Knowledge Management — Converting Expertise Into Processes and Systems:
Lessons from the Mature Industry

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Knowledge, on the face of it is an intangible asset for the organization. The need of managing knowledge is paramount in the software industry where ad-hocism is still at its highest. Software engineering attempts to systematize at least some amount of expertise (an intangible) into a process (which is more tangible). Practical experience suggests that dependence on people is a norm rather than exception. However, with systematic efforts of documenting the process and the expertise, it is many-a-time possible to reduce this dependence substantially. Process, then becomes an asset, which can produce products of substantial value. Lessons can be learnt from process evolution and process maturing of the conventional engineering industry. Rigor of process implementation has two sides as usual. These are acceptability of the specified rigor for process implementation and predictability of the outcome of defined processes. More the rigor, lesser is likelihood of acceptability by the people. This refinement of process of production than the product itself has created the ability to perform the same task at a much lower skill and knowledge level. The mechanism to institutionalize knowledge should not depend on the 'kind' of knowledge but should be more general purpose than that. Converting knowledge into easy to follow process is the proposed answer to the knowledge management.

Introduction

Advances in information technology and the nature of work in the 90s have given rise to a term — 'knowledge worker'. Knowledge, on the face of it is quite an intangible asset for the organization. Managing the intangible has become a most needed function in any organization in the 90s.

This need of managing knowledge is paramount in the software industry where ad-hocism is still at its highest. It is interesting to observe the maturing process of the more conventional industry of today and how has it transformed knowledge into real assets through processes.

Software engineering attempts to systematize at least some amount of expertise (an intangible) into a process (which is more tangible). Having acknowledged the role of better and different HR practices for the knowledge industry, it should be understood that it is not enough. It is required to analyze and understand the real pitfalls in creating a work product such as a software program. Practical experience suggests that dependence on people is a norm rather than exception. However, with systematic efforts of documenting the process and the expertise, it is many-a-time possible to reduce this dependence substantially. Majority of problems observed in the end product can be attributed to process (or lack of it!) than expertise. This obviously does not obviate the need for expertise but stresses the need for process, which makes expertise manageable. Process, then becomes an asset, which can produce products of substantial value.

Maturing Process of Engineering

It is interesting to note the evolution and maturing of the conventional engineering industry. This industry, in its infancy, was only as good as the current state-of-the-software-industry. Various aspects, which helped this industry to mature, can well be identified. The paper also discusses these aspects, which have helped the engineering industry manage its knowledge and present itself in its current state. There are substantial lessons, which can be learnt from these experiences by its modern day counterparts the software industry.

The paper also touches upon the differences in methods of knowledge management of the past and the present. Issues of relationships as intangibles and why are these important in the present knowledge management context, is also discussed.
Defining processes needs substantial thinking. It also needs thinking from the psychological perspective of those who would use these processes. Rigor of process implementation has two sides, as usual. Two sides, which need consideration, are acceptability of the specified rigor for process implementation and predictability of the outcome of defined processes. More the rigor, lesser is likelihood of acceptability by the people (those who are expected to follow the process). At the same time, more rigor is more likely to yield better and more predictable results. Better predictability means success of having managed the knowledge better. The paper also addresses this dichotomy.

**Knowledge Management — Past and the Present**

Knowledge management is not necessarily a new faculty. It has existed for quite some centuries. One of the reasons, as to why its importance is growing, is the fact that rate at which knowledge is being created is increasing at a much faster pace that in the past.

We can take some interesting examples which underline the knowledge management practices at large. Take a simple example of manufacturing as simple an item as nail. Those who invented this item and its application needed painfully long time and effort (including intellectual), to ensure that the nail was indeed according to specification. This is attributed to a very crude process adapted for manufacturing the nail. This lack of refined process made it difficult to:

(i) Ensure the quality and dependability of the product.
(ii) Manufacture the product on larger scale.
(iii) Make the manufacturing process largely independent of the expert.

And there could have been more difficulties than this. If we really try and understand this evolution, we can safely say that much of the ability to produce products in large quantities can well be attributed to process research. This refinement of process of production than the product itself has created the ability to perform the same task at a much lower skill and knowledge level — in cases almost trivially — over a period of time.

Fundamentally the methods adapted by our historical counterparts should even be effective today. The issue however is the 'rate' at which new knowledge comes to the fore and the older one becomes obsolete. The most important intangible asset that we need to strive and create today — is imbibing ability in individuals to learn and adapt to changing technologies and with those altogether new applications which were never thought of (knowledge).

As an organization the issue is becoming more and more grave. Focus of larger percentage of organizations is on trying to retain (manage?) knowledge by having the same people around. Though retention is certainly one of the most important aspect of knowledge management, it cannot compensate fully for building mechanisms of learning and building mechanisms to ensure that the knowledge is retained at the organization level (than at the individual level). Another interesting aspect of current-day knowledge management problem, is the fact — that by the time you discover ways to manage your current knowledge — that knowledge becomes obsolete. This also means that the mechanism to institutionalize knowledge should not depend on the 'kind' of knowledge but should be more general purpose than that. This problem is certainly new and probably quite different from the past.

Another aspect causing substantial difficulty in the efforts to manage knowledge better is the cultural shift. Knowledge workers thinking processes have changed substantially. There has been a marked difference in level of importance of 'things to do' from organization perspective and those from the individual perspective. Lack of this alignment makes knowledge management even more difficult.

**The Dichotomy — Process Rigor vs Implementation Difficulty**

Defining processes needs substantial thinking. It also needs thinking from the psychological perspective of those who would use these processes. Rigor of process implementation has two sides as usual. Two sides, which need consideration, are acceptability of the specified rigor for process implementation and predictability of the outcome of defined processes. More the rigor, lesser is likelihood of acceptability by the people (those who are expected to follow the process). At the same time, more rigor is more likely to yield better and more predictable results. Better predictability means success of having managed the knowledge better. The paper also addresses this dichotomy.

Average age of a current day knowledge worker is between 25 and 30 y. It is extremely difficult proposition to have young engineers at this age to appreciate and assimilate the need for processes (Could even be
personal processes!). It is even more difficult for them to understand the organization perspective in ever-changing business orientation of current day organization. Look at the new business models emerging — which talk about create a team and technology and sell that to the larger entity — business harvesting as it is called. In such a scenario, knowledge management aspect is to be dealt by the larger organization than the one, which got sold!

Experience suggests that the need for process is understood, only when one goes through problems arising out of lack of processes! Realization of the fact that processes play an important role comes in when individuals are presented with whole project or problem responsibilities and work is expected to be performed by the team. This is the situation when there are substantial integration issues expected to throw up, while putting together the work done by team members.

In a typical software project, this integration becomes messy, difficult or in cases impossible when there are no cohesive processes followed by team members. An individual — who had been team member till yesterday, realizes the importance of standards, processes and compliance almost overnight, once he lands up with the whole project responsibility!

The approaches attempted are varied. There seems to be no panacea for this problem of dichotomy. One of the approaches is to take on new people and provide them no choice, but using stringent guidelines for process compliance. This has a potential negative impact of limiting their creativity. Other approaches are based on use of standard components for pieces of development — to force discipline. This is a good approach and is not as traumatic to the developer. Reason being, it alleviates some of his/her problems of doing some mundane but most required aspects of development. At the same time — it helps the organization to keep the varying styles in check.

Organization always wants to manage knowledge to ensure that it becomes integral part of the organization, without becoming a specific attribute of a team member. Converting knowledge into easy to follow process is the proposed answer to this 'want'.

About the author

Ajay Phatak received his B Tech in Chemical Engineering from Indian Institute of Technology, Bombay. Having worked in industry for a while he returned to academics to complete his Masters in Computer Science. He has been working in Process Modeling, Simulation and Control software development for a while before co-founding a company, Jopasana Software in 1989. The company focuses on Real time and mission critical product development (application enablers and software tools in varied areas) and deployment for local as well as international customers. His current interests include combining emerging technologies and aspects of behavior to institutionalize knowledge apart from communication and Internet technology as an enabler of new applications.