

# Tacit Knowledge and Organizational and Innovation

Ajith Kumar J XLRI,

Jamshedpur

**Abstract:** The success of a firm in a fast changing world is shaped by its innovation potential. The literature has pointed out that a key factor underlying innovation is knowledge. In this paper, we discuss the role that the tacit dimension of knowledge plays in innovation. Creativity, which plays a pivotal role in innovation, is discussed in brief. To represent these findings in literature, a concept map is developed for serving as a guide for studies in this area. Suggestions are made for further research.

**Keywords:** *Tacit knowledge, Innovation, Creativity, Competitiveness*

*“Novel ideas come to the prepared mind” – Louis Pasteur*

## 1. Introduction:

### 1.1 Historical development

It is now almost clichéd to state that knowledge is a resource of critical importance to an organization. A brief look at history shows that economists were the first to recognize and popularize this notion, which was later adopted by management theorists. Schumpeter (1934) introduced the idea of “creative destruction”, a dynamic phenomenon in which new and improved products and services continuously “destroy” and replace older ones in the market. According to him, it is the continuous application of knowledge that drives creative destruction. Subsequently, Hayek (1945) distinguished the problem of knowledge as one of prime significance to economic theory. He described market processes as knowledge transactions. By the late 1960s, knowledge was gaining more recognition as a distinct economic good by social scientists and economists. Drucker (1969) distinguished the knowledge worker, whose work involved a greater degree of the use of knowledge, from the manual worker.

Advances in digital technology however, brought into focus the critically supportive role of information in the gamut of business decision-making and as a vital factor in the nation’s economy. The work of Bell (1973) is worthy of mention. In his concept of the post-industrial age, he argued that information as opposed to labour, would be the key driver of the economy. The period since 1970 is broadly referred to as the “information-age”, one in which society depended on its ability

to acquire, store, process and utilize information, and which was described later by Toffler (1980) as the “third wave”.

However, the focus on knowledge as a crucial organizational resource, distinct from information, evolved only in the last decade of the 20th century. It is thus imperative to clearly distinguish knowledge from information, even if only briefly.

## **1.2 Knowledge vs Information**

Although the terms “knowledge” and “information” are used interchangeably in literature, several authors (Bateson, 1980, Dretske, 1981, Machlup, 1983, Nonaka and Takeuchi, 1995) have attempted to draw distinctions between them. Patterns identified by analyses of raw unstructured data can be termed information. Knowledge, on the other hand, is obtained by the synthesis of such information in a directed and purposeful manner. As Dretske (1981, pp. 44) states, “Information is a commodity capable of yielding knowledge and what information a signal carries is what we can learn from it...” Information thereby, contains within it the potential to yield useful knowledge. Knowledge, as opposed to information, has a personal component to it. As Nonaka and Takeuchi (1985, pp. 58-59) argue, “Information is a flow of messages, while knowledge is created by that very flow of information, anchored in the beliefs and commitments of its holder. This understanding emphasizes that knowledge is essentially related to human action” (emphasis in the original). Whereas information can be acquired, transmitted and represented by mechanistic means, knowledge builds on the experiences of the knower and is shared through interactions between knowers. Thus, knowledge is non-mechanistic and is clearly positioned at a higher level of cognitive manifestation. Although a detailed philosophical discussion on the distinction between the two is not within the scope of this paper, it is important to succinctly conclude that whereas information is objective in nature and can be delivered explicitly, knowledge is fundamentally subjective in character, in that it draws from the beliefs and values of its holder. More discussion on this is provided later in this paper as we discuss the different aspects of tacit knowledge.

### 1.3 Core Competence, Knowledge and Innovation

Some of the foundational ideas on the role of knowledge in the organization have arguably been drawn from Prahalad and Hamel (1990) on the concept of core competence, according to them is "...the collective learning in the organization..." and in contrast with other tangible resources, has a self-replenishing nature – "Core competence does not diminish with use. Unlike physical assets, which do deteriorate with time, competencies are enhanced as they are applied and shared... are the glue that bind existing businesses... and also the engine for new business development." The authors argue that the long-term competitiveness of a corporation is directly related to its ability to build these competencies effectively and efficiently (faster than its competitors and at lower costs). Such competence building will enhance its ability to provide attractive market offerings in response to unanticipated changes. Indeed an organization which has well-built core competencies is adept at meeting the challenge of continuously, "...infusing products with irresistible functionality or better yet, creating products that consumers need but have not yet even imagined" (Prahalad and Hamel, 1990). In other words, well- developed core competencies enhance the ability of an organization to innovate – to provide entirely new products as well as better functionality in existing ones.

The "collective learning" of Prahalad and Hamel (1990) is akin to what is now more commonly referred to as organizational knowledge. Knowledge in the business context can form, exist and evolve at various levels– individual, group, organization or at the level of the industry. Its importance is underscored by Nonaka (1991) who argues, "in an economy where the only certainty is uncertainty, the one sure source of lasting competitive advantage is knowledge... successful companies are those that consistently create new knowledge, disseminate it widely throughout the organization, and quickly embody it in new technologies and products." He describes such a company as a "... 'knowledge-creating company', whose sole business is innovation." He thus links knowledge to innovation.

What exactly does the term "innovation" refer to in the business context? Why is it important? What is the relationship, if any, between innovation and knowledge and what significance does such a relationship bear upon firm competitiveness? These questions setup the context for the essence of this paper. We begin by looking at the subject of innovation, followed by a discussion on knowledge, specifically its tacit form. We then at look at arguments made by researchers in the area linking these two concepts and the implications for further research.

## **2. The Study of Innovation**

### **2.1 What is innovation?**

The term “innovation” has been used variously in management literature to refer to both a process as well as to the results that emerge by applying the process, within an organization. As a process, it refers to the set of activities directed towards bringing about improvements in the company’s offerings (products and services), other processes (such as administrative, accounting and marketing) in the organization or sometimes, in the structure of the organization itself. Innovation however could also be aimed at creating entirely new products and services, or introducing drastically different organizational processes or major internal structural changes. Good innovation ensures effectiveness with enhanced efficiency, by improving functionality, services provided, and reduction in time, cost or a combination of all of these. Thus, “innovation is the effort to create purposeful, focused change in an enterprise’s economic or social potential” Drucker (2002). Succinctly put, innovation is all about change, either at micro or at macro-levels in the existence of a business organization aimed at better efficiency and effectiveness. It is habitual for organizations and individuals to innovate as and when an opportunity or need arises, thus innovation is an ever-existent phenomenon even when it is not formally addressed.

### **2.2 Why innovation?**

A careful look at the current global business scenario reveals several phenomena occurring simultaneously such as societies becoming more heterogeneous, technology advancing rapidly and outlooks of people evolving, thereby transforming their needs and expectations. The organization’s business environment therefore is constantly changing and ever infused with competitors who constantly challenge its market share by offering similar products and services. It is logical therefore to surmise that, if an organization can provide products and services of the same or better quality and at lower costs than its competitors and market them effectively, it ought to attract a greater share of customers. Continuous innovation, as a result, is not merely a secondary enterprise, but an essential consideration in today’s business organization.

As Kelley and Littman (2001) note, “The biggest single trend we’ve observed is the growing acknowledgement of innovation as a centerpiece of corporate strategies and initiatives.” Organizations innovate in order to either penetrate or expand existing market niches, or to create totally new markets. The older genre of the satisfied and successful organization, which “is more likely to maintain its old programs and less likely to innovate ...” (Slevin, 1971) is today replaced with

the fast changing and competitive organization which recognizes innovation as an essential culture that it must practice, not only to succeed, but even to survive. Indeed, organizational leaders today are aware that refraining from continuous innovation will almost surely imply the demise of their organization. Leonard (1995, pp. 15) cites Gordon Forward, then CEO of Chaparral Steel as saying, "... if we stop growing, we may die." There is little debate that a business firm's long-term success is related to its developing and offering innovative products and services (Chen et al., 2017; Perez-Luno et al., 2019; Saunila, 2017).

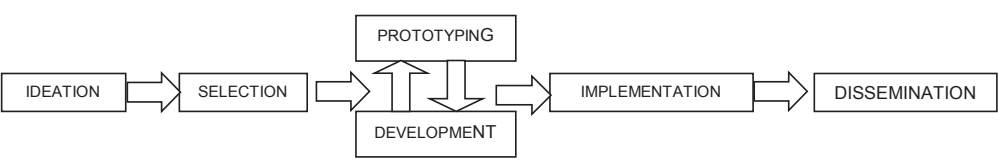
### **2.3 Facets of innovation**

Innovations can be generally classified as - Product, Service, Process or Structural. An example of a product innovation is that of the Post-It pads of 3M, a product that has become indispensable today in institutions and homes worldwide. Service innovation is well illustrated by the example of Virgin Atlantic Airways, which, in 1984, eliminated its first-class service altogether in exchange for providing enhanced comfort and other facilities to the business class (Kim and Mauborgne, 2004). By doing so, Virgin Atlantic attracted not only business-class passengers of other airlines but also captured a significant share of the first-class and economy-fare market. Process innovations are illustrated by Wal-Mart. One of Walmart's best-known innovations is that of cross docking (Hammer, 2004). Cross-docking refers to the process of shipment in which goods trucked to a distribution center from suppliers are immediately transferred to trucks bound for stores, without ever being placed into storage, thereby tremendously saving on storage costs and time. This is a striking example of process innovation. A striking example of structural innovation is provided by Nonaka and Takeuchi (1995, pp. 165-66). They describe innovations in the structure of the US military during the Second World War. As opposed to the Japanese military's rigid bureaucratic structure, the US military developed a flexible structure based upon its task-force teams, which helped it to ultimately win its battles against Japan.

Innovations can be incremental (continuous) improvements or radical (discontinuous) changes. An example of the former is the periodic successive versions of an automobile model, each of which carries a minor yet relevant improvement over its predecessor. The latter is illustrated by the invention of powered-flight by the Wright brothers in 1903, creating a radically different possibility in the concept of travel from those that existed then.

The process of innovation is not necessarily subject to pass through well-defined phases. On the other hand, it often goes through repetitive and overlapping stages. Nevertheless, we can identify six distinct phases that an innovation usually develops through – Ideation, Selection, Prototyping, Development, Implementation, and

Dissemination. In the ideation phase, innovators look for various ideas that can be useful to them, ideas that can mold their innovation into something that can be of value to its end-users. Ideation also involves refining existing ones and clearly defining the final goals. Selection involves, “zeroing-in” - ideas are consolidated by discussions and specific ones that are important and sure to add value to the innovation, are identified. The prototyping and development phases are intertwined with each other in an evolutionary loop; several prototypes may be made by the process of testing and feedback –each an improvement over its predecessor, till a final model is reached that can be mass-produced. Each successive prototype may resemble the final product to greater extent than the one before it, in appearance and functionality. Prototypes are made to continuously evaluate the original concept as it develops into the final product, before proceeding with large-scale production. Once the final design is developed, the phase of implementation takes over. In the case of a product, it is the stage of production. A service, process or structural innovation involves operationalizing for use in real-time. The extent to which the innovation offers value as perceived by its target users determines how rapidly and extensively it can be disseminated around the world. The use of airbags in automobiles for safety, received a wide degree of acceptance thus enhancing its dissemination. On the other hand, an innovation may never “take-off”, as was the case with Coca-cola’s New Coke, launched in 1985. The phases although identified as distinct, overlap with each other as the innovation evolves. In Fig 1, we depict these phases graphically.



**Fig 1:** The Phases of the Innovation Process

Organizational innovation can take place at a single location, as was the case with Thomas Alva Edison’s incandescent lamp, which was developed in his Menlo Park laboratory at New Jersey in the late nineteenth century. Nowadays, it is common to have an innovation effort, taking place by the simultaneous combined effort of persons located across the globe. An example of this is software development.

Although it is not uncommon for individuals to innovate on their own, it is more common however to find an enterprising individual directing teams of workers in developing his innovation, which may ultimately be attributed to him. Alexander Graham Bell, famous for the telephone he invented, worked with a team. It is the norm today in organizations to form teams guided by team-leaders and assign specific innovation projects to them, making innovation a team responsibility rather than an individual one. Often, the innovation process spawns the entire organization such as the development of the Honda City automobile (Nonaka and Takeuchi, 1995). Teams across the organization contribute to various aspects of the automobile model as it evolves through successive phases and thus innovation takes place at the organizational level. As Slevin (1971) says, “the implementation of any major innovation in an organization can be accomplished only by large numbers of individuals trying things they have not tried before.” An innovation can also develop across the world, by the work of organizations, teams or individuals working independently in different countries. The first modern passenger airliner, the Boeing 247, which appeared in 1933, was the result of continuous technological innovation in diverse areas that spanned America and Europe for about 30 years, beginning with the first powered flight the cumulative result of several independent organizational as well as individual efforts.

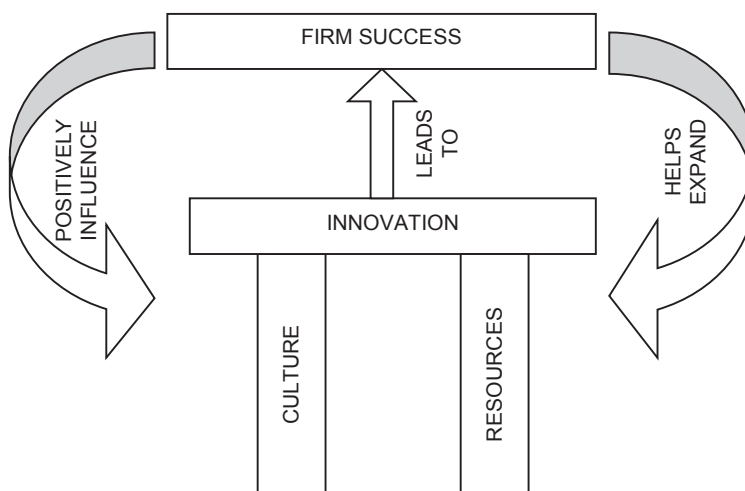
Organizations may conduct the innovation activities in-house, with the involvement of their own employees, or outsource them to a company specializing in design and innovation activities. Several leading knowledge management researchers (Nonaka, 1991, Leonard, 1995, Davenport and Prusak, 1998) advocate the culture of in-house innovation, as the knowledge generated in the innovation process stays and grows within the organization. However, as Kelley and Littman (2001, pp. 3) point out, firms nevertheless outsource innovation activities for several reasons – among them being the lack of capacity (includes infrastructure), lack of expertise or for want of speed.

Two other dimensions on which an innovation can be assessed are development cost and time. These can vary widely depending upon the nature, type and the objective of the innovation.

## **2.4 The Two Pillars of Innovation**

So far, we have discussed the importance of innovation and its various facets. We next identify two broad factors, which we argue, form the pillars of the innovativeness of an organization – Organizational Culture and Organizational Resources (Fig. 2).





**Fig 2:** The Two Pillars of Innovation

**Organizational Culture** – Organizational culture is the personality of an organization (mapnp.org). An organization has distinct beliefs, concerns, values, and ethical codes of conduct and discipline, which make up its culture, much as these very same things make up an individual’s personality. Thus, the culture of an organization is unique to it, collectively contributed to by the individuals working in it and molded by its leadership. Culture determines in what ways and contexts and to what degree, people interact with each other, how much empowerment they have in matters of decision-making, how they are rewarded for their performance and what their individual aspirations are. In more subtle ways, culture influences the motivation levels of the individuals, to what extent they “connect” with the overall vision of the organization, to what measure they are ready to share their knowledge and expertise with fellow workers and how much they are willing to sacrifice to help achieve its goals. Cultures favorable to innovation encourage “... respect for the individual, tolerance to failure, and openness to ideas from outside.” (Leonard, 1995, pp. 15). On the other hand, a culture that fosters high degrees of mistrust between employees and absence of a proper vision is antagonistic to innovation.

**Organizational Resources** – can be further classified as tangible and non-tangible resources. The tangible resources are physical assets (land, infrastructure, technology), monetary capital, the human beings working for the organization and the processes in place that determine the work-routines. The intangible resources are the knowledge and expertise acquired by the organization, existing at its various levels. Adequate resources are a must if an organization has to conduct innovation activities.



Given suitable resources, innovation is nurtured by the presence of a benign organizational culture, powered by the passion of its leaders. The success of innovation depends on how well the two factors – culture and resources are managed. Successful innovation in turn has an influence on these two factors as well. How? Firstly, it leads to enhanced firm performance and profitability, thereby enhancing the firm's capacity to expand its resource base. Secondly, firm success positively influences the motivation levels of its employees, thus strengthening the cultural dimension. This paper highlights the role of knowledge (a resource), in the process of innovation. In the next section, we develop this discussion in detail.

### **3. Tacit Knowledge**

#### **3.1 What is Tacit knowledge?**

Investigations into the nature of knowledge have evolved over several thousands of years, arguably the oldest of epistemological traditions being the Nyaya School of Indian philosophy. Nyaya specifically addresses the issues of what constitutes knowledge, how true knowledge is obtained, and how it can be distinguished from that which is false. Epistemology also developed extensively in the west.

The term “tacit knowledge” was coined by the scientist turned philosopher, Michael Polanyi, and is discussed in his works *Personal Knowledge: Towards a Post-Critical Philosophy* (1962) and *The Tacit Dimension* (1966). The term tacit refers to that which is implicit and not directly perceived. Hence, knowledge possessed implicitly by an individual, that he himself is often not conscious of, is his tacit knowledge. As Polanyi puts it, “we can know more than we can tell” (Polanyi, 1966).

Tacit knowledge is personal, context-specific and hard to formalize and communicate. Human beings, as well as animals, create this knowledge, by their personal involvement with the object or concept being known and Polanyi (1966) describes this as “indwelling”. Thus, the personal experience of the individual is an essential pre-requisite to acquire tacit knowledge. This experience may occur through formally administered training and practice, or through the innumerable interactions that an individual faces as he passes through life. An individual's tacit knowledge resides within him and enables him to perform suitable actions.

On the other hand, knowledge which the individual is aware of and is able to articulate, or express formally is called explicit knowledge. As Nonaka and Takeuchi (1995, pp. 60) contend, it is only the “tip of the iceberg” of the entire body of knowledge. Knowledge thus exists in two forms - tacit and explicit. However, these two forms are not separate from each other, rather they are closely related. Tacit knowledge is the basis for explicit or conscious knowledge, and as stated by Polanyi (1966), “all knowledge rests in a tacit dimension.”

Fig. 3 summarizes and compares the characteristics of the two forms of knowledge.

Tacit Knowledge	Explicit Knowledge
Builds from the individual's interactions with the world, over time.	Born from the individual's tacit knowledge, as well as acquired from outside.
Resides unconsciously or semi-consciously.	Resides consciously.
Is subjective and personal.	Is relatively objective and impersonal
Is unstructured, perception-based and cannot be codified.	Is relatively structured, systemic and can be codified.
Cannot be processed independent of the individual in whom it resides. It lives and grows within the individual.	Can be processed in various ways, independent of the individual(s) who originated it – can be communicated, stored, reduced, transferred etc...

Fig 3: A Comparison of the Two Forms of Knowledge.

It is relevant here to note that if knowledge is to be practically useful to an organization, then it must be available in its explicit form - articulable in common language, communicable, transferable and capable of being stored and retrieved when necessary. When explicit knowledge crystallizes from the existing tacit base in the mind of an individual, it takes the shape of conscious feelings, coherent thoughts, ideas, hypotheses or propositions, which he is able to express either through common language, art, music or various other forms. While manifesting explicitly at various levels, knowledge becomes increasingly tangible and structured – a theorem, an essay, a poem or a piece of music. The grosser and more structured explicit knowledge is, the greater is its potential to be processed. In its grosser forms, the character of explicit knowledge tends towards that of information, high on its objectivity but low on subjective experiential content. However, explicit knowledge is distinct from information. In Fig 4., we attempt to capture this distinction, by the comparing the two with each other<sup>1</sup>.

<sup>1</sup> We illustrate this distinction with an example. The statement “Shiva is a kind person” represents knowledge, whereas the statement “Shiva is 30 years old” represents information. That Shiva is a kind person is the conscious knowledge of one who believes it, yet it’s meaning is specific to how its knower interprets the characteristic “kind”. This characteristic may hold several different meanings to different knowers, hence the subjectivity. The knowledge that Shiva is kind is also experiential as it is formed from the direct / indirect experiences of its knower with Shiva, and can be interpreted and compared by other knowers in terms of their experiences with him. From these two observations we can say that explicit knowledge manifests differently in different frames of reference (i.e. the mind-sets of its knowers), hence the heterogeneity in the frames of reference. The statement “Shiva is 30 years old” on the other hand conveys the same sense to a universal set of knowers (e.g. all human beings who can cognize simple English and numbers), as by its very construction this statement is meant to be interpreted in a frame of reference universally defined in terms of the rules of language and notation (semantics). It is interpreted to mean the same thing by all the knowers in this set, irrespective of differences in their mind-sets and experiences with Shiva. Thus, it is more objective, semantic and is based on homogeneous frames of reference.

<b>Explicit Knowledge</b>	<b>Information</b>
High on subjective content	High on objective content
Experiential	Semantic
Based on heterogeneous frames of reference	Based on homogeneous frames of reference

**Fig 4:** Explicit Knowledge vs. Information

#### **4. Tacit Knowledge and Innovation**

We now attempt to see how tacit knowledge bears upon innovation by first delving into the phenomenon of creativity.

##### **4.1 Knowledge and creativity**

In a general sense, creativity can be defined as the ability to bring forth new ideas or concepts, or combining existing ones in a unique way. A creative insight is a new understanding that did not exist earlier. Creativity is thus an important ingredient in the art of innovation.

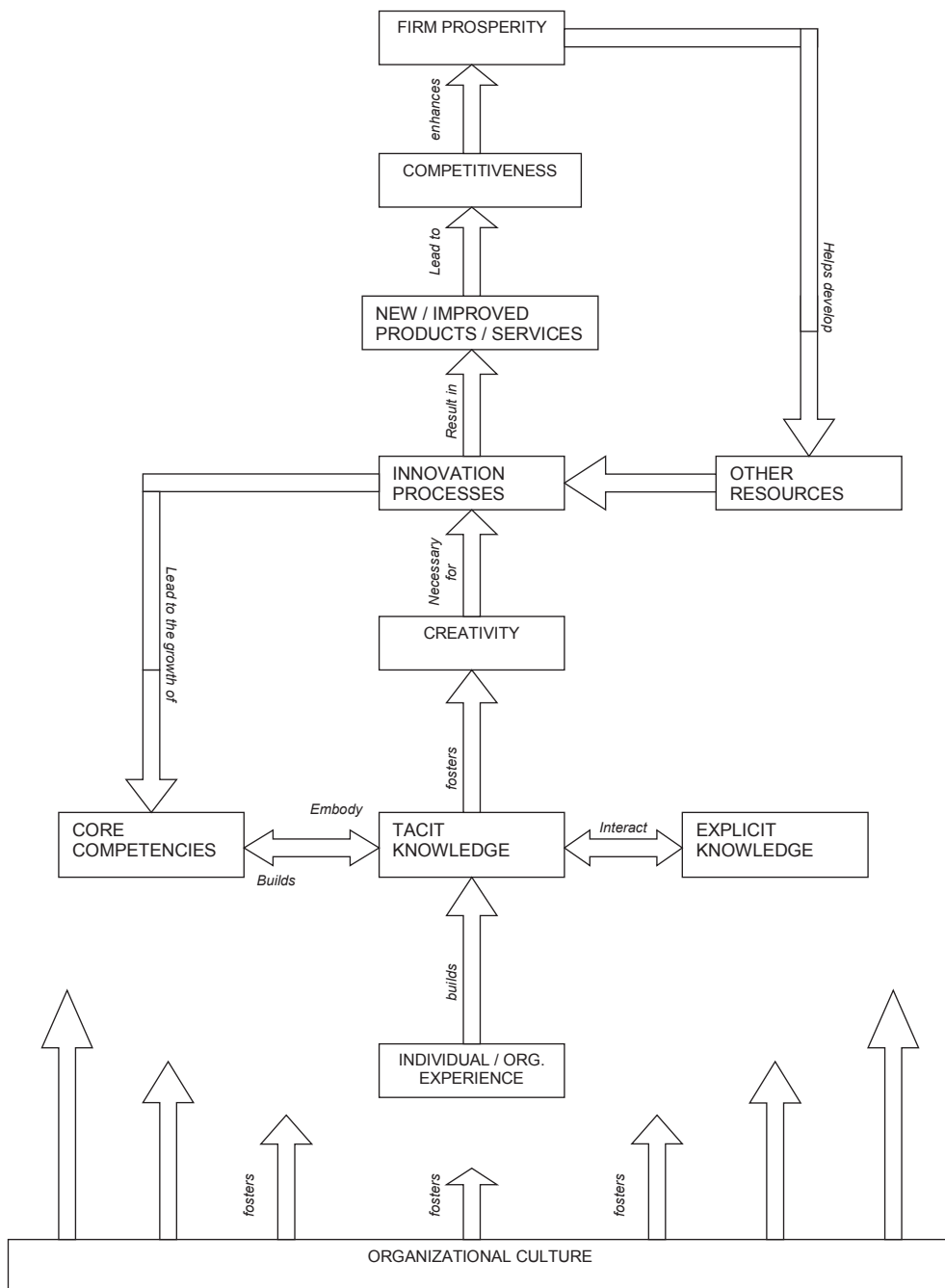
At a fundamental level, creativity is a characteristic of an individual. Individuals are the prime movers in organizations; thus their creativity is of prime importance to the organization. Organizations however make groups and teams of individuals to address specific problems. It is well known that in groups, an individual develops a strong sense of identity with the group’s mission – an extended sense of being, beyond his individual self, which when properly managed leads to synergistic outcomes. Thus, the concept of the group- or team- creativity is also discussed in literature (Leonard and Sensiper, 1998).

What factors favor creativity? Diver (2002) discusses two conditions that foster creativity – mastery and versatility. Mastery refers to the depth; and versatility, to the breadth of the knowledge held by the individual.

Mastery is attained by immersion in the field accompanied by sequencing, structuring and establishing coherence (Diver, 2002). Mastery cannot be acquired overnight – it is patiently and painstakingly built over time. Nobel laureate Herbert Simon argues that it takes at least ten years of sustained effort to acquire sufficient mastery to make major contributions to a field. According to Simon (as quoted by Diver, 2002), creative problem solving requires a “skill at searching spaces of possible . . . solutions in a highly selective manner, [recognizing] familiar patterns . . . that give access to bodies of knowledge, stored in memory.” The “knowledge” referred to here by Simon, “stored in memory” and that which can be accessed but not described when one looks for a solution to a problem is the same as tacit knowledge, which resides deep within the individual.

It is to be noted that insights and hunches appear to the well-prepared mind and sometimes lead to major break-through revelations. Kekule discovered the ring-structure of benzene, when in 1864, he saw in a dream, atoms joined to each other in snake-like forms and the snakes “trying to catch their own tails.” This discovery sparked off rapid advancement in organic chemistry. This famous discovery literally happened overnight, but it happened in a mind which had seen long years of immersion in the subject of chemistry. Kekule’s deep tacit knowledge of chemistry provided the fertile soil on which new ideas could sprout. Thus the depth of one’s tacit knowledge base is essential for creativity.

Versatility indicates tacit knowledge that spans multiple fields – in other words – it has breadth. Versatility implies familiarity with several bodies of knowledge, but not necessarily to the same extent or depth. Creativity can manifest while bridging a chasm between two bodies of knowledge. New and revolutionary ideas are often born when one “suddenly” sees a new connection between two or more well-known concepts - a connection that was never seen before. The internal combustion engine, for instance, was created while combining knowledge of thermodynamics (fuel combustion) with knowledge of mechanics (piston movement), both fields being apparently independent by themselves. However, unless there is sufficient knowledge on both sides of the chasm, it would not be possible to make this bridge. Thus familiarity with several bodies of knowledge has the potential to trigger creative insights.



**Fig 5: A Concept Map**

We thus see that although new ideas come about serendipitously, they do so in the presence of adequate tacit knowledge. Creativity, which is essential to innovation draws from tacit knowledge as its basic raw material – knowledge in depth (mastery) as well as in breadth (versatility). As a corollary, we can say that in the absence of sufficient tacit knowledge, creativity of the individual or the team would be at a loss, thereby reducing the innovation potential of the firm.

Tacit knowledge has been identified as leading to innovation in three different ways (Leonard and Sensiper, 1998) – problem finding, problem solving and prediction / anticipation. Experts who possess a greater tacit knowledge base than novices are more adept at problem solving, as they “have in mind a pattern born of experience, which they can overlay on a particular problem and use to quickly detect a solution”. Often, an expert’s unease with the current formulation of a problem leads him to re-formulate the problem, ultimately leading to a more useful solution. Here, tacit knowledge aids in identifying an inappropriately formulated problem and re-formulating it more usefully. Finally, tacit knowledge enables an individual to “anticipate and predict occurrences,” that are subsequently explored consciously.

## **Summary and Conclusions**

The above discussions are represented in a concept map (Fig. 5). The organization’s culture provides the climate in which innovation processes thrive. In a favorable climate, the cumulative experiences of the employees, which they have gathered prior to joining as well as in their various duties within the organization are harnessed to build the knowledge base of the organization, which is embodied in its core competencies. This knowledge can be utilized to generate creative ideas and solutions, which are used to conduct the innovation processes in the organization. As Nonaka and Takechi (1995) argue, engaging in innovation activities leads to continuous knowledge creation. New knowledge created further enhances the core competencies of the organization, which in turn favors greater innovation potential. Thus, knowledge and innovation interact with each other in a positive reinforcing cycle. Enhanced innovation processes lead to the development of new products and services. This gives the firm greater competitiveness in the market and thus increased prosperity.

One noteworthy implication of the above discussion is that it directly hints at the importance of the individual in the organization. If knowledge is the most valuable resource, then its bearer, the individual is at least as important to the organization. “An organization cannot create knowledge without individuals. The organization supports creative individuals or provides contexts for them to create knowledge” (Nonaka and Takeuchi, 1995, pp. 59).

This explanatory study leads us to several broad inter-connected questions – How much emphasis do firms actually give to innovation activities, as compared to their routine activities? What problems do they encounter in the process? In what way do they motivate their individuals to utilize their knowledge for creative purposes? What prevents individuals from doing so? Further, what organizational factors enhance employees' creative skills? What factors are unfavorable for the same? Although knowledge is a necessary ingredient for creativity, is it sufficient? And, is good creativity alone sufficient to ensure a healthy innovation culture in the organization?

We conclude with the remark that these questions create a context for further study, which will shed light on several aspects of organizational culture and strategy of relevance to managing knowledge successfully and fostering innovation.



## References

- Bell, D (1973). *The Coming of Post-Industrial Society: A Venture in Social Forecasting*, Basic Books, New York,
- Chen, X., Y. Zhou, and Probert, D. (2017), *Managing Knowledge Sharing in Distributed Innovation From the Perspective of Developers: Empirical Study of Open Source Software Projects in China*, *Technology Analysis & Strategic Management* 29 (1), 1–22.
- Davenport T., and L. Prusak. (1998). *Working Knowledge: How Organizations Manage What They Know*, Harvard Business School Press, Boston,
- Diver C. (2002), *In Praise of Creativity*, Reed Magazine, November (see [http://web.reed.edu/reed\\_magazine/](http://web.reed.edu/reed_magazine/)) Dretske F. (1981), *Knowledge and the Flow of Information*, MIT Press, Cambridge, MA,
- Drucker P. F (1969), *The Age of Discontinuity*, Heinemann, London,
- Drucker P. F. (2002), *The Discipline of Innovation*, *Harvard Business Review*, 80 (8), 95-103
- Hammer M. (2004), *Deep Change: How Operational Innovation Can Transform Your Company*, *Harvard Business Review*, 82 (4), 85-93
- Hayek, F. A. (1945), *The Use of Knowledge in Society*, *American Economic Review*, 35 (4), 519-30.
- Kelley T., and Littman J (2001). *The Art of Innovation*, Profile Books Ltd, London
- Kim W. C., and Mauborgne R. (2004), *Value Innovation: The Strategic Logic of High Growth*, *Harvard Business Review*, 82 (6), 172-180
- Machlup, F. (1983) *Semantic Quirks in Studies of Information*, in *The Study of Information*, Heinemann, ed. F. Machlup and U. Mansfield, 641-71, John Wiley and Sons, New York,
- Leonard D. (1995). *Wellsprings of Knowledge*, Harvard Business School Press, Boston,
- Leonard D., and Sensiper R. (1998), *The Role of Tacit Knowledge in Group Innovation*, *California Management Review*, 40 (3), 112-132
- Nonaka, I. (1991), *The Knowledge Creating Company*, *Harvard Business Review*, November-December, 96-104.

- Nonaka, I. and H (1995). Takeuchi. The Knowledge Creating Company, Oxford University Press, New York,
- Perez-Luno, A., Alegre, J. and Valle-Cabrera, R. (2019), The role of tacit knowledge in connecting knowledge exchange and combination with innovation, *Technology Analysis & Strategic Management*, 31 (2), 186-198.
- Polanyi M (1966), *The Tacit Dimension*, Routledge and Kegan Paul Ltd, London,
- Polanyi M. *Personal Knowledge*, Routledge and Kegan Paul Ltd, London, 1962
- Prahalad, C.K. and G. Hamel. (1990), The Core Competence of the Corporation, *Harvard Business Review*, 68 (3), 79-91
- Schumpeter, J. A. (1934) *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*, Translated by Revers Opie, Harvard University Press, Cambridge, Mass.,
- Slevin D. P. (1971), The Innovation Boundary: A Specific Model and some Empirical Results, *Administrative Science Quarterly*, 515-531.
- Saunila, M. (2017), Innovation Capability in Achieving Higher Performance: Perspectives of Management and Employees, *Technology Analysis & Strategic Management*, 29 (8), 903–916.
- Toffler (1980), A. *The Third Wave*, Bantam Books.