the organization. The author suggests that people's (employees, vendors, suppliers, and customers) explicit and tacit knowledge flows within the organization through interactions. Through interactions, only new knowledge goes into products and services. This knowledge flow continues and enriches organizational knowledge perpetually. The second concept is about a knowledge value chain of four different types of organizations that create and manipulate knowledge in different ways. KM requirements of each type of organization are different because of the nature of knowledge and its manipulation methods. The third one is a framework for managing knowledge by proposing a 2x2 matrix for organizational knowledge. These four types of knowledge have different dynamics in today's organizations and are required in different propositions by the four types of organizations. While domain-explicit knowledge, which is increasing very fast can easily be managed by information technology tools, the management of domain tacit knowledge which happens to deplete very fast these days, needs a human-centric initiatives to manage it. The social-explicit knowledge which is changing at a very fast speed as well and requires continuous learning from the internal and external social environment to keep the organization updated. Last, but not the least, social-tacit knowledge (which is mainly leadership traits and skills) is essential for every organization for survival and growth. This is why developing leadership is the most important task of knowledge management programs. The author suggests that KM practices have to be custom designed based on this framework. In Table 1 author lists a few of the KM practices that were experimented with and implemented at DRDL, Hyderabad, India.

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Author Contributions

Atul Sen is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

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Biography

Dr. Atul Sen is doctorate in Physics from IIT, Kanpur (India) and MBA in Technology Management from BIM, Trichy (India). He superannuated as a Director, from Defence Research and Development Laboratory, Hyderabad, one of the prime laboratories of DRDO under the Ministry of Defense, India. During his 35 years of distinguished career, he served at several important positions and has worked closely with several other distinguished professionals like the former president of India Dr. APJ Abdul Kalam. He was also the founder Head of Knowledge Management Centre, Hyderabad (India); the first Knowledge Management initiative started by the Government of India in 1999. He has more than twenty publications in national and international Journals.