# Reconsidering the tacit-explicit distinction - A move toward functional (tacit) knowledge management

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**Abstract:** To move beyond the technology focus and adequately embrace knowledge, organisations need a working conceptualisation of knowledge. Within the literature, the dominant conceptualisation converges around the acknowledgement of tacit and explicit types distinctly. This paper argues that a more fundamental approach is necessary. The *functional view* is a theory on the nature of knowledge that serves as a promising alternative. By placing knowledge within the context of goals and formalisation possibilities, it can help transform organisations from information-intensive to truly knowledge-based.

**Keywords:** Knowledge management, tacit-explicit distinction, nature of knowledge, functional view

## 1. The structural complexity driving knowledge

The recognition that knowledge is a precursor to organisational success permeates the literature: Nonaka and Takeuchi (1995) pay heed to knowledge's role in product innovation, De Leo (1997) to its facilitation of operational improvements, and Baumard (1999) to its role in reducing marketplace ambiguity. But before accepting their premise *that* knowledge is important, we must understand *why* it is important—that is, the concrete factors necessitating its presence in the organisation. Although Davenport and Prusak (2000), Quintas (2002) and earlier scholars mention drivers like heightened competition and the importance of continuous innovation, they fail to adequately convince us of today's knowledge necessity. In essence, they miss a discussion of globalisation's *structural complexity* of matching supply and demand.

### 1.1 Causal processes

In explicating this complexity, we first turn to the fact that the global economy entails the acceleration of doing business across borders—as evidenced by the tripling of global goods and services exports from 1980 to 2001 (WTO 2002). For companies participating in this acceleration, knowledge of different cultures and rule-regimes becomes crucial; although transport and communication developments have obviated the geographic barriers of conducting business in new environments, other obstacles (cultural, legal, operational, etc.) remain. Furthermore, as an outgrowth of the trade acceleration, the global economy has witnessed the rise of more demanding consumers. That is, because the acceleration implies heightened competition and hence unlimited supply choices, consumers can place greater demands on their purchases. For suppliers, this translates into the necessity of knowing and meeting the needs and preferences of specific segments; it necessitates the personalisation of products and services. Finally, in staying abreast of consumer and cross-border trading requirements, organisations are met with the dynamic growth—or structural expansion—of the global economy, wherein continuous change takes place. These changes occur in the form of new technology, processes, product cycle times, cost structures, and so on. And as Liautaud and Hammond (2000) note, to handle these changes, companies must be "faster, more agile, and crucially, more *intelligent*" (italics original, p 4).

### 1.2 Alleviating the complexity: Moving beyond technology

In attempting to alleviate the structural complexity and fully embrace knowledge, organisations have progressively turned to technologies that enable knowledge codification and manipulation—from intranets/extranets to document management tools to knowledge-based systems. But despite the proliferation of these technologies, the management of knowledge remains a major challenge. This is well evidenced by Strassmann's (1999) analysis of more than 1,500 U.S. industrial firms, which showed zero correlation between information technology expenditure and firm profitability. Based on this study—and his subsequent estimates of firms' knowledge assets—Strassmann (2001) concludes that knowledge has simply been used as a means of justifying increased information technology spending, and for most organisations, has failed to improve profits.

Picking up on this so-called 'productivity paradox', Johannessen et al. (2001), Dunford (2000) and other knowledge scholars suggest that the failure of technologies stems from their focus on explicit and codifiable knowledge.

 

Drawing most often on the epistemological system of Polanyi, they argue that such a focus implies the neglect of the second, equally significant, part of a company's knowledge base—namely, tacit knowledge. As will be illustrated below, the recognition of a tacit dimension does not adequately serve to advance the management of knowledge. While agreeing that a conceptualisation of knowledge is necessary in order to move beyond the technology focus, we argue that a more fundamental view is needed. The main objectives of this paper are thus to (1) discuss the practical limitations of the tacit-explicit conceptualisation, (2) reveal the deeper implications of this discussion and (3) describe an alternative, functional approach to knowledge. Acknowledging the functional view's roots in computer science, the paper will conclude by (4) illustrating its value for knowledge management – a value that reaches beyond the scope of pure technology. In moving toward these goals, it is appropriate to briefly revisit the tacit knowledge trajectory.

## 2. The emergence of the tacit 'dimension'

Pushed along by philosophers such as Gilbert Ryle, William James and Michael Polanyi, the modern epistemological trajectory has moved from a positivistic paradigm to a more balanced paradigm—one that recognizes the presence of the experiential and personal facets of knowledge alongside the objective and scientific. Definitively, this shift has expressed itself through the likes of Ryle's (1949) 'knowing how' and Polanyi's (1966) 'tacit dimension.' Polanyi's work is exemplary in that it argues that the elimination of the personal, tacit dimension will in essence destroy all objective knowledge, as it provides the perception and mental models that enable us to understand the comprehensive whole of an entity. In exemplifying, Polanyi considers how we recognize the face of an acquaintance: We know the appearance of the face in its entirety by 'attending from' the tacit particulars and 'attending to' the explicit whole of the face. Thus, although we can delineate the face among a crowd of people, we are often unable to articulate precisely how we know the face. This, Polanyi argues, is tacit knowing, and it is the foundation for all knowledge.

Polanyi's line of thinking has long since surfaced in other theoretical disciplines, and with the help of Nelson and Winter (1982), the realm of economics was by no means overlooked. Nelson and Winter's tacit knowledge is defined in terms of the organisation's automatic (and often unconscious) skills, such as the ability to choose the right job applicant or make the right investment. They suggest that the organisation's tacitly driven skills are often the basis for organisational routines, which in turn govern smart business behaviour and hence organisational success. Following their lead, a plethora of scholars (e.g., Nonaka & Takeuchi 1995; Spender 1996; Baumard 1999) began to dominate the economics literature in their convergence around tacit knowledge. Unlike Polanyi and Nelson and Winter, however, these scholars commonly offer a clear, bounded distinction between tacit knowledge and its supposed counterpart, explicit knowledge.

As we have seen, the overreaching thread within their conceptualisations includes the notion that explicit knowledge is that which is explicable and transmittable; essentially it is an information stock that exists outside the individual and/or organisational mind. Tacit knowledge definitions are less concurrent, but on the whole their authors argue that it is highly contextual and bound to individual experiences or firm processes, thus making it either impossible or less conducive to codification and transfer. As such, organisational tacit knowledge is said to be expressed in terms of employee skills, problem solving abilities and mental models, whilst explicit knowledge manifests itself in the form of mathematical expressions, instruction manuals, product blueprints, and so on (e.g., Nonaka & Takeuchi 1995).

Adherence to this distinction in the accumulating wealth of literature is grounded in the notion that it is tacit knowledge that will determine the degree to which companies remain competitive. The rationale being that while explicit knowledge is more easily managed, tacit knowledge has more value, being derived from particular circumstances and therefore difficult to imitate externally. Thus, citing the importance of tacit knowledge to prosperity, as well as the lack of evidence for the positive impact of explicit knowledge solutions, researchers are calling for the addition of techniques and cultures to promote tacit knowledge transfer. Nonaka and Takeuchi (1995) suggest a four-phase knowledge management process to facilitate the interplay of tacit and explicit knowledge—a process ideally initiated through face-to-face employee socialization. Subsequent authors (e.g., Johannessen et al. 2001; Dunford 2000; Lubit 2001) likewise recommend targeted

 

interpersonal solutions such as apprenticeships, mentoring and narrative storytelling in order to ensure tacit knowledge's place beside formalized explicit knowledge.

## 3. Inadequacies of the distinction

Although useful in theory as a means of reminding organisations to manage the entirety of their knowledge base, the tacit-explicit distinction does not adequately serve to guide organisations through the knowledge management process. An adequate knowledge view should, first and foremost, help in tuning strategic goals to knowledge goals, and further, should help in determining and realizing knowledge formalisation possibilities. The tacit-explicit approach misses on both accounts.

### 3.1 Goal-dependency issues

The simple classification of knowledge into tacit and explicit does not directly and concretely substantiate the relationship between goals of an organisation and the essential role of knowledge in achieving these goals. Failing to clearly align goals that rigidly govern the knowledge process only serves to ensure that knowledge initiatives remain within the level of information production and distribution – as codified knowledge is often gathered that is irrelevant to the functional objectives of the organisation. In the end, this equates to limited knowledge transparency and application, as the organisation remains trapped in an information-intensive frame of reference. It also important to note that the absence of a goal orientation hinders the awareness that knowledge is an essential asset for optimal business performance and, as a consequence, that knowledge management is a need-to-have activity instead of just a nice-to-have activity.

### 3.2 Formalisation issues

As noted in section 2 above, authors of the distinction within the knowledge management literature distinguish tacit and explicit types primarily on the basis of ease of transfer or codification/formalisation. Spender's (1996) account deviates slightly in its recognition of tacit knowledge as knowledge that is 'not yet explicated,' thus suggesting that it exists on a continuum and can potentially be formalized (as Polanyi has long since told us). Attempts at operationalising the tacit-explicit approach are complex and limited, as we see through the examination of, for example, Schulz and Jobe (2001), Zack and Serino (2000) and Davenport and Prusak (2000). Their somewhat vague discussions of knowledge codification converge around the idea that the 'richness' or 'abstractness' of knowledge determines whether it should be managed through people (tacit) or through technology (explicit).

If we lend specificity to their discussions, and enrich the tacit-explicit distinction with a formalisable/non-formalisable dimension, we more clearly see the issues, alternatives and complications involved in its management (Figure 1). Here we define formalisation as the process of representing knowledge using a data structure. A data structure can be a text, a flowchart, a decision table, a record in a database, etc.

| | **Formalisation impossible** | **Formalisation possible** |
|---|---|---|
| **Tacit** | Knowledge management through humans | Are there any chunks of knowledge worth formalising? |
| **Explicit** | Impossible | Render it more Knowledge-based? |

**Figure 1.** Tacit and explicit knowledge mapped to formalisation possibility

The figure displays three possible states: (1) tacit knowledge cannot be formalised, (2) tacit knowledge can be formalised and (3) knowledge is explicit. These states in turn reveal what we deem as the key deficiencies in the tacit-explicit approach to knowledge management:

1. It does not help to assess whether knowledge is formalisable;
2. It does not account for knowledge that falls in between the dichotomous range of formalisable and non-formalisable knowledge;
3. When knowledge is deemed not formalisable, it does not clarify what it is that people have when we say they have knowledge, nor does it clarify how we utilize human capacity for tacit knowledge management;
4. When knowledge is deemed formalisable, it does not help to select and evaluate knowledge representation formalisms such as text, flowcharts, database records, rules and formulas;
5. When knowledge is already explicit, it does not support the improvement of the representation, nor does it help in deciding to move another to knowledge

 

representation formalism;
6. When knowledge is explicit, it does not help in determining the *value* of rendering explicit knowledge more efficient, transparent and maintainable.

In short, the tacit-explicit distinction is a rather superficial instrument. What is needed in its place is a *theory on the nature of knowledge* that precedes and advances knowledge management. It is to this that we turn below.

## 4. Functional object-types as an alternative

### 4.1 Knowledge is matching

In moving toward a more fundamental view on knowledge, it is useful to return to Polanyi's (1966) conceptualisation. Although often overlooked in current discussions on tacit knowledge management, Polanyi's central notion of 'attending away' from the particulars of an entity and 'attending to' its joint whole lends much to our understanding of knowledge. Polanyi explains that the relationship between the particulars and the whole are functional, in that we rely on our awareness of the particulars in our ability to attend to the whole in our achievement of a joint purpose. How could we otherwise recognize the face of an acquaintance, play the piano or ride a bicycle skilfully if we were not able to coordinate our idea of successfully accomplishing these acts with our mental and physical performance of them Knowledge, then, establishes a relationship between the particulars and the whole of the entity: it provides an "*understanding* of the comprehensive entity which these two terms jointly constitute" (Polanyi 1966, p 13, italics original).

A scheme that further contributes clarity to the notion of knowledge as a process of understanding comprehensive entities (or concepts) is that of Ogden and Richards (1946). Ogden and Richards explain that a concept consists of an object-type, an object and a term. The object-type refers to a set of conditions, the object to the real-world entity that complies with these conditions, and the term to the label that denotes the object-type. A child, for instance, develops the object-type 'ball' to structure and act upon her environment. An object that matches conditions such as 'round form' and 'it rolls when you kick it' qualifies as a ball. The actual word 'ball' symbolises or labels the object-type.

Drawing on such discussions, we define knowledge as the competence to realize goals by matching object-types and objects (Figure 2). The child's ability to identify a ball by matching 'round form' and 'it rolls when you kick it' to the real world object 'ball' is thus knowledge. The child's ability to kick the ball by matching her concept of 'ball kicking' to the real world action of kicking a ball is also knowledge.

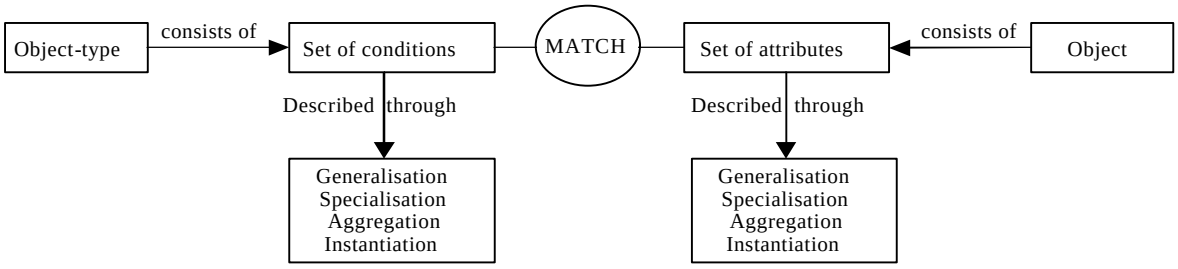


**Figure 2.** Matching object-types and objects

The relation between an object-type and its objects is that objects are referents that should comply with the object-type. Objects are the real-world counterparts of the object-type. As noted in the examples above, objects need not be physical phenomena; they may also be formed by a sequence of activities. Furthermore, because real-world object-types and objects can be highly complex, basic abstraction mechanisms are necessary in helping us to describe them (Figure 2). These include the generalization of specific object-types into a general category (balls are a generalization of footballs); specialization of general object-types into a specific category (footballs are a specialization of balls); aggregation of several object-types into a new object-type (the child's mental and physical abilities, plus the presence of the ball are the aggregated object-type of kicking a ball); and

 

the instantiation of a real world object-type (the way the child kicks the ball is an instantiation of all ball kicking).

If object-types determine the conditions of knowledge, then knowledge about concepts depends upon the definition, or construction, of the object-type. From this we conclude that in order to understand the nature of knowledge, we need to understand how object-types are constructed. The functional view provides us with such an understanding. Although other views on how to construct the conditions of an object-type exist, including the classical view, the prototypical view and the probabilistic view, we focus on the functional view (for an in-depth mutual comparison of these views see Van Der Smagt 1985; Hendriks 1986; Lucardie 1994). The functional view is unique in that it more clearly assigns goals as central to knowledge, and further, it recognizes that in the real world objects may present themselves in many different ways. This is evidenced through two basic characteristics of the functional view: (1) the goal-oriented selection principle and (2) functional equivalence.

### 4.2 The goal-oriented selection principle

Constructing an object-type is a strikingly difficult activity. Illustrative is the description of the object-type 'water' (Lucardie 1994, pp 80-91). An indefinitely large number of conditions potentially qualify for incorporation into the object-type 'water'. Consider the following characteristics: at sea level water boils at $100^0$C; the saturation pressure of water at $6^0$C is 0.6 cm mercury; water is a liquid with a refraction-index for sodium light of 1.33299 (at $20^0$C); liquid water has maximum density at $3.98^0$C; the viscosity of water vapour at $20^0$C is $9.6 \times 10^{-3}$ cP; water is a set of $H_2O$ molecules; water is a set of $T_2O$ molecules; and water is a set of $D_2O$ molecules. Given the innumerable possibilities, how then should we describe water? Is it something that boils at $100^0$C? Should we describe water through its isotopes $T_2O$ or $D_2O$?

Water is by no means the only object-type that displays an overwhelming array of conditions. In fact, all object-types are describable by a great number of conditions. A selection principle is thus needed. The functional approach operationalises a selection principle by assuming a goal or context of classification. Again, for the object-type 'water', goals need to be introduced such as 'quench one's thirst' or 'produce $H_2SO_4$'. Whereas the first goal requires attributes describing the drinkability of water, the latter goal requires the evaluation of the object attribute $H_2O$ ($T_2O$ or $D_2O$). Thus a change of goals or context alters the content of an object-type. Instead of having one object-type 'water', we distinguish several object-types 'water', each of which is true in relation to a certain goal or context.

### 4.3 Functional equivalence

Functional equivalence denotes the phenomenon that objects are identical—even if they possess quite different attributes—because they can perform the same function. In other words, objects may vary in attributes, but if they match one of the constructs of a goal-constituted object-type, they are functionally equivalent. Functional equivalence can be traced to three basic mechanisms: conditional relevance, conceptual interaction and variation limited to goal-constructed categories.

- *Conditional Relevance.* The first mechanism of functional equivalence refers to the phenomenon that, under specific conditions, other attributes may become important for determining class membership. Their relevance is conditional upon circumstances that also need to be incorporated in the object-type. This is exemplified in Figure 3 below, which shows the object-type 'client' with three conditions: bank account duration, business performance and wealth. The conditions 'wealthy' and 'not wealthy' are only relevant if 'bank account 12' and 'performance >50 and 75'.

- *Conceptual Interaction.* Categorizations of attributes of objects may influence each other. This phenomenon is called conceptual interaction. It manifests itself in the mutual influence of the categorizations of the attributes. Figure 3 shows conceptual interaction between 'bank account' and 'performance'. Another category of 'bank account' leads to another categorization of 'performance.'

Variation limited to goal-constructed categories. The third phenomenon contributing to functional equivalence refers to the situation where objects may have different attribute values, but that this variation is limited to, or falls within, goal-constructed categories. Objects 3 and 4 in the figure below have different but functionally similar values for 'performance'. The variation of 'performance' is

 

limited within the goal-constructed category 30.

**A. Object-type 'Client'**

| | | |
|---|---|---|
| (Bank account 12 months) | (Performance 50) | → Normal client |
| | (Performance >50 and 75) (not wealthy) | → Normal client |
| | (Performance >50 and 75) (wealthy) | → Special client |
| | (Performance >75) | → Special client |
| (Bank account > 12 months) | (Performance 30) | → Normal client |
| | (Performance > 30) | → Special client |

**B. Functionally similar objects**

Object 1: (Bank account 10 months), (performance 20) (wealthy)
Object 2: (Bank account 12 months), (performance 45) (poor)
Object 3: (Bank account 30 months), (performance 5) (poor)
Object 4: (Bank account 30 months), (performance 29) (wealthy)

**Figure 3.** The object-type 'client' and functionally equivalent objects

## 5. The value of the functional view

As the functional view gives insight into the basic characteristics of knowledge, it helps to clarify the fuzziness that surfaces when organisations attempt to construct and handle knowledge. As exemplified below, the goal-orientation of the functional view helps organisations more accurately define and use knowledge, while the underlying characteristic of functional equivalence helps to guide organisations forward through the operational processes of knowledge formalisation.

### 5.1 Installation of a goal-orientation

One of the most promising benefits of the functional view, is that it helps the organisation to start working from a goal or system of goals. A goal-oriented approach disentangles the confusion that often occurs when an organisation attempts to manage an object-type (e.g., an employee, a service, a product, or a client) while not taking into account that multiple goals are involved. As an example, we turn to a case where a computer system was used to help determine students' eligibility for university scholarships. The object-type 'scholarship student' that was incorporated into the system led to complaints from students who were overlooked for a scholarship because the system mistakenly failed to classify them as a 'scholarship student' (mismatch). It subsequently appeared that the rather complex object-type was constructed using the government's goal 'should suit budget,' while the universities linked to the scholarships had the implicit goal to acquire as many scholarship students as possible. Analysis revealed that at least two distinct object-types 'scholarships' should have been distinguished based upon the different goals of the actors involved. In addition to the efforts spent handling students' complaints, the costs to reconcile both object-types in an adapted system were substantial. The inclusion of goals and the related distinction of several object-types (and objects) would have eliminated irrelevant information, and increased transparency of knowledge. When goals determine which conditions are relevant for the definition of an object-type, knowledge becomes something in use as a function of the organisation's goals. This prevents knowledge from becoming obsolete, or just a sitting stock of information; for when the goals change, knowledge changes with it. This is true irrespective of whether knowledge is processed through humans, systems or both.

### 5.2 Assessment of formalisation potential

Beyond goal alignment, the functional view helps to assess the formalisation potentials of knowledge.Where As objects are functionally

similar, but are heterogeneous through conditional relevance and conceptual interaction, the formalisation potentials of knowledge are low. On the other hand, when similar objects are homogenous in the sense that the same attributes apply and the number of conceptual interactions is limited, formalisation is possible. Thus, through a measurement system, the functional view can help assess which knowledge can be managed through people and which through computer systems. More specifically, by measuring the number and complexity of conditional relevancies and conceptual interactions in a knowledge area, we can assess the degree of homogeneity (or heterogeneity) of that area. The degree of homogeneity is proportionate to the degree of formalisation, which is an indication of whether (and to what degree) knowledge should be put into computer systems or managed through humans. For example, in building a knowledge-based system for a municipality to allocate dwelling space to its inhabitants, it appeared that the object-type 'medically urgent person' was highly heterogeneous. It was thus decided that the knowledge-based system would assign the decision of whether a person is medically urgent to human experts who could easily handle the heterogeneity.

### 5.3 Evaluation of representation formalisms

Finally, the functional view is helpful in selecting and evaluating appropriate knowledge representation techniques for specific types of knowledge. Besides formulas and mathematical functions for representing knowledge of a compensatory nature, other formalisms exist for knowledge that is less homogeneous, including text, programming languages and flow charts. By defining the characteristics of a given representation technique, and determining these characteristics' ability to handle the functional equivalence of a specific knowledge area, we can determine whether it is a suitable match. Without a framework to select and evaluate knowledge representation formalisms, organisations often turn to the representation of knowledge in Lotus Notes or databases while the nature of functional equivalence requires other formalisms. As a consequence, maintenance costs accumulate quickly.

## 6. A functional blueprint

Stepping back from the examples above, we find it useful to close with a case where the functional view served as a driving force in a comprehensive knowledge management initiative. At the Department of Strategic Legal Affairs within the Ministry of Traffic and Trade in the Netherlands, the functional view helped in designing and implementing a blueprint of the knowledge-based organisation. The blueprint described the goals of the department, the processes necessary in achieving these goals and an assessment of the knowledge needs related to the processes. Specifically, for each process problems were identified through knowledge spectacles, and thus pinpointed as either knowledge fragmentation, lack of knowledge or unbalanced knowledge accessibility. The blueprint then measured the gap between the state of the department as a knowledge-intensive, information-based organisation (the As-Is situation), and as a knowledge-based organisation (the To-Be situation). The blueprint contained descriptions of the stages that would, step by step, transform the department into a knowledge-based organisation. Within each stage of this transformation, the blueprint guided the department through the use of knowledge enablers, including human resource management, organisational culture, processes, information technology architecture (e.g., the internet) and strategy. The choice of knowledge enabler(s) for a given knowledge area was then functionally assessed based upon the level of homogeneity for that area.

This blueprint is now being implemented to improve the department's performance. For example, a new information technology architecture was built to generate licenses consistently and quickly. This system, called QuicKlic, prevents claims (due to the improved and consistent licenses) and shortens the production time of a license by at least a factor of ten. QuicKlic was put into operation a few years ago, and combined with a new working methodology, the system has realized major improvements. Also, as a result of the functional view blueprint, knowledge-based human resource management has been implemented at the department. This initiative, called the Strategic Personnel Management Project, identifies individual knowledge needs within a five-year time frame, and tackles these needs through education and the hiring of new types of employees who are evaluated on their knowledge sharing.

 

## 7. Conclusion: A promising view on knowledge

The complex interplay between supply and demand forces organisations to embrace new business models built around knowledge; it forces them to become knowledge-based. The knowledge-based organisation is the organisation that optimises the application of knowledge to reach operational and strategic goals. It is about finding the most efficient, transparent and effective way of representing knowledge. It is about decreasing information flows and increasing knowledge flows. Neither the technology focus nor the tacit-explicit distinction suffices in helping organisations realise a knowledge-based paradigm.

By providing a framework in which organisations can align goals, assess knowledge and select appropriate knowledge solutions and representation formalisms, the functional view offers a promising alternative. And one that can be operationalised. During the last ten years, the functional approach has been successfully applied in various economic sectors—the cases mentioned above are just a few examples. The next step is to clarify the intricacies of the view in scientific publications, which in turn will help initiate its acceptance as a serious approach to handling organisational knowledge. Maybe then organisations can begin to move past their technology focus and toward being truly knowledge-based, which in turn will equate to better performance.

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