



Tacit knowledge acquisition and sharing in a project work context

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Abstract

In this article we address the question of what kind of social engagements provide the proper project work context for tacit knowledge acquisition and sharing to take place. In pursuit of this objective two epistemological assumptions are presented, and the analytical tool for understanding the behaviour of project team members, the Holistic Concept of Man, is illustrated and discussed. Project as a context of tacit knowledge utilisation is discussed, and different factors and situations that affect acquisition and sharing of tacit knowledge in project work, are analysed. The results of the study suggest that the situations, where the members of a project team can interact face-to-face with each other, reinforces tacit knowledge sharing. Also used language, mutual trust and proximity are factors which affect the grade of tacit knowledge utilisation in project work.

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1. Introduction

Tacit knowledge represents knowledge based on the experience of individuals. It expresses itself in human actions in the form of evaluations, attitudes, points of view, commitments, motivation, etc. Usually it is difficult to express tacit knowledge directly in words, and often the only ways of presenting it are through metaphors, drawings and different methods of expression not requiring a formal use of language. On the practical level many experts are often unable to express clearly all they know and are able do, and how they make their decisions and come to conclusions.

Polanyi [26] encapsulates the essence of tacit knowledge in the phrase “We know more than we can tell”, and provides further clarification of the concept in such commonplace examples as the ability to recognise faces, ride a bicycle or swim without even the slightest idea of

how these things are done. Rosenberg's ([29], p. 143) description of traditional technological knowledge, accumulated in crude empirical ways with no reliance upon science, provides a good definition of tacit knowledge in technology companies: “The knowledge of techniques, methods and designs that work in certain ways and with certain consequences, even when one cannot explain exactly why”. Thus, tacit knowledge equals practical know-how.

However, in project work context the significance of tacit knowledge has probably not yet been sufficiently understood. The fact that a great deal of the know-how required, for example, in an engineering project is tied to knowledge that is not written in documents but realised through the expertise and understanding of the project personnel, is not taken into consideration as a whole. Also the fact that projects often last only for short time periods, which means that project people must continuously change their work situations, is not taken well into account.

This study on tacit knowledge utilisation in projects explores the situated character of human understanding and interaction in a project work. It focuses on the relationship between tacit knowledge utilisation and social

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situations in which it occurs. The study asks what kind of social engagements provide the proper project context for tacit knowledge acquisition and sharing to take place.

In pursuit of this objective we first highlight project as a context of knowledge utilisation. Second, two epistemological assumptions are illustrated to get an insight into knowledge and its formation. Third, our analytical tool, the Holistic Concept of Man, will be introduced and discussed. And fourth, we analyse factors and situations in projects in which tacit knowledge acquisition and sharing take place.

2. Project as a context of knowledge utilisation

A project is an organisation of people dedicated to a specific purpose or objective. Projects generally involve large, expensive, unique, and high risk undertakings which have to be completed by a certain date, for a certain amount of money, within some expected level of performance. At a minimum, all projects need to have well defined objectives and sufficient resources to carry out all the required tasks. Project characteristics, that all together are needed, are of a temporary nature, with specified end-results, of a non-recurrent character, with complexity and significance.

When an individual performs a task, s/he needs a competence. The competence of an individual member of a project team can be divided into three sections [17]: (Fig. 1)

- *Explicit knowledge*, which is the type of knowledge that an individual has acquired mainly in school and university. Explicit knowledge implies factual statements about such matters as material properties, technical information, and tool characteristics. Thus, explicit knowledge can be expressed in words and numbers, and is therefore easily communicated and shared.

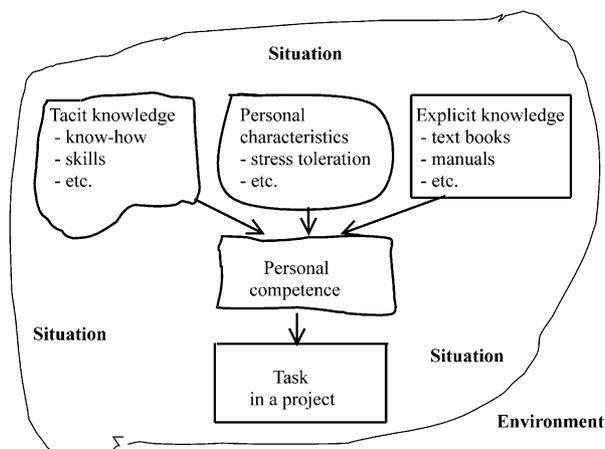


Fig. 1. Knowledge tree. (Adopted from the idea of Bohn [8]).

- *Tacit knowledge*, which is highly personal and hard to communicate or to share with others. Tacit knowledge is deeply rooted in an individual's experience, and it consists of schemata, belief, and perceptions stored so deep in the worldview of an individual that we take them for granted.
- *Personal characteristics* such as stress toleration, which either enhance or decrease an individual's ability to perform a task, and which are also a part of individual's competence.

Thus, tacit knowledge is a part of an individual's competence. However, it must be noticed that "...knowledge is about specific insights regarding a particular topic, competence is about the skill to carry out work" ([38], p. 106).

Although every project is unique and different, it is, however, possible to roughly classify projects into different categories in accordance with the need to use explicit and tacit knowledge in them:

- Research-, development-, and design projects are projects in which the goals of the projects are not always clear at the outset of the work. Also the means and procedures needed in the course of the project implementation are often unclear. This means that at the outset of the project the possibilities to foresee the future results and success of the project are rather poor. Thus, we can conclude that abundant use of tacit knowledge is often necessary in these types of projects.
- Delivery- and investment projects are projects in which the goals of the projects are often clear at the outset of the work. Also the means and methods needed in the implementation of the project are usually well known. This means that the possibilities to foresee the results of the project at the beginning of the project are good. Thus, we can conclude that the possibilities to use mainly explicit knowledge in these types of projects are good.

All of the knowledge needed by a project is visualised by Fig. 2. The trunk of the tree describes the project output. The branches from the trunk are the main activities that affect the outcome of the project. Branching off from each of these main activities are sub-activities, which together with the main activities collectively determine the outcome of the project. The shading of each activity represents the stage of knowledge. White colour (invisible) represents tacit knowledge, while black colour represents explicit

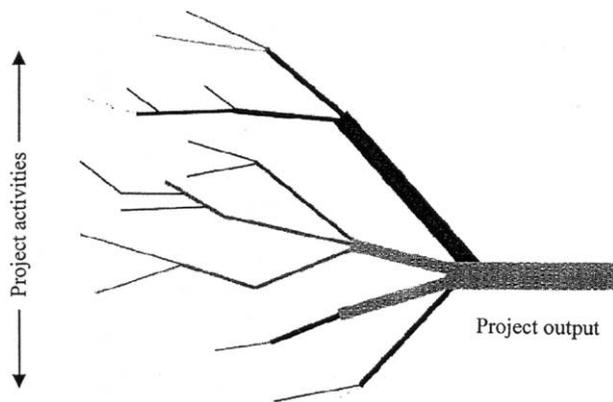


Fig. 2. Personal competence.

knowledge. The thickness of the each branch represents its importance to the project (c.f. [5]).

In an ideal case a project would have much explicit knowledge and little tacit knowledge about the activities to be implemented. However, in practice a project team is likely to know only a little about some important issues. For example, knowledge about customer needs is often unclear at the outset of a product development project. Conversely, the project team may have a lot of explicit knowledge about some unimportant tasks.

Indeed, a project can be seen as a knowledge intensive task, which can be approached in terms of the quality and quantity of the knowledge. Therefore the brief discussion of the next section concentrates on epistemological assumptions with the purpose to get an understanding what is knowledge and how it develops.

3. Epistemological assumptions

Epistemology is a branch of the grand divisions of philosophy and deals with the views of interpreting knowledge, i.e. the ways of knowing. With organisational epistemology we can construct a theory on how and why organisations, like project teams, know. Organisational epistemology deals with some core questions: what is knowledge, how does it develop, and what are the conditions for knowledge to develop (c.f. [38]).

Differences in the epistemology are manifested in different ways to categorise knowledge. For example, by uncovering the epistemological roots of different projects one can better understand the characteristics of knowledge management needed in those projects. The managerial practises employed in a project have to match the specific nature of knowledge. “In order to manage knowledge assets, we need not merely to identify them but to understand them—in depth—in all their complexity: where they exist, how they grow, how managers’ actions affect their viability” ([18], p. xii). According to Venzin et al. [35], being familiar with

different possible epistemologies means having a larger knowledge management repertoire, and a better understanding of the limitations of each approach.

The epistemological distinction that is highlighted in the following is based on the contributions of Varela et al. [34] and von Krogh et al. [37]. These authors refer back to cognitive science because it has been the most influential for scientists studying organisational knowledge. The following sub-sections provide a short illustration of the two epistemologies.

4. Cognitivist epistemology

Organisations are considered to be systems which develop knowledge by formulating increasingly accurate representations of their pre-defined worlds. Because knowledge is seen as a representation of these worlds, knowledge accumulation and dissemination are the major knowledge development activities in organisation: the more explicit knowledge organisations can gather, the closer the presentation is to reality. Hence, the cognitivist epistemology equates knowledge only with explicit knowledge.

When gathering knowledge from the external environment the brain stores facts, relates them to existing experiences and creates a picture of the world. The world is considered to be a pre-given object, event or state, which can be perceived in an objectivistic way. What varies from one person to another is the ability to represent reality. The truth of knowledge is understood as the degree to which inner representations correspond to the world outside. As new things are learned, this truth will be constantly improved. Learning in the cognitivist epistemology means taking knowledge from the environment and relating it to the previously acquired frames of reference, to the cognitive map [33].

5. Autopoietic epistemology

Autopoietic epistemology provides a fundamentally different understanding of the input coming from outside an organisation. Input is regarded not as knowledge but as data, i.e. knowledge is data put into a certain context. This means that knowledge cannot be directly conveyed from one individual to another, because data have to be interpreted.

When a teacher delivers a speech, two students build different knowledge. The transmission by the teacher is the same for the two of them, but the knowledge produced is different: knowledge therefore cannot be transmitted but only produced [36].

Thus, knowledge can only be produced, not imported. This is to say that the only way to acquire new knowledge is to utilise existing knowledge. For example,

within a project team the members cannot provide knowledge, but they can help in formation of situations where an individual team member can produce new knowledge.

Unlike the cognitivist epistemology, autopoietic epistemology does not claim that the world is a pre-given, but cognition is a creative function. Thus, knowledge is a component of the autopoietic, i.e. self-productive process. This means that knowledge is context dependent and situation sensitive [20,34]. Furthermore, knowledge is not abstract but is embodied in the individual, in other words, everything known is known by somebody. "...knowledge depends very much on the point of observation. Where you stand or what you know determines what you see or what you choose to be relevant" [38].

According to the discussion above, we choose the autopoietic epistemology to be the basis of our understanding of knowledge acquisition and sharing in projects. This also means that we reject the common understanding according to which explicit knowledge can always be easily transmitted. (see Table 1).

6. The Holistic Concept of Man

Because knowledge is embodied in the individual, we define the notion of an individual in a way that is compatible with the autopoietic epistemology. Our choice is the Holistic Concept of Man (HCM). The Holistic Concept of Man [24,28] is a concept which consists of an individual's three basic modes of existence: consciousness, situationality, and corporeality. These three modes of existence are defined as follows:

- *Consciousness* is existence as a psychical-mental phenomenon, as experiencing (the mind)
- *Situationality* is existence in relation to a certain part of reality, i.e. the world or the environment (the situation)
- *Corporeality* is existence as an organism with organic processes (the body).

The HCM obtains its meaning, not in a concise definition of its boundaries, but in its multiple, theoretically generative interconnections with persons, activities,

knowing, and the world. In other words, the HCM takes into account an individual's knowledge and skills that s/he uses in the implementation of a task, and the knowledge and skills s/he acquires while doing/using different things in different situations.

The Holistic Concept of Man that is clarified in the three following sub-sections is based on the contribution of Pihlanto [24], who, in turn, refers to Rauhala's [28] philosophical work.

7. Consciousness

Psychical-mental activities constitute, in the form of a continuous and almost uninterrupted process, the consciousness of an individual. An object in the situation of an individual, for example a task in a project, provides the consciousness with meaningful content. A meaning emerges in the consciousness as this content becomes referred to the object located in the situation in such a manner that a person understands what the object implies. This is, a person understands an object in terms of a meaning. The network of all meanings accumulated in the consciousness is called the worldview of an individual. The worldview is continuously redefined as new meanings emerge on the basis of new contents from one's situation.

All in this process occurs in terms of understanding, which means that a person knows, feels, believes in and dreams about phenomena and objects in his/her situation in terms of their 'being something'. Understanding is complete only after a meaning is generated. Meanings are components from which the world as people experience it is constructed. In the consciousness, a continuous restructuring of meaning occurs. Meanings are often forgotten, fading into the unconsciousness and perhaps retrieved into the consciousness anew. An important condition from our point of view is that knowledge (both explicit and tacit knowledge) is 'stored' in the worldview of an individual in terms of meaning.

8. Situationality

Situation is that part of the reality with which a particular individual forms a relationship. Situationality, then, is the totality of the relationships of a person to

Table 1
Cognitivist vs. autopoietic epistemology (Modified from [37])

Cognitivist epistemology	Autopoietic epistemology
Knowledge is a representation of a pre-given reality	Knowledge is creational and based on distinction making in observation
Knowledge is universal and objective	Knowledge is history dependent and context sensitive
Knowledge is transferable	Knowledge is not directly transferable

his/her situation. It is exactly this personal relatedness that makes situationality an individually accentuated concept: every individual's situation and situationality is unique, because it is only the person in question who lives exactly within a particular personal situation.

The situation of an individual consists of a multitude of structural components, which may be concrete or ideal. The former include all kinds of physical factors, and the latter such things as values, norms, human relationships as experienced contents, etc. Thus, situationality is the totality of relationships of a person to all concrete and ideal components of his/her situation. According to the Holistic Concept of Man situationality is not simply the entity of the relations to the external factors which have a causal influence on an individual, but is more basic in nature: a human actor not only comprises consciousness and corporeality, but also situationality.

This view accentuates the great relevance the particular objects and ideas in a person's situation have in shaping his/her behaviour. For example, many phases and situations in project implementation provide concrete components of situations of individuals working for a project.

In sum, situationality is useful notion, because it connects an actor to his/her environment and even assimilates these two. In addition, situationality is linked with and dependent on the other two dimensions of an actor: an occurrence in one of these three has an immediate reflection on the other two. This makes an individual an extremely complex phenomenon—a three dimensional totality.

9. Corporeality

Corporeality must not be dismissed in a project work context, due to the fact that all three modes of existence appear inseparably linked: they can never be independent of each other.

While situation is the 'game venue' in which corporeality, but also consciousness is located and dependent on, corporeality establishes the physical side of the existence of a human being and simultaneously makes the other two possible. Consciousness, then, steers the course of one's physical existence in a situation in terms of meanings and understanding, but is, of course, dependent on the physical processes of corporeality. In more ordinary terms, what we think is dependent both on the situation in which we are placed and the nervous system, brain and other corporeal functions.

According to the autopoietic epistemology, knowledge is situation sensitive and embodied in the individual. This means in terms of the HCM that knowledge is located in an individual's worldview in the form of meanings and thus it refers to objects in the situation of an individual.

10. Situational acquisition and sharing of tacit knowledge in a project work context

Only seldom does a single person know enough to solve complex problems faced in projects. In many projects knowing how to find and apply relevant knowledge efficiently is more practical than trying to master a large amount of knowledge. However, it is often assumed in projects that people turn to databases and procedure manuals to obtain information. In practice a team member often relies upon other team members for knowledge and advice. Rather than turning to databases an individual seeks knowledge from trusted and capable colleagues. This is in line with our argument that knowledge is essentially embodied in the worldview of individuals. According to Handy [12] people are about five times more likely to turn to friends or colleagues for answers than to other sources of information. In short, this situational condition means that who you know significantly affects what you eventually know.

In many projects the distributed technology is at the heart of knowledge management. Most initiatives have concerned identifying relevant knowledge in various places of an organisation in order to build a technical infrastructure to support knowledge capture and dissemination. Knowledge repositories often contain reports, memos, and other work documents. Ideally, these technologies allow a project to apply its collective intellect to any problem, regardless of time or geographic location.

However, databases only complement the personal networks of those seeking answers to problems. No matter how robust the search functionally, a person's network of human relationships often determines which knowledge s/he access. People usually take advantage of databases only when colleagues direct them to a specific point in the database. Rather than engaging in an extensive search through a company's repository of knowledge, employees turn to friends and peers to learn where to find relevant knowledge.

A key to tacit knowledge acquisition and sharing in a project is access to a wide range of project's activities, to ideas of the other people, to information, and to opportunities for participation. Thus, we can conclude that knowledge within a project and the ways of perceiving it is revealed through interaction. Also we can conclude that a project team, which is a part of the social world—the situation of team members—, is reflected in multiple ways and can become further 'field of transparency', just as it can remain opaque.

In general scepticism about communicability of tacit knowledge is often identified as a factor which might explain why tacit knowledge is not easily shared. Hamel [11] and Badaracco [2] emphasise that tacit knowledge, by its very nature, is difficult to acquire and transfer. According to them, this type of knowledge is highly

context and history dependent, in other words, influenced by individual situationality. Even though these authors stress the difficulties of transfer, this type of knowledge is not seen as impossible to transfer. To get a better understanding of these difficulties, in the following discussion, we analyse with the help of the Holistic Concept of Man, situations and factors that affect the acquisition and sharing of tacit knowledge in a project work context, namely interaction between people involved, language, trust, and proximity.

11. Interaction between people involved in a project

Projects process information using many channels, and research indicates that these channels are not equal in their capacity to facilitate knowledge. Literature dealing with management considers the transfer of knowledge, in terms of media richness, as a determinant of the extent to which knowledge is successfully transferred. The richness of the media can be analysed in terms of two underlying dimensions: the variety of cues that the medium can convey and the rapidity of feedback that the medium can provide [8,3]. Media have varying capacities for resolving ambiguity, meeting interpretation needs, and transferring knowledge. They can be placed along a five-step continuum: (1) face-to-face, (2) telephone, (3) written personal, (4) written formal, and (5) numeric formal [8].

Face-to-face interaction is considered the richest medium because it allows immediate feedback so that understanding can be checked and interpretations corrected. This medium also allows simultaneous interaction of multiple cues, including body language, facial expression, and tone of voice, which convey knowledge beyond the spoken message [21]. Face-to-face interaction uses lots of variety, natural language, and messages are tailored personally to the recipient. The high relevance of this medium can be explained by the fact that tacit knowledge is embodied in the personal worldview in the form of meanings which are often unclear and ambiguous.

Also Berger et al. [3] argue that most experiences of others take place in face-to-face situations because there another's subjectivity is available through a "maximum of symptoms". The here and now of the persons continuously impinge on each other, both consciously and subconsciously, as long as the face-to-face situation continues. Misinterpretation of meanings is less likely in a face-to-face interaction than in less close forms of social relations.

Duncan et al. [10] recognise that learning or knowledge development is achieved by individuals and that there must be organisational processes by which individual knowledge becomes shared organisational knowledge. "This process need not be formal. Indeed

we would argue that it is a natural process driven by the need for organizational knowledge. The overall organizational knowledge base emerges out of this process of exchange, evaluation and integration of knowledge...but it is a social process, one that is extraindividual. It is composed of the interaction of individuals and not their isolated behaviour".

Practice demonstrates that in engineering projects, face-to-face interaction is a common means of interaction. Because of its capacity for immediate feedback and the availability of multiple cues, it enhances the use of tacit knowledge in these projects. However, in the planning stages of many engineering projects, the firm that delivers and the client are quite distant from one another so that face-to-face interaction is not possible. At the implementation phase this often results in surprises and issues that were unclear at the planning phase [16].

Interaction problems within project teams come up because everyone has their own way of speaking and listening. A team can be formed from personnel in different parts of an organisation or from different companies, whose backgrounds can vary significantly. This means that worldview and situationalities of individual team members can be extraordinarily different, which therefore can cause problematic situations in interaction and understanding. The members can also have difficulties in adapting to different bases of interaction. This results in participants in teamwork situations often having a tendency to think about their own perspectives and presentations rather than listening. Due to the different worldviews and situationalities of individual team members, it is also not self-evident how people understand what they hear.

In the opinion of Ruuska [30] over half of project management problems result, entirely or in part, from poorly handled interactions. Effective interaction requires the ability, as well as the desire, to communicate issues. The minimising of interaction problems in project activities requires that the project team and other people involved learn to understand each other and regularly contact each other.

As a result of the above discussion we draw the conclusion that the creation of project knowledge is not only about the processing of objective information but it also requires that the subjective views, intuitions and inklings embodied in the subjective worldview of individual project team members are presented, tested and taken into use. These subjective views and intuitions are mainly acquired and transformed into new tacit- and project knowledge by informal face-to-face interaction. (see Fig. 3).

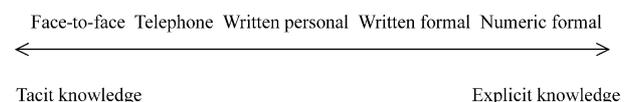


Fig. 3. Media richness vs. tacit knowledge transfer.

12. Language, the carrier of the raw material into a knowledge production

According to the autopoietic epistemology knowledge is produced through acquired and transmitted data (symbols) with an efficiency that will vary with the characteristics of communication channels used for such transmission. In the opinion of Boisot [6] the process of codifying a message for transmission involves a loss of information that can only be recovered in situations where a receiver associates the same cluster of meaning with the symbols chosen as does the sender. The transmission of tacit knowledge may give a rise to uncertain or ambiguous interpretations of meanings, and therefore, requires either the simultaneous activation of several channels of communication, in order to minimise the loss of information implied by the use of a single channel, or a prior sharing of experiences out of which emerges an uncertainty reducing convention for the use of certain symbols [31].

Pondy et al. [27] treat language as a kind of technology for processing data and, as is the case with any production technology, language will also determine what inputs will be accepted. They identify four distinct roles for language in organisational behaviour:

- Control of perception. Those events for which language expressions do not exist tend to be filtered out of consciousness
- Attribution of meaning. By categorising streams of events, language gives a description of meaning connecting our experiences
- Facilitation of communication. Old and new meanings can be communicated better
- Provision of a channel of social influence. Language is essential in the organisation's power games.

According to Blackler et al. [4] language does not passively mirror the world, but rather speech is a practical act that shapes and negotiates meanings. Thus, project team operates within interpretive or discourse communities; for example, 'project manager' only makes sense within members of a project team, who understand the deep meaning of the term.

Koskinen [16] shows how the similar worldviews and situationalities of the supplier and the client helped them solve difficult technological problems together in the project although they did not speak the same native languages. On the other hand, Breite et al. [7] describes how in a Finnish tap manufacturing company a product development project exceeded both the budget and schedule, because the senior level metallurgists and the junior level electronic engineers could not speak the 'same language' and therefore they had difficulties to see the goals of the project in the same way.

Externalising tacit knowledge into explicit knowledge often means finding a way to express the inexpressible. One of the means for doing so is the usage of figurative language and symbolism. One kind of figurative language that is especially important is metaphor (e.g. Tsoukas, [32]). Metaphor is a distinctive method of perception. It is a way for individuals grounded in different contexts and with different experiences to understand something intuitively through the use of imagination and symbols without the need for analysis or generalisation. Through metaphors, people put together what they know in new ways - in the form of new meaning structures—and begin to express what they know but cannot yet say. As such, metaphor is highly effective in fostering direct commitment to the creative process in the early stages of a product development project.

On the basis of the discussion above we conclude that individual project team members may use language and expressions which are specific to their profession and experience and which therefore are also situation and worldview related. The result of this is that at the outset of a new project different team members may not understand well all the terms and expressions used in the interaction within the project team.

13. Trust, a facilitator of accessibility to knowledge

Accessibility determines the type and frequency of interactions that occur. Accessibility can be defined as an individual project team member's perception of his/her liberty or ability to approach or interact with another project team member. Factors which influence the type and amount of interaction that occur between team members include an individual member's schedule, out-of-office commitments and other such situational factors.

The basis of all trust is a presentation of the individual self as a social identity, which builds itself through interaction and which corresponds to its environment (e.g. [19]). Trust depends upon sincerity in the sense that project team members are what they claim to be. Trust is based on expectations and is therefore formed in the consciousness of project team members. According to Huemer et al. [13] expectations are based on the trustor's perception of the motives and abilities of the trustee, i.e. the identity will be shaped by perceived motives and abilities.

Trust in relation to project team mind and collective action is a particularly important issue. Trust ties together an attentive system, which forms the collective mind required for reliable performance. According to Weick et al. [39] co-operation is imperative for the development of mind, and trust is imperative for co-operation. Indeed, interpersonal skills enable people to represent and subordinate themselves to project work.

Many conceptions of how trust develops emphasise that trust is a history-dependent and therefore, as well, a situation related process. Trust builds incrementally and it accumulates. However, in projects there is not time to engage in the usual forms of confidence-building activities that contribute to the development and maintenance of trust. This means that the people involved in a project have not possibilities to get acquainted with the worldviews and situationalities of other team members. Therefore the trust emphasised in project teams is a unique form of collective perception and relating that is capable of managing issues of vulnerability, uncertainty, risk and expectations. People in project teams deal with each other more as roles than as individuals [22]. A form of depersonalised trust may develop based on category membership, i.e. such trust occurs independent of the object of perception.

Trust is, however, basically an individually accentuated phenomenon, because it is based on understanding with the help of which every member of a project team tries to understand other members' behaviour, state of mind, and motives. The development of relationships of the team members directs the process. When a feeling of trust becomes established it affects the perceptions of a member's motives more than does behaviour. Thus, trust has an indirect effect on the accessibility and efficient transfer of tacit knowledge. The greater the level of trust, the greater the level of accessibility and the better the opportunities for tacit knowledge to be transferred.

According to the above discussion we conclude that trust develops only with time as the result of project team's interpersonal relations within their shared situationalities. This results in that the trust of individual project team members is not developed in the course of time, but it is often based on the roles of the other members, and therefore the utilisation of tacit knowledge within a project team may be a problematic one. We also conclude that the shared experiences of project team members, experiences that are derived from previous jointly implemented projects, improve the possibilities to share tacit knowledge.

14. Corporeal proximity, a facilitator of tacit knowledge acquisition and sharing

Research suggests that physical structure can influence the type of interaction that occurs within and among people in a project (e.g. [9]). Frequent interactions among project team members tend to produce interpersonal attraction, while also creating the accessibility to other team members' tacit knowledge. According to Peters [23] the individuals most likely interact with others when the physical characteristics of

building or settings encourage them to do so. "If people want to share meaning, then they need to talk about their shared experiences in close proximity to its occurrence and hammer out a common way to encode it and talk about it" [39].

The research has investigated the effect of corporeal proximity - in our terms: a physically shared situationality- of team members on project outcomes (e.g. [1,14]). According to Pinto et al. [25] the findings have been somewhat inconclusive in establishing a link between physical distance among project team members and project outcomes. On the other hand, Kessler et al. [15] are the opinion that in product development projects, which produce radical innovations, the corporeal proximity speeds up innovation, but in projects, which produce incremental innovation, the corporeal proximity is a factor that slows down productivity. Allen [1] and Keller et al. [14] have demonstrated that corporeal proximity is useful for enhancing tacit knowledge sharing among project team members. Pinto et al. [25] argue that although the research has not supported the link between physical distance and actual project outcomes, the proximity can be an effective tool in creating supportive team relationships and improved dissemination of tacit knowledge. Furthermore, Pinto et al. also argue that the modern communication technology, such as electronic mail, is impersonal means of communication and often details, confidential issues and idiosyncracies of messages hinder their effectiveness. These type of tools are useful for routine communications but are less effective in situations that are non-routine. Projects often entail a significant amount of non-routine activities.

Physical separation produces communication barriers between various members of a project team. This is, co-operation becomes more difficult if a person is separated from the rest of the team. Instead of getting direct communication, those who are separated must choose written communication channels and they will therefore have only few connections to the rest of the members. Those who separate themselves do not participate in informal events either. However, over half of informal conversations are related to issues at work [30]. Project work is by and large co-operation, within the project as well as with the project and its environment.

On the basis of the discussion above we conclude that corporeal proximity—a physically shared situationality—has a positive effect on tacit knowledge transferring in a project. This suggests, for example, that an open plan-type office is an appropriate room for a project team to work together. Furthermore, we conclude that due to the fact that tacit knowledge cannot be aggregated in order to allow centralised decision making, the decisions made on the basis of tacit knowledge can be made only when all the people involved are present.

15. Discussion and conclusions

The conventional notion of tacit knowledge acquisition emphasises the sustained character of its development. This is often the case in functional types of organisations. Furthermore, the gradual process of building working patterns, development of trust, and enduring strains inherent in the continuity are also often stressed.

In this study we have moved away from this conventional notion of tacit knowledge acquisition. In other words, we have shortened the scale of time, and focused on temporary project organisations. We have explored different factors and situations in which tacit knowledge is acquired and shared in project work context.

On the basis of the analysis above we conclude that temporary and adhoc nature of project work do not block tacit knowledge acquisition as it is. However, the project type working setting may render formation of trust, which is often a significant facilitator of successful tacit knowledge acquisition and sharing. Also we found that language may cause difficulties in situations in which different project team members have different professions and backgrounds. Furthermore, we concluded that corporate proximity enhances tacit knowledge utilisation in project work.

In a project company one project might need more explicit knowledge than another project. Alternatively there might be differences in the degree to which projects are able to utilise tacit knowledge. Although the success of a project might accrue any type of knowledge, the approach that the project management should take to manage each type of project, is rather different in each case.

It is commonly accepted that the utilisation of tacit knowledge depends on the context and situation where it is used. Therefore it is important to carry on research on tacit knowledge usage in different project work contexts and situations. In particular, every project member's individual situationality and consciousness—and their intimate interrelationships—are crucial means for analysis. In that way we can reach a better understanding of tacit knowledge and its usefulness in project work.

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