ROZDZIAŁ 8

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INSTITUTIONALIZATION OF KNOWLEDGE SHARING IN A SOFTWARE DEVELOPMENT ORGANIZATION

1. INTRODUCTION

While knowledge management is the driving horse of any software and systems R&D organizations, there is a commonly known pitfall when knowledge management practices are developed either only at the grass-roots, or only at the level of higher level strategy and without tying them together. This chapter presents research showing methods and practices desired by engineers for institutionalization of the knowledge sharing across the organization.

2. KNOWLEDGE MANAGEMENT IN SOFTWARE PROJECT ORGANIZATIONS

Knowledge is information of which a person, organization or other entity is aware. Knowledge is gained either by experience, learning and perception or through association and reasoning. The term *knowledge* is also used to mean the confident understanding of a subject, potentially with the ability to use it for a specific purpose [Wikipedia 2007].

Research and development is driven by knowledge, so knowledge management should be a crucial field of interest to software and systems engineering organizations. According to KPMG publication [Strojny 2004]:

- Less than half of Polish enterprises has knowledge management strategy
- From that part, only in two thirds of them the strategy is formalized and written
- Moreover, in majority of those firms driving force of knowledge management is HR department. Only in 2% of organizations the driving force is R&D department.

Low activity of R&D departments in knowledge management activities may be somewhat surprising: this is the department responsible, by delivering innovations, for building knowledge and for success of the organization. For a savvy observer, it seems to be almost impossible that R&D department may be even able to function properly without at least informal knowledge management system. There may be proposed a few

reasons why KPMG research indicates so small participation of R&D in creating and improving knowledge management [Kowalczyk, Szczerbicki 2007b]:

- Not all organizations have dedicated R&D department. Often the organization unit responsible for innovations may be positioned in other departments, like: production, marketing, IT.
- R&D in many organizations is perceived as a kind of a black box. The black box is given with input in a form of requirements for a new product or innovation. Then it is expected to return specified output by specified time. Because KPMG research was addressed to higher management, it is likely that respondents were not aware of the knowledge management processes in R&D departments.
- Because of diverse and unpredictable knowledge sharing needs, R&D departments tend to create own processes and tools for knowledge management. Usually they do not care of aligning them to and of tying with the overall knowledge management strategy of the organization.

Success of a software project oriented organization, possibly even more than of other types of organizations, depends on its R&D department. R&D is usually responsible for the whole product lifecycle. From the very beginning, starting at requirements stage, through design and development until maintenance stage, R&D departments are mainly responsible for the product shape, functionality and parameters. While supported by marketing, customer services, and others, the R&D is on the critical path. This makes knowledge management in R&D even more important for software project organizations than for the generality of business.

3. UNDERSTANDING OF KNOWLEDGE BY R&D ENGINEERS

Knowledge management institutionalization in R&D should be preceded with prior analysis of needs and preferences of the engineers. Moreover, first should be evaluated whether R&D engineers understand knowledge processes.

Intel Technology Poland (ITP) is an R&D site of Intel Corporation, located in Gdansk, Poland. About 300 employees work there, mostly R&D engineers (Software and Hardware). The engineers were asked about their understanding of knowledge and their opinion on best ways to share knowledge. Note that although engineers were directly requested to respond according to their personal point of view, the answers are likely to be influenced by their workplace. ITP has a reputation of a very strong process-oriented culture and mature approach to software and systems development process. Because of that results of similar research in the overall of the software development industry might have been significantly different.

80 persons were asked to fill the survey. 40 of them have been randomly selected from all the engineers in ITP. Next 40 have been selected based on criterion of their active contribution to ITP's Wiki-based knowledge base ("top writers list"). Here are presented results of the first, control group. 25 persons from the group responded to the survey.

About 2/3 of respondents correctly believe they are knowledge workers (Fig. 1). Majority of the remaining part is not sure about that. Only two persons think they are not knowledge workers.

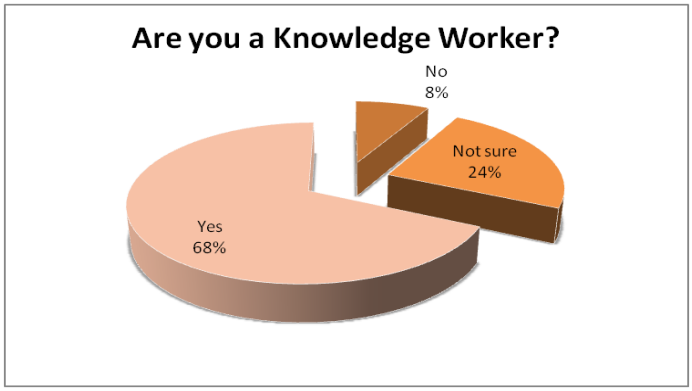

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Figure 1. Results of the opinion survey on a sample of ITP engineers

There is no uniform, widely accepted definition of knowledge, although survey attempted to ask engineers what is knowledge. They were provided with some options and also allowed to respond with custom definition if none of the provided fit their opinion. What is important, 68% of the respondents seem to understand what knowledge is – they know that full understanding of the subject and ability to use this understanding are major attributes of knowledge. Remaining respondents do not distinguish knowledge from plain data or information, as shown on fig. 2.

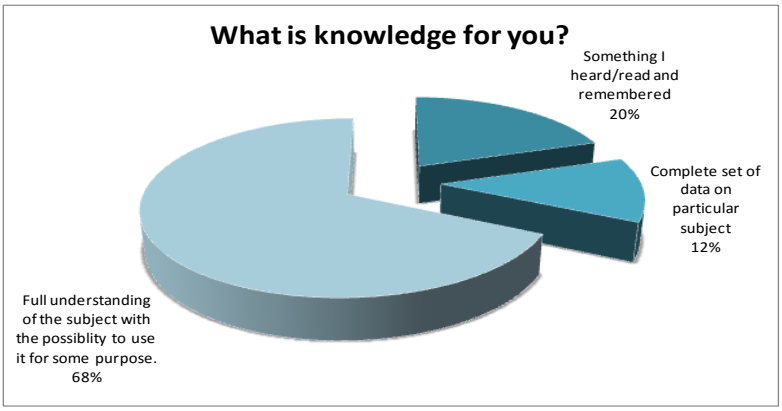

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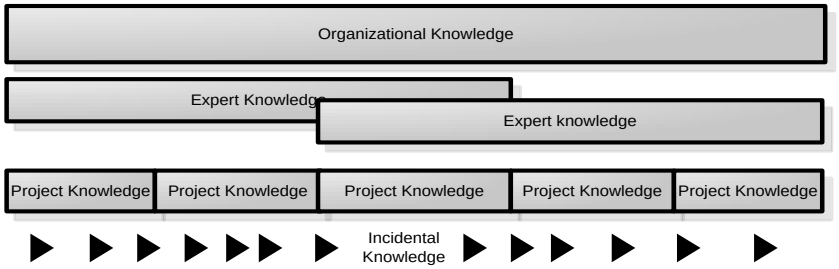
Figure 2. Results of the opinion survey on a sample of ITP engineers

4. ORGANIZATIONAL LEARNING

Kowalczyk and Szczerbicki [2007a] have been presented a proposal how to classify knowledge in a software development organization. The classification is based on a lifetime (usefulness time) criterion. The classification, is presented on Fig. 3 and elaborated below, ordered by knowledge usefulness time:

– Incidental knowledge: knowledge about a single, incidental issue. Shortest lifetime.

– Project knowledge: knowledge about a single project. Useful until the project ends.
– Expert knowledge: knowledge about particular area. Useful between projects
– Organizational knowledge: useful in whole organization. Longest lifetime.



Source: [Kowalczyk, Szczerbicki 2007a].

Figure 3. Knowledge classified regarding its lifetime

There can be identified various transmissions of knowledge from one kind to another. The most important transmissions, from organizational learning point of view, are the transmissions from incidental knowledge and from project knowledge into organizational knowledge.

Engineers were asked about their opinion how an organization can learn from individuals and individual events. Results are presented on Fig. 4. About 68% are in favor of systematic approach: regular project meetings, employing process improvement system, peer reviews, working directly with other persons. 16% rather see the best opportunity for an organization to learn in special events like post project reviews or severe issues escalations. Surprisingly, 12% of respondents do not believe that big organizations can learn anything.

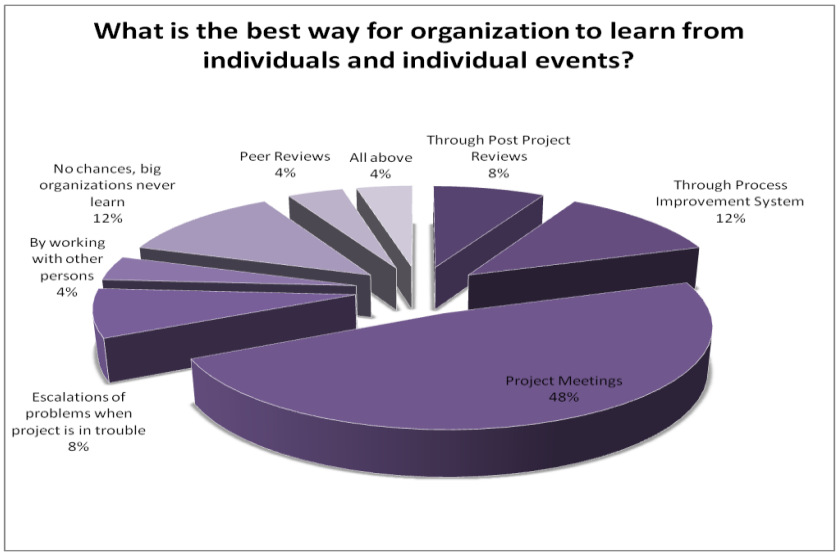


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Figure 4. Results of the opinion survey on a sample of ITP engineers

4. INSTITUTIONALIZING KNOWLEDGE SHARING

According to survey results, engineers generally believe that knowledge sharing can be improved. For majority (see Fig. 5) the best way to improve knowledge sharing is to provide workers with simple and always available tools supporting searching and sharing knowledge. Some of the engineers also believe that a special "process for knowledge sharing" could be created – this is another manifestation of the strong process culture in ITP. Some other persons believe that proper motivation system (rewarding employees) would improve knowledge sharing.

A research done in non-government organizations (NGO) in 2005 [Łapniewska, Szczerbicki 2005] revealed that lack of technology supporting knowledge sharing is the major obstacle for NGOs. KPMG research [Strojny 2004] also reveals that 35% of surveyed companies do not use technology to share knowledge. This research shows that majority of engineers in ITP believe that simple, accessible tools are the most important way to improve knowledge sharing.

Knowing those three research results should lead to question whether companies and research studies put enough focus on how to waterfall "knowledge management strategy" to the lowest operational level. Although, based on KPMG report, 46% of organizations possessed KM strategy, only 64% of them (i.e less than 30% of the sample) have this strategy documented and formalized. This can lead to conjecture that only in 30% of organizations knowledge management strategy is really alive.

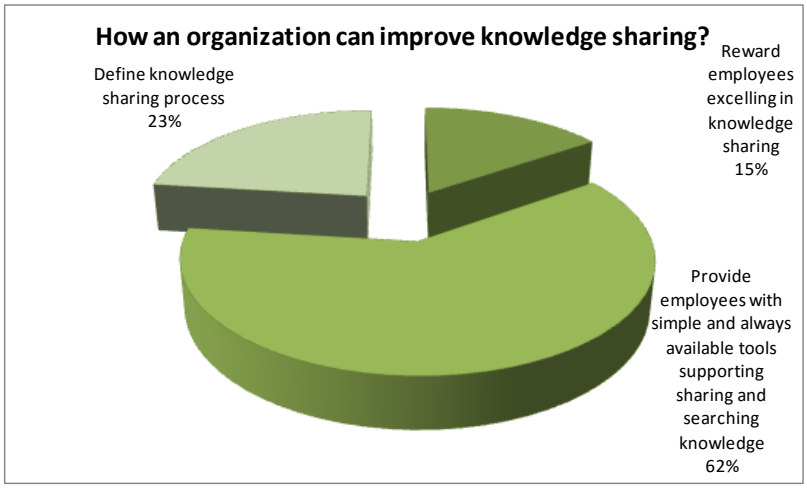

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Figure 5. Results of the opinion survey on a sample of ITP engineers

The strategy cannot be realized without proper tactics implementing the strategy. Tactical level management should find right ways and tools to support operational level in sharing knowledge. Knowledge sharing tools, as confirmed by ITP engineers, seem to be very important working aid and engineers in the researched organization believe that they can improve knowledge sharing practices between individuals across the organization. Of course, evaluation and introducing such tools may be not enough, but seems to be *sine qua non* for making companies more efficient and knowledge centric.

People are perceived as the most important value of many organizations. This especially applies to R&D, because they carry the most important and the less shareable value – tacit knowledge. Organization should help employees to share knowledge and provide knowledge sharing platform for that [Kowalczyk, Szczerbicki 2006a,b]. Externalizing knowledge is also supported by many process areas of CMMI model. Although CMMI does not explicitly require any single knowledge sharing platform, it requires sharing specific categories of information and knowledge and making that information and knowledge available to all stakeholders [CMMI 2006].

5. CONCLUSIONS

When results of the researches presented here are connected, they may lead to conclusion that the problem of employing proper tools supporting knowledge management processes is underestimated. Surveys and organizations focus on strategic level because it is simple to define for higher management. Then the strategy is not hammered out into proper tactics, which should discover and deploy appropriate tools and processes around the tools.

DISCLAIMER

The paper presents personal opinions of the authors. There are no official Intel opinions presented.

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