

Knowledge Management and Innovation

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Abstract-

This paper addresses all the fundamental management dimensions in the process of innovation.

It recognizes that beside technology and finances knowledge is the core component of innovation. Nurturing and managing the flow of knowledge may be the most distinctive competence of the decade. Knowledge and creativity are now the major driving forces behind pioneering companies that are achieving competitive edge crucial to competing in today's economy. Innovative Knowledge Management provides a valuable resource for promoting current academic discourse on innovation in knowledge-intensive organizations and contexts. This paper explore about the links between knowledge management and innovation. Knowledge management activities are adding value to organizations by enhancing Innovation and innovativeness. While the results are far from linear, survey respondents Indicates numerous ways in which knowledge could be, or at least should be, leveraged to add value to the creation, development, and implementation of new product and process ideas

Keywords- *Innovation, knowledge, diffusion, implementation, strategists, dissemination, channels, processes, Spirals*

I. INTRODUCTION

Knowledge management has become a well known term. But the real challenge facing most companies is that of faster innovation. Creating the system within which ideas are created and applied is more than management. It is a matter of strategy and leadership. That's where Knowledge Innovation comes to the force.

Innovation embodies the concept that innovation is the one competence needed for the future. It addresses all the fundamental management dimensions in the process of innovation - the creation and conversion of ideas into viable commercial products in addition to building a foundation for future sustainable growth. It recognizes that knowledge is the core component of innovation - not technology or finances per se. Nurturing and managing the flow of knowledge may be the most distinctive competence of the decade. Knowledge and creativity are now the major driving forces behind pioneering companies that are achieving competitive edge crucial to competing in today's economy. Innovative Knowledge Management: Concepts for Organizational Creativity and Collaborative Design provides a valuable resource for promoting current academic discourse on

Innovation in knowledge-intensive organizations and contexts. A defining collection of field advancements, this Premier Reference Source creatively showcases wide-ranging issues relevant to the use of knowledge management. This paper explore about the links between knowledge management and innovation.

Diffusion of innovation:

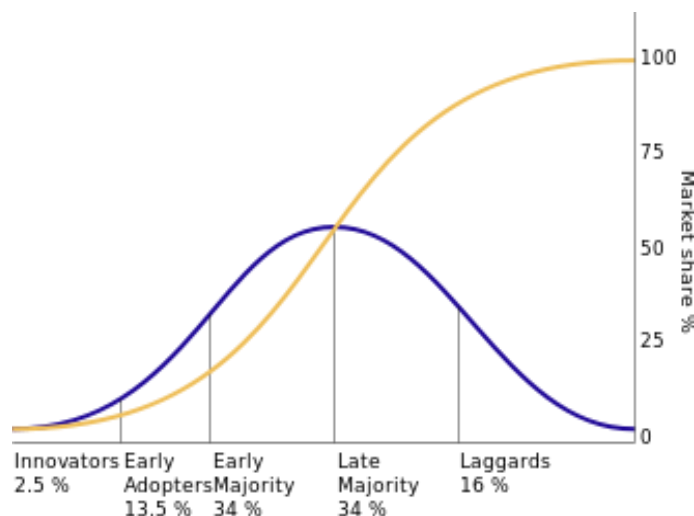
Diffusion of innovation research was first started in 1903 by seminal researcher Gabriel Tarde, who first plotted the S-shaped diffusion curve. Tarde (1903) defined the innovation-decision process as a series of steps that includes the following:

1. First knowledge
2. Forming an attitude
3. A decision to adopt or reject
4. Implementation and use
5. Confirmation of the decision

Once innovation occurs, innovations may be spread from the innovator to other individuals and groups. This process has been proposed that the life cycle of innovations can be described using the 's-curve' or diffusion curve. The s-curve maps growth of revenue or productivity against time. In the early stage of a particular innovation, growth is relatively slow as the new product establishes itself. At some point customers begin to demand and the product growth increases more rapidly. New incremental innovations or changes to the product allow growth to continue. Towards the end of its lifecycle, growth slows and may even begin to decline. In the later stages, no amount of new investment in that product will yield a normal rate of return

The s-curve derives from an assumption that new products are likely to have "product life"—i.e., a start-up phase, a rapid increase in revenue and eventual decline. In fact the great majority of innovations never gets off the bottom of the curve, and never produces normal returns.

Innovative companies will typically be working on new innovations that will eventually replace older ones. Successive s-curves will come along to replace older ones and continue to drive growth upwards. In the figure above the first curve shows a current technology. The second shows an emerging technology that currently yields lower growth but will eventually overtake current technology and lead to even greater levels of growth. The length of life will depend on many factors.



According to Rogers the diffusion of innovations is when successive groups of consumers adopt the new technology (shown in blue), its market share (yellow) will eventually reach the saturation level. In mathematics the S curve is known as the logistic function

II. KEY RESULTS OF INNOVATION

A. Increase in Growth and Innovation:

‘Innovation Intensity’ (i.e. the percentage of revenue derived from products/services which are less than 3 years old) has increased for large firms and SMEs, with SMEs registering a greater increase in Innovation Intensity than large firms. 42% of the large firms and 17% of the SMEs are also ‘Highly Innovative’ firms (i.e. firms who have introduced ‘new to world’ Innovations during the course of business in the last five years.)

B. Nearly half of the large firms and SMEs attribute more than 25% of change in the following factors to Innovation, increase in competitiveness, increase in profitability, reduction in costs and increase in market share. For large firms Innovation has the most significant impact on competitiveness, while for SMEs, Innovation has the most significant impact on increase in market share.

C. 17% of the large firms rank Innovation as the top strategic priority and 75% rank it among the top 3 priorities. All the large firms agree (of which 81% strongly agree) that Innovation has gained importance as being critical to growth and competitiveness since the start of economic liberalization in India. All the large firms agree (of which nearly half strongly agree) that they cannot survive and grow without investment in Innovation. An overwhelming 96% of large firms see Innovation spending increasing over the next 3-5 years.

III. MODELS OF INNOVATION

The Linear Model of Innovation is an early model of innovation that suggests technical change happens in a linear fashion from Invention to Innovation to Diffusion.



Original model of three phases of the process of Technological Change: It prioritizes scientific research as the basis of innovation, and plays down the role of later players in the innovation process.

Current models of innovation: It derives from approaches such as Actor-Network Theory or social shaping of technology and provides a much richer picture of the way innovation works. current ideas in Open Innovation and User innovation derive from these later ideas.

Traditional Phase Gate Model: Under this model, product or services concept is frozen at early stage so as to minimize risk. Also innovation process in enterprise involves series of sequential phases/steps arranged in such a manner that the preceding phase must be cleared before moving to next phase. Thus a project must pass through a gate with the permission of gatekeeper before moving to the next succeeding phase.

Criteria for passing through each gate, and the person at each gate are defined beforehand. The gatekeeper examines whether the stated objectives for preceding phase have been properly met or not and whether desired development has taken place at the preceding phase or not?

IV. VERSIONS OF LINEAR MODEL OF INNOVATION

Two versions of the linear model of innovation are given below:

1. "technology push" model
2. "Market pull" model.

In the period 1950s-Mid-1960s the industrial innovation process was generally perceived as a linear progression from scientific discovery, through technological development in firms, to the marketplace, Rothwell (1994)

The stages of the "Technology Push" model are:

Basic science→Design and engineering→Manufacturing→Marketing→Sales

V. MARKET PULL "MODEL OF INNOVATION

In the period mid 1960s- Early 1970s emerges the second-generation Innovation model, referred to as the "market pull" model of innovation. According to this simple sequential model, the market was the source of new ideas for directing R&D, which had a reactive role in the process. The stages of the "market pull" model are:

Market need—Development—Manufacturing—Sales.

The linear models of innovation supported numerous criticisms concerning the linearity of the models. These models ignore the many feedbacks and loops that occur between the different "stages" of the process. Shortcomings and failures that occur at various stages may lead to a reconsideration of earlier steps and this may result in an innovation.

VI. KNOWLEDGE MANAGEMENT FOR INNOVATION

Knowledge management can be described as indispensable and that KM must help increase an organization's profit margins. The corollary is that if KM doesn't lead to organization's profit margins, it is dispensable. This dichotomy can be explained here. In the post-modern industrial era of today when knowledge has been universally deemed a critical wealth for sustained growth of all the business systems, an organization's top executives are somewhat duty bound to admit KM's indispensability, or they (and their companies in turn) will look antediluvian to their customers and stakeholders. But at the same time their old world vestiges force them to look for profitable returns under every dime they have to invest on KM. And indeed, why not? After all a business organization is not a social welfare state. KM theorists, practitioners, and dabblers can't stay unaffected by these capitalistic concerns of corporate oligarchy. When we have repeatedly averred from high pedestals that knowledge is a wealth and a prized resource, then it's only fair to assume that calls will be made to make good of this wealth and demands will arise to use KM to make a positive, and more importantly, a tangible—a showcase able—difference in the organization. We can say that knowledge management can be made to play a significant role in increasing an organization's capacity to innovate and use innovative practices to gain or retain, as may be the case, the cutting edge against thriving competition and fluctuating markets. Innovation, as it is widely recognized, is the only master key to unlock an organization's successful future. Organizations that innovate and adopt innovation sustain and prosper while those who do not wither away. All of the three types of innovations, viz. sustaining, disruptive, and breakthrough, result from the process of intensive research which implies plodding through existing store-houses of information and sifting, weighing, and balancing the information pieces to move ahead. These pieces of information are primarily published and catalogued works like books, research papers, white-papers, correspondences, spread sheets, analytical reports etc; but they are also unpublished and uncategorized stuff like wisdom, perception, thoughts, ideas, verbal conversations, hidden best practices and informal chats, to name a few.

Whereas the first part has drawn the attention of researchers and innovation experts, it is the later aspect that presents real challenges and risks. Things like wisdom, perceptions, ideas etc. are often transacted in an unstructured environment. They flow freely from one person to another, transcending minds, geographies and time. If not tapped at right opportunity, they diminish or disperse and are lost. For example an exciting conversation among a group of technology enthusiasts might contain seeds of an innovation, but if not captured in time, the conversation may die down and never reoccur or the people may move to different companies and not meet again.

KM strategies and approaches of knowledge capture, knowledge organization, knowledge dissemination, and knowledge application can be intermixed and used to provide a smart structure where all the potentially useful knowledge transactions can be recorded, viewed, analyzed and processed by decision makers.

By providing this structure KM does two important things

Identify the information channels, thereby increasing the interaction and re-use of knowledge. Note that this is different from identifying information per se. Capturing information channels implies recognizing and enlisting all the possible channels through which information flows within the organization. For example, discussion forums, group email aliases, workshops, chatting networks etc.

Increase the information flow, thereby increasing the intellectual capital; As more information channels are identified and brought to surface, more and more employees will use them to converse, exchange information, seek and learn, share ideas and work in close collaboration (there is empirical evidence to show that sharing and creating information increases an organization's capacity to innovate). All the mature organizations today face challenges in managing innovation. The

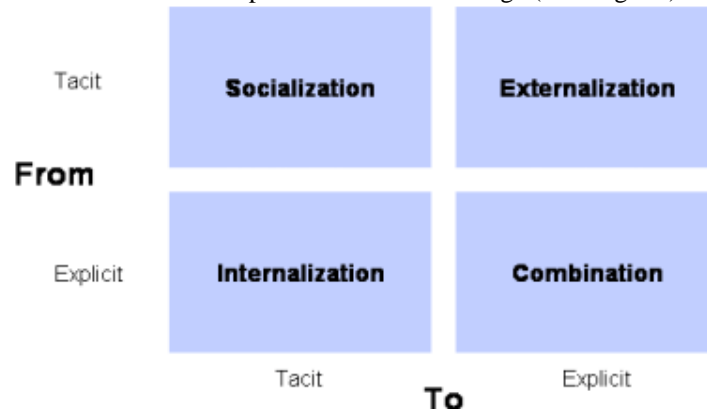
conventional approach of managing innovation through passionate individuals (an innovation manager and a sponsor for example) is not sufficient anymore to nurture, develop, commercialize, integrate and protect an innovation. In this context as we saw, knowledge management emerges as the overarching process that can help organizations to create and sustain a culture of innovation in its operational and commercial strategies

VII. KNOWLEDGE CONVERSION AND THE KNOWLEDGE SPIRAL

As noted in the Essence of Knowledge Management, managing knowledge means dealing with both tacit and explicit knowledge. One of the challenges is deciding how best to share tacit knowledge: what to share through tacit-to-tacit (person-to-person) processes, and what to convert to explicit knowledge, so that it more easily transferable. The work of Nonaka and Takeuchi gives a good conceptual background to consider these options, and others besides. They enunciated two key concepts - that of knowledge conversion processes and the knowledge spiral.

Knowledge Conversion Processes

Nonaka and Takeuchi defined four types of conversion processes which they describe as "fundamental to creating value". The four are the combinations of conversion of explicit and tacit knowledge (see diagram).

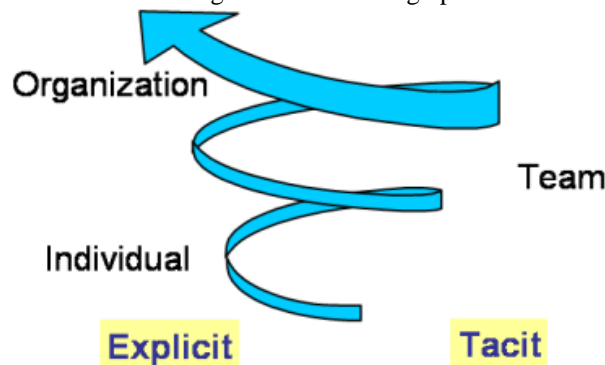


1. Tacit-to-tacit (socialization) - Individuals acquire knowledge from others through dialogue and observation
2. Tacit-to-explicit (externalization) - The articulation of knowledge into tangible form through elicitation and documentation
3. Explicit-to-explicit (combination) - Combining different forms of explicit knowledge, such as that in documents or databases
4. Explicit-to-tacit (internalization) - Such as learning by doing, where individuals internalize knowledge into their own mental models from documents.

It indicates that the conversion from one type to the other (i.e. tacit-to-explicit and vice versa) gives the most added value. Thus, knowledge once in explicit form can be more easily distributed, but then it does need converting and assimilating into another person's tacit knowledge for application in a different context.

The Knowledge Spiral

As per Nonaka and Takeuchi the key to knowledge creation lies in the mobilization and conversion of tacit knowledge". They go on to describe how organizational knowledge is created through processes in the knowledge spiral shown below:



Organizational knowledge starts at the individual level with thoughts or understanding (internalization). It then moves upwards through socialization, where individuals dialogue with their team colleagues. The ideas are then articulated (externalization) and become more widespread through diffusion of explicit knowledge (combination). As knowledge moves up the spiral knowledge is more widely spread and the spiral gets wider.

What also happens is that as individuals access organizational knowledge, they apply it and internalise new knowledge, thus setting the stage for an enhanced piece of knowledge to work it's up the spiral

Summary:

Knowledge management activities are adding value to organizations by enhancing Innovation and innovativeness. While the results are far from linear, survey respondents indicate numerous ways in which knowledge could be, or at least should be, leveraged to add value to the creation, development, and implementation of new product and process ideas. The organic nature of innovation means that it may be influenced, and may be even directed to some extent, but it does not lend itself to control. Measuring and managing the economic value of knowledge, for instance, contributes little to the creation of new ideas, but it does allow more accurate feedback about the impact new ideas have on their respective markets, internal or external. Management's

role appears to be to carefully combine activities which enable and encourage ideas to be generated and grow, support their diffusion, and harvest the value for the organization.

Knowledge management is one set of approaches to doing this which seems to meet with some success. I have explored here the impacts of knowledge management on innovation, but our investigation has only scratched the surface. Further research still needs to be done on the specifics of the innovation/knowledge management interaction, especially around factors of causality, differences among various types of innovation and their knowledge needs, and industry- and company-level variations in implementation and diffusion patterns. In addition, the *isay* versus *ido* gap needs further investigation, since answering interview and survey questions presents one set of perspectives, but knowledge work and innovation can be very subjective activities, many of which are purely tacit. Direct observation is certainly necessary. The difficulties in researching these two quite amorphous areas are many, but we believe in the value and usefulness of understanding critical impact points. While there may never be an explicit knowledge-to-innovation translation mechanism, we will continue to explore how to support growth and innovation efforts through more effective knowledge management.

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