

# Externalization Of Tacit Knowledge Implies A Simplified Theory of Cognition

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## ABSTRACT:

Externalization of tacit knowledge has been on the focus of both human-centric and ICT-centric knowledge management theory for over fifteen years. The whole conception of tacit knowledge in the knowledge management literature has been criticised of being based on incorrect interpretation of Polanyi's original theory of knowledge. At the same time, it has been reported that many knowledge management projects related to externalization of tacit knowledge do not meet their objectives. The above-mentioned findings suggest that there is something wrong in the dominant epistemology of knowledge management theory. We analyzed the conception of externalization of tacit knowledge from the perspectives of epistemology and theory of cognition. We identified various problems related to the dominant conception of mind in the knowledge management literature. We argue that the conception of externalization of tacit knowledge is based on the simplified view on human mind, which also questions the idea of management of tacit knowledge.

Keywords: *Cognition, Epistemology, Externalization, Mind, Polanyi, Tacit knowledge*

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## 1. Introduction

Externalization of tacit knowledge is argued to be a critical procedure in the knowledge management (KM) theory (Stewart, 1997; Kikoski and Kikoski, 2004; Nonaka and Takeuchi, 1995). As Irick (2007, p. 1) puts it: "The primary task of managers is the conversion of tacit, human capital into explicit, structural capital." Although the conception of externalization of tacit knowledge was originally mostly the problem of the human-centric approach to KM, later the problem has been addressed also from the ICT-centric approach by converting tacit knowledge to explicit by the means of information technology.

The conception of explication of tacit knowledge is based on epistemological assumption that there exist two kinds of knowledge, tacit and explicit. This view *is said* to be adopted from Polanyi's philosophy, and it was introduced to KM theory by Nonaka and Takeuchi's (1995) theory of organizational knowledge creation. However, Nonaka and Takeuchi's theory did not become popular only as model of process of innovation but it has been generally adopted as a model of externalization or codification of tacit knowledge in the KM literature. Since then, the epistemological

foundation of Nonaka and Takeuchi's theory, namely the classification of knowledge into tacit and explicit, has gained a dominant role as the basis for epistemology in the KM theory (Maasdorp, 2007; Stacey, 2001).

Many ICT KM projects have stated as their primary aim the conversion of tacit knowledge to explicit knowledge, namely the "externalization" component of Nonaka and Takeuchi's theory (Grant and Qureshi, 2006). Nevertheless, the ICT-aided attempts to externalize tacit knowledge usually have had very limited success (Grant, 2007). Lucier and Torselieri (2001), in their study of 108 companies, remark that they did not find correlation between systematic management of knowledge and improved performance. Moreover, Akhavan et al (2005) suggest that the failure rate of KM projects is 50-70%. It seems justified to ask, whether there is something wrong in a deeper level beyond these practices—namely in the theory that underlies them.

We analyzed the theoretical foundations of the conception of externalization of tacit knowledge in order to identify the potential problems. 'Theoretical foundations' refers to the predominant epistemology, adopted from Nonaka and Takeuchi's theory in KM literature. Since any epistemology implies some kind of theory of cognition/mind, we also discuss the theory of cognition/mind that the conception of externalization of tacit knowledge seems to imply.

We show that the conception of externalization of tacit knowledge does not have coherent, theoretical bedrock that would underlie it. It is based on a simplified conception of mind, which in turn is based on misunderstanding of Polanyi's philosophy in various levels. We claim that this directs both the research and the practices of KM to wrong directions.

## **2. The Theoretical Background Of The Conception Of Externalization Of Tacit Knowledge**

In the early 1990's knowledge became not only a basic, but also the most important resource of production and economy of organizations. This meant that knowledge assets (intellectual capital) became more important to organizations than physical or financial assets; the implication of this shift in thinking was that to prosper in "the new economy" and to exploit the vital knowledge assets, new management techniques, new technologies, and new strategies were needed (Stewart, 2001). Moreover, learning and creation of new knowledge were rapidly concluded to be of prime importance (Nonaka and Takeuchi, 1995). The field of KM emerged in this knowledge-centric atmosphere, and since then KM has been one of the most influential new organizational practices.

From the epistemological perspective contemporary KM is characterized by a commonly accepted view according to which there exists two kind of knowledge, tacit and explicit (Lakomski, 2005). This view is said to be adopted from Polanyi, and it was introduced and made famous by Nonaka and Takeuchi's (1995) theory of organizational knowledge creation. Nonaka and Takeuchi argued that tacit knowledge had been overlooked in organizational context in Western countries, but in Japan tacit knowledge was an important source of companies' competitiveness. Hence, they

(Nonaka and Takeuchi, 1995 p. viii) stated the epistemological presupposition, upon which their theory was based in the following way:

“...we classify human knowledge into two kinds. One is explicit knowledge, which can be articulated in formal language including grammatical statements, mathematical expressions, specifications, manuals, and so forth. This kind of knowledge can be thus can be transmitted across individuals formally and easily. This has been dominant mode of knowledge in the Western philosophical tradition. However, we shall argue, a more important kind of knowledge is tacit knowledge, which is hard to articulate with formal language. It is personal knowledge embedded in individual experience and involves intangible factors such as personal belief, perspective, and the value system.”

Nonaka and Takeuchi (1995) argued that the dynamic model of knowledge creation is anchored to an assumption that human knowledge is created and expanded through social interaction between tacit knowledge and explicit knowledge, which they called 'knowledge conversion'. The key to knowledge creation lied in the mobilization and conversion of tacit knowledge to explicit knowledge. Externalization referred to the articulation of one's own tacit knowledge (ideas, beliefs, intuitions etc.) in words, and on the other hand, eliciting, deducing and translating tacit knowledge of others into an understandable form (Nonaka and Takeuchi, 1995; Nonaka and Konno, 1998). Nonaka and Takeuchi mentioned metaphors, analogies and figurative dialogue as suitable methods for the process of externalization. The idea was that something previously inexpressible can be expressed by using a non-analytical method.

Nonaka and Takeuchi's theory of knowledge creation is considered one of the most significant theories in the history of KM (Maasdorp, 2007). However, their theory did not become popular only as a model of process of innovation but it has been generally adopted as a model of externalization or codification of tacit knowledge in the KM literature. Hence, the epistemological foundation of Nonaka and Takeuchi's theory, namely the classification of knowledge into tacit and explicit, has gained a dominant role as the basis for epistemology in the KM theory (Maasdorp, 2007; Stacey, 2001).

### **3. Externalization Of Tacit Knowledge And Its Implicit Presuppositions Of Cognition**

The methods of externalization or codification of tacit knowledge presented in the KM literature originally included the use of metaphors, analogies and dialogue (e.g. Nonaka and Takeuchi, 1995), and storytelling (e.g. Schilcher 2009; Perret et al, 2004). Also several ICT-based systems has been developed and suggested as tools for the externalization. Despite the method of externalization the requirement for the externalization is a linguistic presentation of the externalized material. The use of metaphors and analogies trivially means communication via language. In the case of the use of information systems the captured and analysed knowledge is based on users' input. Fergus et al (2003, p. 161) explain:

“Tacit knowledge is inherently communicated via face-to-face interactions; therefore we need to integrate these social activities within a technological environment. Merging the social with the technical allows us to develop knowledge extraction algorithms that attempt to gain a conceptual understanding of these interactions in order to extract tacit knowledge and codify it in a knowledge management system. The challenge is to realise such an environment and develop algorithms that effectively extract and codify tacit knowledge.”

The use of language further implies that the knowing subject (whose tacit knowledge is being externalized) is conscious of the source (the representation) to which his linguistic expressions refers, because we can only articulate and describe things that we are conscious of (Ledoux, 2002). Moreover, the use of metaphors, analogies and illustrative dialogue implies that the knowing subject focuses on his contents of the mind and in a reflective and creative manner analyzes tries to articulate them. From a psychological perspective this refers to introspection, a technique in which subjects aim to report their conscious experience (Eysenck and Keane 2005).

The idea of externalization of tacit knowledge implicitly assumes that once the knowing subject has formulized his tacit knowledge into linguistic expression, the meaning of the knowledge is included more or less unchanged in that expression. Hence, it is assumed that beliefs, perceptions, assumptions, values, preferences etc. are states of tacit knowing, and as the knower identifies these states, they can be transformed into natural language. Moreover, this view assumes that shared understanding is possible once tacit knowledge is made linguistic. Churchland (1986) calls this kind of theory of cognition “sentential”. By this she means that human cognition is portrayed as a dance of sentential or propositional states, with the basic unit of computation being the inference from several such states to some further sentential state.

In sum, the implicit assumptions of mind that the idea of externalization of tacit knowledge makes described above are 1) tacit knowledge to be externalized must be conscious; 2) the method of externalization is essentially introspective; 3) the meaning of the state of tacit knowing is passed on in a form of linguistic expression.

#### **4. Problematic Epistemology And Theory Of Cognition**

In this section we consider the three assumptions presented above further, arguing that they are problematic from various perspectives.

##### **4.1. Assumption 1: Externalized Tacit Knowledge Is Conscious.**

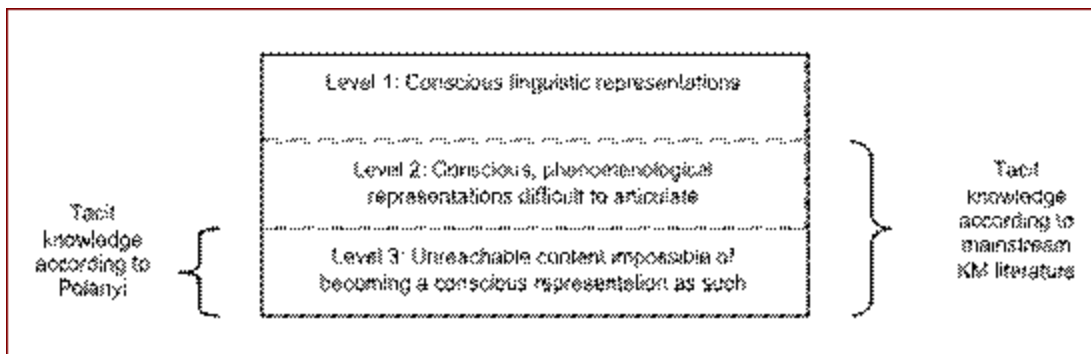
In his analysis of the structure of knowing Polanyi made a distinction between focal and subsidiary awareness. Basically, subsidiary awareness covers the realm of tacit knowledge whereas explicit knowledge belongs to focal awareness. Focal awareness is always conscious (Polanyi, 1968). As Polanyi said, what I am seeing, I am focally aware. Hence, focal awareness refers to the anything on which focal attention is directed, whether it is a perceived object or a mental representation. The content of

subsidiary knowledge, in turn, is “essentially unspecifiable” (Polanyi, 1968, p. 31). Polanyi distinguishes two types of unspecifiability, the difficulty of tracing tacit knowledge (unconscious nature of tacit knowledge) and logically necessary sense deprivation (loss of meaning of tacit knowledge if it is tried to attend focally). In both cases the knower is unaware of tacit knowledge; he is not conscious of it, it is untraceable.

Based on Polanyi’s and KM author’s ideas of tacit knowledge we can crudely distinguish three different levels of content of mind from the perspective of its accessibility.

1. Conscious linguistic representations, or representations that are easily made linguistic (e.g. declarative knowledge, propositional thoughts, texts etc.).
2. Conscious representations that are difficult to articulate because of, for example, lack of words (e.g. an unusual colour), modality of the representation (e.g. a vision or a multimodal experience) or not-yet analyzed nature of representation (an incomplete idea or assumption not yet submitted to verification). In other words, compared to the representations of level 1, the representations of this level are more phenomenological in nature.
3. Unreachable content impossible of becoming a conscious representation.

Based on the characterizations of tacit knowledge made by Polanyi and many KM authors applying his theory for externalization, it is evident that they are not talking about the same mental phenomena when referring to tacit knowledge. To Polanyi tacit knowledge is a phenomenon of the level 3, whereas tacit knowledge in the KM literature refers to both level 2 and 3. However, the focus is on the level 2 since externalization of tacit knowledge is generally considered to be one of the main functions of organizations (e.g. Irick, 2007; Stewart, 1997; Kikoski and Kikoski, 2004). The difference between the views is illustrated in Figure 1.



**Figure 1: Tacit Knowledge According To Different Sources**

A broader use of a concept of tacit knowledge in a more practical context would not be necessarily problematic if the concept was defined accurately. However, in this case the application of Polanyi’s concept has led to significant confusion. First, as most of

the authors mention and refer Polanyi as the primary source of the distinction between tacit and explicit knowledge, it is about misreading Polanyi. Second, levels 2 and 3 (in figure 1) cover so many mental phenomena that the concept has become meaningless buzzword that can refer to almost anything. This has led great confusion of the meaning of the concept. Third, KM is a multidisciplinary field of science, which means that it should communicate with other relevant fields of science. This naturally becomes difficult if central concepts adopted outside the field are redefined. Theoretical statements from different disciplines should refer to the same set of phenomena (Bunge, 1967).

#### **4.2. Assumption 2: The introspective method of externalization of tacit knowledge**

The aim of externalization is to convert tacit knowledge to explicit knowledge that Nonaka and Takeuchi (1995) define as justified true belief in a traditional way. Introspection is a controversial psychological method whose acceptance as a scientific method depends on the psychological school. However, it has been suggested (e.g. Rakover, 1990) that introspection is a useful tool for providing further understanding in explaining data, confirming/falsifying a theory and generating hypotheses in psychological research. Nevertheless, the question that we are interested in here is whether introspection is a useful tool in creating justified true beliefs. Whereas Nonaka and Takeuchi (1995) explain that the externalized (introspected) tacit knowledge (belief) is justified in a social process, the majority of KM authors do not state how the introspected material becomes justified and true (for example in the case of an ICT-system taking care of the capture, the codification and the sharing of tacit knowledge). This suggests that the introspected “tacit knowledge” is considered valid as such.

This obviously is an incorrect assumption. The traditional definition of knowledge stresses objectivity as the most important feature of knowledge. However, introspected material is not originally publicly available. Moreover, the requirement of objectivity of the traditional definition of knowledge that Nonaka and Takeuchi (1995) use assumes that neither the observer nor the instrument he uses affects the phenomenon being observed. Also the repeatability of introspective reports has been questioned (Rakover, 1990). In consequence, the truthfulness and justification of introspected material cannot be assessed objectively as such, which makes us to formulate a new question: can introspective belief be trusted on even as *potentially* justifiable and true belief? In fact, there are various factors that question the validity of introspective reports as knowledge.

First, introspective reports are incomplete, mainly for two reasons:

- A knowing subject is aware only a small part of an experience—much of it is simply unattended (Marcel, 2003).
- Secondly, for example automated processes occur so quickly that they are out of knower’s scope of attentional control and hence cannot be introspected (Rakover, 1990). Naturally, the incompleteness of the reports does not mean that the reported material could not be useful. However, the incompleteness

makes the reports more difficult to understand by others, and also proves that there are things that we cannot tell as Polanyi claimed.

Second, attending to one's own mental representation changes the content, nature and form of the representation (Marcel, 2003). Polanyi (1975) called this 'sense deprivation', and it was one of his main arguments why the true meaning of tacit knowledge cannot be captured—a fact that has been completely ignored in the KM literature. For example, if one performs an activity “normally” (that is, not monitoring his own performance), or perceives reality in a usual way, and does not make phenomenal separation of it. However, as Marcel explains, differences in the mode of attention yield different phenomenology. The more analytical one's attention is, the more the experience itself is abstracted and decontextualized, consisting of separate components.

Third, attention adds to its objects (Marcel, 2003). For example, if a subject is asked to imagine a woman's face and is later asked about the colour of her lipstick, the subject may give a definite answer although the mental image contains no information concerning the lipstick until the question. The original image contains only what has been imaged as canonically necessary (Marcel, 2003). Again, in the context of externalization the added information might not be problematic. However, the point is that even the knower has no *sure* way to know what information belongs originally to the representation to be reported.

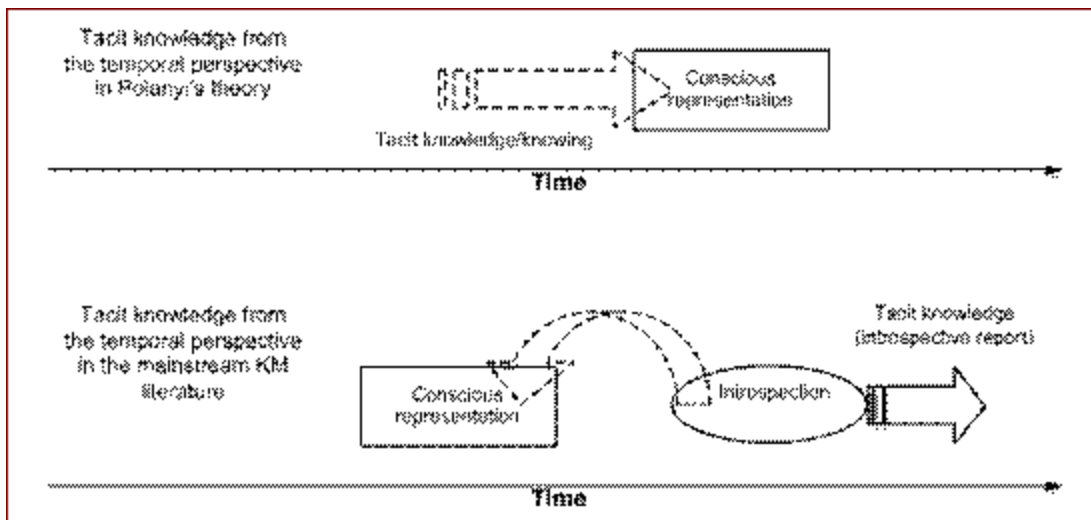
Fourth, one's prior theories about our experiences and about ourselves can intervene in his understanding of it (Lambie and Marcel, 2002). Indeed, it is very difficult to distinguish our theories of how things should be from the experience or the representation itself. In the end, there is no way to be sure up to a which point the externalized material is just a backward explanation of how things are assumed or deduced to be. In fact, the findings made in the field of cognitive psychology shows that people's self reports are systematically biased and misleading (Eysenck and Keane, 2005; Lakomski, 2005).

In conclusion, the content of our consciousness is opaque and affected by paying attention to it (Marcel, 2003). This suggests that we should at least question the validity of “externalized tacit knowledge” that introspective methods produce. Interestingly, in the KM literature more attention seems to be paid to the methods of externalization than to the procedures to assess the validity, usefulness and justification of externalized material. Since awareness of private representations comes as a result of drawing inferences from later observations of those representations, mind cannot be expected to know of its own activities (Hebb 1977).

If Polanyi's conception of tacit knowledge is compared with the conception of tacit knowledge in KM literature from the perspective of introspection, even more severe theoretical problems emerge. If the methods of externalization (or introspection) are assessed from the temporal perspective, externalization is obviously a retrospective method; externalization is about attending to one's past experiences, current action or current contents of the mind. In each case, there is an interval of time between the

occurrence of the representation and the report of it. Hence, in the process of externalization tacit knowledge is *derived* from the focal representation.

One of the basic features of Polanyi's theory is that knowing is directed from tacit knowledge to the focal representation. In fact, Polanyi (1968) called the realm of tacit knowledge (subsidiary awareness) 'from-awareness'. The knower is subsidiary aware of tacit knowledge; it serves as a guide to the focal representation that the knower focuses his attention (Polanyi 1966). In this important sense, *tacit knowing precedes the explicit representation* that thus is the result of tacit knowing. One of the Polanyi's most significant epistemological results was that knowledge could not be wholly justified because of its tacit, untraceable roots. According to him, knowing is not a reversible process: it is not possible to go back from the integrated focus to its subsidiaries (Gill 2000). Hence, tacit knowledge cannot be derived from explicit knowledge. The differences between the view of KM literature and Polanyi from the temporal perspective are presented in Figure 2.



**Figure 2: Tacit Knowledge From The Temporal Perspective According To Different Authors**

#### **4.3. Assumption 3: The Meaning Of The State Of Tacit Knowing Is Passed On In A Form Of Linguistic Expression**

This assumption basically says that appropriate linguistic expressions are translations of experiences or mental representations, which can be transmitted as such to other individuals. The content of internal representation is identified by means of language, and an isomorphism is assumed between the internal representation and the relevant linguistic set of sentences. Hence, it is assumed that what we know is expressible in the symbolic form and can be coded back to internal representation of others—as long as the externalization is successful. However, Boland et al (1994), among others, have questioned the possibility to reach shared understanding of complex representations. They argue that interpretation is personal, and in the end, there is no way to ensure the compatibility of various interpretations. Indeed, Polanyi (1962, p. 252) argues: “It is



not words that have meaning, but the speaker or listener who means something by them”. Polanyi meant that the mind creates the meaning of the attended objects. All objects and all knowledge presented in explicit form are dependent on non-critical pre-linguistic capacities based on our experiences, our use of certain language and our participation of certain traditions. We attend the objects of knowing from these capacities, from ourselves, and make sense of reality this way. This is the true meaning of Polanyi’s (1966, p. 4) famous phrase “...we can know more than we can tell”. Interestingly, when this phrase has been combined with the idea of externalization of tacit knowledge, it seems to have transformed in the form ‘we know only what we can tell’ in the KM literature.

## 5. Discussion

One of the biggest challenges of KM theory has been the following controversy. First, Nonaka and his colleagues were one of the first to understand and explicitly argue that codified, objective knowledge could not explain individuals’ competences and creation of new knowledge. Hence, they focused on the individuals and “the softer side” of knowledge accepting the subjective dimension of knowledge. Nevertheless, their starting point and the interest of knowledge are purely managerial, which calls for objectivist and positivist perspectives; otherwise knowledge cannot be managed. The question is, is it possible to get these two opposite perspectives to communicate.

However, this attempt seems to have headed to problems from the very beginning, because the novel assumptions it makes at first are soon discredited. One of the most fundamental reforms of Nonaka and Takeuchi was to “provide a fundamentally new economic and management perspective” and that way overcome the limitations of Cartesian dualism assumed traditionally in the organizational theory (Nonaka and Takeuchi, 1995). Yet their epistemology, namely the dualism of explicit and tacit knowledge, is a “hallmark of empiricist theory” because it makes a difference between scientific, or empirically adequate knowledge and non-scientific knowledge (Lakomski 2005). As Lakomski remarks, this implies a theory of cognition that privileges the processing of symbols echoing a spirit of Cartesian dualism.

In a same way, drawing from Polanyi, Nonaka and his followers stress the importance of the role of the individuals and tacit knowledge possessed by them in the organizations. But again, the dualist epistemology and the stressing of the importance of codification of tacit knowledge turn the argument up side down. Tacit knowledge is seen as a reservoir of secondary knowledge that is useless as such unless converted to “real” knowledge. Explicit knowledge is clearly privileged compared to tacit knowledge, although Nonaka and Takeuchi (1995, p. viii) first argue: “a more important kind of knowledge is *tacit knowledge* [compared to explicit knowledge]”.

In a theoretical sense there are also three other significant problems. First, epistemologically Polanyi has been misread in the KM literature. A typical reference to Polanyi in the mainstream KM literature is that Polanyi was the first to distinguish tacit knowledge and explicit knowledge. Polanyi, however, did not make an ontological distinction between tacit and explicit knowledge, but stressed that the structure of an act of knowing always had tacit and focal (“explicit”) dimensions. Hence, tacit

knowledge is a feature in all forms of knowledge; it is not a kind of knowledge as such as presented in KM literature. This is a well-known issue highlighted by e.g. Maasdorp (2007), Tsoukas (2003) and Mooradian (2005).

Second, the above mentioned misunderstanding and the problems highlighted in the previous section suggest, Polanyi, on the one hand, and Nonaka's followers on the other, refer by tacit knowledge a different sets of phenomena (although the sets also partly overlap). From the scientific perspective the situation is unfortunate because re-defining the concept of tacit knowledge in a rather ambiguous manner leaves it without a theoretical foundation, transforming it as a label of *all* unclear social and mental phenomena.

Third, the conception of explication of tacit knowledge implies a somewhat simplified theory of cognition at least in two senses.

1. According to the contemporary neuropsychological research, the presumed direct access to the contents of our mind is only a fragment of our imagination and our mental capacity (see e.g. Ledoux, 2002; Damasio, 1999; Paivio, 2007). Instead, much, even the majority, of cognitive work goes on at an unconscious level (Reber, 1993). This means that we simply cannot see or describe what is going on in our brains when we are learning, remembering, solving a problem or using our expertise. Moreover, what we can describe might be as well guessing as knowing.
2. The conception seems to assume some kind of language dominance view of mind. Instead of accepting the nonlinguistic modes of thought, the conception of explication of tacit knowledge seems to assume that language and thought are more or less inseparable because even the foundations of our representations (tacit knowledge) can be articulated (albeit difficultly). This idea reminds behaviourist Watson's (1930) simplified claim that thinking is nothing but talking to ourselves. As Damasio (1999), among others, has suggested, words and sentences denote entities, actions, events and relationships, and translate concepts. Concepts, in turn, consist of the *nonlinguistic* idea of what these things are. Hence, concepts precede word and sentences of necessity, both in evolution and in everyday life of humans. It is becoming clear that that thinking is multimodal, imaged and nonverbal (see e.g. Eysenck and Keane, 2005; Paivio 2007; Damasio, 1999). The fact that our brain creates automatically a verbal version of the "story" and there is no way of stopping it is probably the source of the incorrect notion that consciousness might be explainable by language alone (Damasio, 1999).

The criticism towards the idea of the primacy of symbolic representation argued above does not mean that symbolic representations are not important and a great part of what is being a human. The symbolic form of representations makes it possible to present, assess and apply them publicly (Lakomski, 2005). However, such representations do not appear from nothing before them. Our thoughts and concepts, and all other aspects of cognition, are based on the perceptual system, past interactions with our environment and our understanding of the world that has is included into the body and

the brain. Hence, the division of knowledge into propositional and non-propositional, or into tacit and explicit, is not based on the realistic theory of cognition, but purely on the needs to manage knowledge.

## 6. Conclusions

We started by pointing out that many authors have questioned the benefits and the efficiency of the KM practices, which according to our understanding suggests that there might be some problems in the KM theory itself. As the conception of externalization of tacit knowledge is still in the focus of KM practices, we analyzed its foundations from the perspective of epistemology and theory of cognition. We have identified significant problems in KM theory in this respect. The conception of externalization of tacit knowledge does not have coherent, theoretical bedrock that would underlie it. It is based on a simplified conception of mind, which in turn is based on misunderstanding of Polanyi's philosophy in various levels. This directs both the research and the practice to wrong lines. For example, many KM projects have stated as their aim the conversion of tacit knowledge into explicit knowledge, storing and sharing it by developing and using ICT-systems. These projects, however, often are reported to have very limited success, which is not a surprising if it is not very clear what they are even trying to capture and convert. As Grant (2007) suggests, this might have very negative effects on organizations. Moreover, it seems that the tacit/explicit dichotomy puts too much weight on the process of codification although more attention should be paid on the question concerning what kind of knowledge is valuable for the organization in the first place. A second somewhat bypassed problem seems to be the possible means and circumstances to gain some kind of shared understanding of the externalized information; the process of externalization might be of no use if the material difficult to articulate is also difficult to comprehend.

Despite the understandable need of KM theory to unite subjective and objective views on knowledge, Polanyi's theory cannot be united with objectivist theory of knowledge. In fact, Polanyi's theory itself already unites subjective aspects of knowing with objective ones, and as such might function well as a basis for KM theory if read correctly. Polanyi's theory, however, implies that tacit knowledge cannot be managed. This suggests that the concept of tacit knowledge is not as useful concept in the knowledge *management* theory as it has been argued.

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