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WHAT IS ORGANIZATIONAL KNOWLEDGE?*

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ABSTRACT

Organizational knowledge is much talked about but little understood. In this paper we set out to conceptualize organizational knowledge and explore its implications for knowledge management. We take on board Polanyi's insight concerning the personal character of knowledge and fuse it with Wittgenstein's insight that all knowledge is, in a fundamental way, collective. We do this in order to show, on the one hand, how individuals appropriate knowledge and expand their knowledge repertoires, and, on the other hand, how knowledge, in organized contexts, becomes organizational. Our claim is that knowledge is the individual capability to draw distinctions, within a domain of action, based on an appreciation of context or theory, or both. Organizational knowledge is the capability members of an organization have developed to draw distinctions in the process of carrying out their work, in particular concrete contexts, by enacting sets of generalizations whose application depends on historically evolved collective understandings. Following our theoretical exploration of organizational knowledge, we report the findings of a case study carried out at a call centre in Panafon, in Greece. Finally, we explore the implications of our argument by focusing on the links between knowledge and action on the one hand, and the management of organizational knowledge on the other. We argue that practical mastery needs to be supplemented by a quasi-theoretical understanding of what individuals are doing when they exercise that mastery, and this is what knowledge management should be aiming at. Knowledge management, we suggest, is the dynamic process of turning an unreflective practice into a reflective one by elucidating the rules guiding the activities of the practice, by helping give a particular shape to collective understandings, and by facilitating the emergence of heuristic knowledge.

INTRODUCTION

The aim of this paper is to explore the links between individual knowledge, organizational knowledge, and human action undertaken in organized contexts. Those

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links have remained relatively unexplored in the relevant literature, a large part of which, captive within a narrowly Cartesian understanding of knowledge and cognition, has tended to privilege 'pure' knowledge and thinking at the expense of outlining the forms of social life which sustain particular types of knowledge (Tsoukas, 1996, 1997, 1998; Varela et al., 1991; Winograd and Flores, 1987).

Moreover, although most people intuitively identify knowledge with *individual* knowledge, it is not quite evident how knowledge becomes an individual possession and how it is related to individual action, nor is it clear in what sense knowledge merits the adjective *organizational*. Despite the insights gained by the research of leading experts on organizational knowledge, there are still crucial questions unresolved. For example, Nonaka and Takeuchi (1995, pp. 58–9) argue that:

> Information is a flow of messages, while knowledge is created by that very flow of information, anchored in the beliefs and commitment of its holder. This understanding emphasizes that *knowledge is essentially related to human action*. (Emphasis in the original)

Other researchers have similarly stressed the close connection between knowledge and action: whatever knowledge is, it is thought to make a difference to individuals' actions (Choo, 1998; Devenport and Prusak, 1998; Leonard and Sensiper, 1998; Suchman, 1987; Wigg, 1997). However, while this is a useful insight, it is not clear *how* knowledge is connected to action, nor, more fundamentally, what knowledge is. True, knowledge makes a difference, but how? How is knowledge brought to bear on what an individual does? What are the prerequisites for using knowledge effectively in action?

Davenport and Prusak (1998, p. 5) have provided the following definition of knowledge:

> Knowledge is a flux mix of framed experiences, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms.

While this definition correctly highlights the dynamic character of knowledge (i.e. knowledge is both an outcome – 'a framework' – and a process for 'incorporating new experiences and information'), it is not clear in what sense knowledge is different from information, nor how it is possible for values and contextual information to originate and apply in the minds of individuals alone. Moreover, Davenport and Prusak pack into knowledge too many things, such as 'values', 'experiences' and 'contexts', without specifying their relationships, thus risking making 'knowledge' an all-encompassing and, therefore, little-revealing, concept. Also, while it is acknowledged that knowledge becomes embedded in organizations, it is not mentioned in what form, nor how individuals draw on it.

For some researchers and practitioners (see Gates, 1999; Lehner, 1990; Terrett, 1998) organizational knowledge tends to be viewed as synonymous with information, especially digital information, in which case the interesting issue is thought to be how knowledge-as-information is best stored, retrieved, transmitted and

shared (cf. Brown and Duguid, 2000; Hendriks and Vriens, 1999). In contrast, for some researchers, such as Kay (1993), organizational knowledge becomes the essence of the firm. For example, as Kay (p. 73) remarks, '[organizational knowledge] is distinctive to the firm, is more than the sum of the expertise of those who work in the firm, and is not available to other firms'. Here knowledge is thought to be profoundly collective, above and beyond discrete pieces of information individuals may possess; it is a pattern formed within and drawn upon a firm, over time. While few would take issue with this definition, it does not quite reveal what are the characteristic features of organizational knowledge, and does not even hint at the relationship between individual and organizational knowledge.

From the above admittedly cursory review, it follows that it is still not clear what knowledge is, nor what makes it organizational. Realizing that knowledge is indeed a tricky concept, some researchers have gone as far as to suggest (mostly in the context of academic conferences) that, perhaps, we do not need more formal definitions of knowledge, since they, very likely, end up complicating things further. We do not agree with this view. Our understanding of organizational knowledge (or any other topic of interest) will not advance if we resign ourselves to merely recycling commonsensical notions of knowledge for, if we were to do so, we would risk being prisoners of our own unchallenged assumptions, incapable of advancing our learning. On the contrary, what we need is ever more sophisticated theoretical explorations of our topic of interest, aiming at gaining a deeper insight into it. Those who think such an attempt is futile need to ponder the great extent to which Polanyi's notion of 'personal knowledge' has advanced our understanding of what knowledge is about and, accordingly, how much impoverished our understanding would have been without that notion. If theoretical confusion is in evidence the answer cannot be 'drop theory' but 'more and better theory'.

In this paper we will argue that our difficulties in getting to grips with organizational knowledge stem from a double failure: to understand the generation and utilization of knowledge we need a theory of knowledge, *and* to understand *organizational* knowledge we need a theory of organization. Moreover, it needs to be pointed out that, although no self-respecting researchers have so far failed to acknowledge their debt to Polanyi for the distinction he drew between tacit and explicit knowledge, Polanyi's work, for the most part, has not been really engaged with. If it had been it would have been noticed that, since all knowledge has its tacit presuppositions, tacit knowledge is not something that can be converted into explicit knowledge, as Nonaka and Takeuchi (1995) have claimed (cf. Cook and Brown, 1999; Tsoukas, 1996). Moreover, and perhaps more crucially, it would have been acknowledged that Polanyi (1962), more than anything else, insisted on the *personal* character of knowledge – hence the title of his magnum opus, *Personal Knowledge*. In his own words: '*All* knowing is personal knowing – participation through indwelling' (Polanyi, 1975, p. 44; emphasis in the original).

In this paper, we will take on board Polanyi's profound insight concerning the personal character of knowledge and fuse it with Wittgenstein's claim that all knowledge is, in a fundamental way, collective, in order to show on the one hand how individuals appropriate knowledge and expand their knowledge repertoires, and, on the other hand, how knowledge, in organized contexts becomes organizational, with what implications for its management. We will ground our theoretical claims on a case study undertaken at a call centre in Panafon, the leading mobile telecommunications company in Greece.

The structure of the paper is as follows. In the next section we describe what personal knowledge is and develop further the notion of organizational knowledge. In a nutshell, our claim is that knowledge is the individual capability to draw distinctions, within a domain of action, based on an appreciation of context or theory, or both. Similarly, organizational knowledge is the capability members of an organization have developed to draw distinctions in the process of carrying out their work, in particular concrete contexts, by enacting sets of generalizations whose application depends on historically evolved collective understandings. Following our theoretical exploration of organizational knowledge, we report the findings of a case study carried out at a call centre in Panafon, in Greece. In line with our argument that all organizations can be seen as collections of knowledge assets (cf. Wenger, 1998, p. 46), we investigate how call operators at a call centre – a unit which, conventionally, would not be called knowledge-intensive – answer customer calls by drawing on and modifying organizational knowledge to suit their particular circumstances. Finally, we explore the implications of our argument by focusing on the links between knowledge and action on the one hand, and the management of organizational knowledge on the other.

ON PERSONAL AND ORGANIZATIONAL KNOWLEDGE

The distinction between data, information, and knowledge has often been made in the literature (Boisot, 1995; Choo, 1998; Davenport and Prusak, 1998; Nonaka and Takeuchi, 1995). What differentiates knowledge from information, it has been argued, is that knowledge presupposes values and beliefs, and is closely connected with action. Similarly, Bell (1999, pp. lxi–lxiv) has provided a neat definition of these terms, which is particularly useful for our purpose here. For Bell *data* is an ordered sequence of given items or events (e.g. the name index of a book). *Information* is a context-based arrangement of items whereby relations between them are shown (e.g. the subject index of a book). And *knowledge* is the judgement of the significance of events and items, which comes from a particular context and/or theory (e.g. the construction of a thematic index by a reader of a book).

What underlies Bell's definition of knowledge is his view that data, information, and knowledge are three concepts that can be arranged on a single continuum, depending on the extent to which they reflect human involvement with, and processing of, the reality at hand. For example, the name index of a book is merely data, since it involves minimal effort on the part of an individual to make such an index – the names are there, it is just a matter of arranging them alphabetically. The subject index of a book, however, requires more processing on the part of the individual, since it depends on his/her judgement to construct the appropriate headings for such an index. Finally, when a reader relates the content of a book to his/her own interests, he/she may construct his/her own analytical index – in other words, the reader in this case has a far greater degree of involvement and exercises far greater judgement in organizing the material at hand. Put simply, data require minimal human judgement, whereas knowledge requires maximum judgement. Knowledge is the capacity to exercise judgement on the part of an individual, which is either based on an appreciation of context or is derived from theory, or both (Bell, 1999, p. lxiv).

Drawing on Dewey's (1934) conception of aesthetic experience, Bell (1999, p. lxiv) goes on to argue that 'judgement arises from the self-conscious use of the prefix *re*: the desire to *re*-order, to *re*-arrange, to *re*-design what one knows and thus create new angles of vision or new knowledge for scientific or aesthetic purposes'. The self-conscious desire to re-arrange what one knows implies that the individual wishes to see things differently, to disclose aspects of a phenomenon that were hitherto invisible, or simply to see more clearly than before. But this is not all: the individual will re-arrange his/her knowledge while being located somewhere – a certain standpoint or tradition. Thus the capacity to exercise judgement involves two things. First the ability of an individual to draw distinctions (Reyes and Zarama, 1998; Vickers, 1983) and, secondly, the location of an individual within a collectively generated and sustained domain of action – a 'form of life' (Wittgenstein, 1958), a 'practice' (MacIntyre, 1985), a 'horizon of meaning' (Gadamer, 1989) or a 'consensual domain' (Maturana and Varela, 1988) – in which particular criteria of evaluation hold.

Why does the capacity to exercise judgement imply the capability of drawing distinctions? Because when we draw a distinction we split the world into 'this' and 'that', we bring into consciousness the constituent parts of the phenomenon we are interested in (Dewey, 1934, p. 310). Through language we name, and constantly bring forth and ascribe significance to, certain aspects of the world (including, of course, our own behaviour) (Schutz, 1970; Taylor, 1985; Winograd and Flores, 1987). When our language is crude and unsophisticated, so are our distinctions and the consequent judgements. The more refined our language, the finer our distinctions. Our attempt to understand and act on reality is simultaneously enabled and limited by the cultural tools we employ – with language being one of the most important (Vygotsky, 1978, pp. 23–30; Wertsch, 1998, p. 40). Just like someone with a rudimentary knowledge of English cannot easily tell the different kinds of accent of English speakers (that is, he/she cannot draw fine distinctions related to accent), so a person untrained into a particular activity has only a rule-based, undifferentiated outline of it in mind, rather than a set of refined distinctions (Dreyfus and Dreyfus, 1986). Polanyi (1962, p. 101) has perceptively captured this point in the following illustration:

> Think of a medical student attending a course in the X-ray diagnosis of pulmonary diseases. He watches in a darkened room shadowy traces on a fluorescent screen placed against a patient's chest, and hears the radiologist commenting to his assistants, in technical language, on the significant features of these shadows. At first the student is completely puzzled. For he can see in the X-ray picture of a chest only the shadows of the heart and the ribs, with a few spidery blotches between them. The experts seem to be romancing about figments of their imagination; he can see nothing that they are talking about. Then as he goes on listening for a few weeks, looking carefully at ever new pictures of different cases, a tentative understanding will dawn on him; he will gradually forget about the ribs and begin to see the lungs. And eventually, if he perseveres intelligently, a rich panorama of significant details will be revealed to him: of physiological variations and pathological changes, of scars, of chronic infections and signs of acute disease. He has entered a new world. He still sees only a fraction of what the experts can see, but the pictures are definitely making sense now and so do most of the comments made on them.

The medical student refines her ability to read an X-ray picture through her exposure to the relevant material (what Lakoff (1987, p. 297) calls 'the basic-level interactions with the environment') *and* the specialized language she is taught to apply to that material (Schon, 1983). How does this happen? Having a body, the medical student is capable of obtaining preconceptual experience, that is experience that is tied to gestalt perception, mental imagery and motor movement (Lakoff, 1987, pp. 267–8, 302–3). At the same time, being a language user, the medical student operates in the cognitive domain, namely a domain within which she recursively interacts with his/her own descriptions (i.e. thoughts). What initially appears only as a shadow of the heart and the ribs (i.e. a description), is further processed, through language and with the help of an instructor or with peers, until a much more refined picture emerges. As Mercer (1995, p. 13) remarks, 'practical, hands-on activity can gain new depths of meaning if it is *talked about*' (emphasis added). Relating her hitherto knowledge to the X-ray picture and talking about it with her instructor, the medical student is forced to revise and refine her understanding about the matter at hand (Hunter, 1991). In von Foerster's (1984, p. 48) second-order cybernetics language, cognitive processes are never-ending processes of computation. Cognition consists in computing descriptions of descriptions, namely in recursively operating on – modifying, transforming – representations. In doing so, cognizing subjects re-arrange and re-order what they know, thus creating new distinctions and, therefore, new knowledge (Bell, 1999, p. lxiv; Dewey, 1934).

Individuals draw distinctions within a collective domain of action, namely within a language-mediated domain of sustained interactions. For the medical student to be able to discern the medically significant pattern of an X-ray picture, she necessarily draws on medical knowledge, namely on a collectively produced and sustained body of knowledge (Hunter, 1991). Likewise, for an individual copier technician to be able to diagnose a faulty photocopier, he needs to draw on a specific body of expertise, which is produced and sustained by the company making photocopiers and by the community of technicians as a whole (Orr, 1996; cf. Wenger, 1998). Why is this so? The reason is that the key categories implicated in human action, for example, 'physiological variation', 'pathological change' (Polanyi, 1962, p. 101), 'faulty photocopier' (Orr, 1996), or 'clunky flute' (Cook and Brown, 1999, p. 396; Cook and Yanow, 1996), derive their meanings from the way they have been used within particular forms of life (the medical community or the community of photocopier technicians or the community of flutemakers). One learns how to recognize a pathology on the lungs or a 'clunky flute', only because one has been taught to use the category 'pathological lung' or 'clunky flute' within a domain of action (Toulmin, 1999).

In other words, knowing how to act within a domain of action is learning to make competent use of the categories and the distinctions constituting that domain (Wenger, 1998). As Spender (1989) has shown, upon entering a particular industry, managers learn a particular 'industry recipe', that is a set of distinctions tied to a particular field of experience. The distinctions pertain to a number of issues ranging from how markets are segmented to the kind of employees suited to an industry or to the technology used. To put it broadly, to engage in collective work is to engage in a discursive practice, namely in the normative use of a sign system which is directed at influencing aspects of the world and whose key categories and distinctions are defined through their use in discourse (Harré and Gillett, 1994, pp. 28–9; Taylor, 1993; Tsoukas, 1996, 1998).

On the basis of the preceding analysis, the definition of knowledge mentioned earlier may be re-formulated as follows: *knowledge is the individual ability to draw distinctions within a collective domain of action, based on an appreciation of context or theory, or both*. Notice that such a definition of knowledge preserves a significant role for human agency, since individuals are seen as being inherently capable of making (and refining) distinctions, while also taking into account collective understandings and standards of appropriateness, on which individuals necessarily draw in the process of making distinctions, in their work.

The individual capacity to exercise judgement is based on an appreciation of *context* in the ethnomethodological sense that a social being is (or, to be more precise, becomes) knowledgeable in accomplishing routine and taken-for-granted tasks within particular contexts (e.g. taking measurements, driving, holding a conversation, filling in a medical insurance form, etc), as a result of having been through processes of socialization (Berger and Luckmann, 1966; Garfinkel, 1984; Schutz, 1970). We do not need a PhD in linguistics to carry out a conversation, nor do we need specialized training in economics or agricultural science to buy cheese at the grocers. We know how to deal with the practical things in life because we have picked up through interaction (with the world and with others) what is expected of us, or what works (Heritage, 1984; Wenger, 1998). 'We bring to situations of interaction', notes McCarthy (1994, p. 65), a 'tacit awareness of the normative expectations relevant to them and an intuitive appreciation of the consequences that might follow from breaking them'.

The individual capacity to exercise judgement is based on an appreciation of *theory* in the epistemic sense that, as Bell (1999, p. lxiii) has noted, 'theory allows one to take a finding and generalize from any one context to another context. From verified theory – Newton's laws of motion – we can accept the finding in a new context as knowledge'. Choosing a theory and applying it in a new context involves judgement, and the capacity to make such judgements is knowledge. The notion of 'theory' here is a broad one to include any framework, set of generalizing principles, or abstract instructions. Just as a judge brings a set of legal principles to bear on a particular situation, so a copier technician draws upon, among other things, a set of abstract instructions in order to repair a faulty photocopier. Whatever abstract principle enables an individual to generalize across contexts counts as theory and forms an additional basis for exercising judgement.

If the above is accepted then it becomes possible for us to see the sense in which knowledge becomes organizational. In a weak sense, knowledge is organizational simply by its being generated, developed and transmitted by individuals within organizations. That is obvious but unrevealing. In a strong sense, however, knowledge becomes organizational when, as well as drawing distinctions in the course of their work by taking into account the contextuality of their actions, *individuals draw and act upon a corpus of generalizations in the form of generic rules produced by the organization*.

Why is this the case? A distinguishing feature of organization is the generation of recurring behaviours by means of institutionalized roles that are explicitly defined. For an activity to be said to be organized it implies that *types* of behaviour in *types* of situations are connected to *types* of actors (Berger and Luckmann, 1966, p. 22; Scott, 1995). An organized activity provides actors with a given set of cognitive categories and a typology of action options (Scott, 1995; Weick, 1979). Such a typology consists of rules of action – typified responses to typified

expectations (Berger and Luckmann, 1966, pp. 70–3). Rules are prescriptive statements guiding behavior in organizations and take the form of propositional statements, namely 'If X, then Y, in circumstances Z'. As Twining and Miers (1991, p. 131) remark, 'a rule prescribes that in circumstances X, behaviour of type Y ought, or ought not to be, or may be indulged in by persons of class Z'.

On this view, therefore, *organizing implies generalizing*: the subsumption of heterogeneous particulars under generic categories. In that sense, formal organization necessarily involves abstraction. Since in an organization the behaviour of its members is formally guided by a set of propositional statements, it follows that an organization may be seen as a *theory* – a particular set of concepts (or cognitive categories) and the propositions expressing the relationship between concepts. Organization-as-theory enables organizational members to generalize across contexts. For example, the operators of the call centre we researched had been instructed to issue standardized responses to standardized queries: if this type of problem appears, then this type of solution is appropriate. From a strictly organizational point of view, the contextual specificity surrounding every particular call (a specificity that callers tend to expand upon in their calls) is removed through the application of generic organizational rules.

Rules, however, exist for the sake of achieving specific goals. The generalizations selected and enforced are selected from among numerous other possibilities. To have as a rule, for example, that 'no caller should wait for more than one minute before his/her call is answered' is not self-evident. It has been selected by the company, in order to increase its customer responsiveness, hoping that, ultimately, it will contribute to attracting more customers, thus leading to higher market share, and so on. In other words, a rule's factual predicate ('If X . . .') is a generalization selected because it is thought to be causally relevant to a *justification* – some goal to be achieved or some evil to be avoided (Schauer, 1991, p. 27). A justification (or to be more precise, a set of logically ordered justifications) determines which generalization will constitute a rule's factual predicate. This is an important point for it highlights the fact that rules exist for the sake of some higher-order goals.

Moreover, rules do not apply themselves; members of a community-of-practice, situated in specific contexts, apply them (Gadamer, 1980; Tsoukas, 1996; Wittgenstein, 1958). Members of a community must share an interpretation as to what a rule means before they apply it. As Barnes (1995, p. 202) remarks, 'nothing in the rule itself fixes its application in a given case, . . . there is no "fact of the matter" concerning the proper application of a rule, . . . what a rule is actually taken to imply is a matter to be decided, when it is decided, by contingent social processes'. Since rules codify particular previous examples, an individual following a rule needs to learn to act in proper analogy with those examples. To follow a rule is, therefore, to extend an analogy. Barnes (1995, p. 55) has put it so felicitously that we cannot resist the temptation to quote him in full:

> To understand rule-following or norm-guided behavior in this way immediately highlights the normally open-ended character of norms, the fact that they cannot themselves fix and determine what actions are in true conformity with them, that there is no logical compulsion to follow them in a particular way. Every instance of a norm may be analogous to every other, but analogy is not identity: analogy exists between things that are similar yet different. And this

> means that, although it is always possible to assimilate the next instance to a norm by analogy with existing examples of the norm, it is equally always possible to resist such assimilation, to hold the analogy insufficiently strong, to stress the differences between the instance and existing examples. If norms apply by analogy then it is up to *us* to decide where they apply, where the analogy is sufficiently strong and where not. (Emphasis added)

Notice that, on this essentially Wittgensteinian view, the proper application of a rule is not an individual accomplishment but is fundamentally predicated on collectively shared meanings. If formal organization is seen as a set of propositional statements, then those statements must be put into action by organizational members, who 'must be constituted as a *collective* able to sustain a shared sense of what rules imply and hence an agreement in their practice when they follow rules' (Barnes, 1995, p. 204; emphasis added). The justification (purpose) underlying a rule needs to be elaborated upon and its meaning agreed by the organizational collective. Organizational tasks are thus accomplished by individuals being able to secure a shared sense of what rules mean (or by agreeing upon, reinforcing, and sustaining a set of justifications) in the course of their work. This suggests an organization as a densely connected network of communication through which shared understandings are achieved.

A collectivist understanding of organizational knowledge has been evident in Penrose's (1959) work on the theory of the firm. The key to understanding firms' growth, wrote Penrose, is to focus not on the given resources a firm possesses but on the *services* rendered by those resources. This means that, according to Penrose, firms have discretion over how they use their resources and, therefore, over the services derived from them. Such discretion stems from the fact that firms view, and thus utilize, their resources differently. On this view, organizational knowledge is the set of collective understandings embedded in a firm, which enable it to put its resources to particular uses. Penrose's view of organizational knowledge identifies the latter with cultural or collective knowledge (Blackler, 1995; cf. Collins, 1990) – *it is a distinctive way of thinking and acting in the world.*

There is an interesting parallel between the preceding Wittgensteinian view of rule following and Polanyi's conception of personal knowledge. Both philosophers showed that even the most abstract formalisms we use ultimately depend, for their effective deployment, on social definitions. Abstract systems cannot be self-sustained; they are necessarily grounded on collective definitions, hence they depend on human judgement (Toulmin, 1999). Polanyi extended this argument further. For him, human judgement is manifested not only at the level of collective significations that happen to have historically evolved; it is equally manifested at the individual level. All knowledge is personal knowledge.

Seeking to highlight the nature of science as a skilful practice, Polanyi described, time and again, the exact sciences as 'a set of formulae which have a bearing on experience' (Polanyi, 1962, p. 49). It is precisely the establishment of this 'bearing on experience' that renders all scientific knowing, ultimately, *personal* knowing. In so far as even the most abstract mathematical formalisms need to be empirically checked, that is predictions to be made, measurements to be taken, and predictions to be compared with measurements, there will bound to be discrepancies between theory and observations, no matter how minor, which will need to be assessed by personal judgement on the part of the scientist (Polanyi, 1975, p. 30).

In his several illustrations, from map reading, through piano playing and bicycle riding, to scientific work, Polanyi consistently pointed out that all abstract systems, from the shortest set of instructions right to the most abstract and comprehensive set of formalisms, ultimately encounter experience – the real world with all its messiness, imperfection, and complexity – and that encounter is inevitably mediated through human judgement. In Polanyi's (1975, p. 31) words,

> Even the most exact sciences must therefore rely on our personal confidence that we possess some degree of personal skill and personal judgement for establishing a valid correspondence with – or a real deviation from – the facts of experience.

Acknowledging that all knowledge contains a personal element or, to put it differently, '[recognizing] personal participation as the universal principle of knowing' (Polanyi, 1975, p. 44), implies that knowing always is, to a greater or lesser extent, a skilful accomplishment, an art.

What is the structure of such a skill? What does it consist of? Either we refer to everyday or expert knowledge or, to use Bell's terminology, to knowledge based on an appreciation of context or theory, the structure of knowing-as-a-skill is identical. In order to know something, the individual acts to integrate a set of particulars of which he/she is subsidiarily aware. To make sense of our experience, we necessarily rely on some parts of it subsidiarily in order to attend to our main objective focally. We comprehend something as a whole (focally) by tacitly integrating certain particulars, which are known by the actor subsidiarily. Knowing has a *from–to* structure: the particulars bear on the focus *to* which I attend *from* them. Subsidiary awareness and focal awareness are mutually exclusive. Action is confused if the individual shifts his/her focal attention to the particulars, of which he/she had been previously aware in a subsidiary manner.

Thus, knowing consists of three elements: subsidiary particulars, a focal target, and, crucially, a person who links the two. Polanyi's (1975, p. 36) classic example is the blind man probing a cavity with his stick. The focus of his attention is at the far end of the stick, while attending subsidiarily to the feeling of holding the stick in his hand. The difference between a seeing man blindfolded and a blind man is that, for the former, probing feels like a series of jerks in his palm, whereas for the latter probing indicates the presence of certain obstacles of a certain hardness and shape. In the first case, the stick has not yet been assimilated (and, as a result, it receives focal awareness), while in the latter case the stick is being subsidiarily aware of and, as a result, it is used as a tool to a certain end.

On Polanyi's view, practical knowledge has two features. First, it is inevitably and irreducibly *personal*, since it involves personal participation in its generation. In his words, 'the relation of a subsidiary to a focus is formed by the *act of a person* who integrates one to another' (Polanyi, 1975, p. 38). And secondly, for knowledge to be effectively applied, it needs to be *instumentalized* – to be used as a tool. On this point, Polanyi was very clear, echoing the Heideggerian line of thinking (Winograd and Flores, 1987). 'Hammers and probes', he wrote, 'can be replaced by intellectual tools' (Polanyi, 1962, p. 59). As we learn to use a tool, any tool, we gradually become unaware of how we use it to achieve results. Polanyi called this 'indwelling' – dwelling in the tool, making it feel as if it is an extension of our own body (Polanyi, 1962, 1975). We make sense of experience by assimilating the tool

through which we make sense. The lapse into unawareness of the manner in which we use a tool is accompanied by an expansion of awareness of the experiences at hand, on the operational plane. We refine our ability to get things done by dwelling in the tools (both physical and intellectual) through which we get things done. The increasing instrumentalization of certain actions in the service of some purpose (or what we earlier called 'justification') enables the individual to expand his/her awareness of the situation he/she encounters and thus to refine his/her skills (Dreyfus and Dreyfus, 1986). The ongoing process of transforming experience into subsidiary awareness or, in Polanyi's (1962, p. 64) words, 'the pouring of ourselves into the subsidiary awareness of particulars', allows one to reach ever higher levels of skilful achievement (e.g. the improvement of the medical student's ability to read the X-ray picture).

To sum up, knowledge is the individual capability to draw distinctions, within a domain of action, based on an appreciation of context or theory, or both. Organizations are three things at once: concrete settings within which individual action takes place; sets of abstract rules in the form of propositional statements; and historical communities. Organizational knowledge is the capability members of an organization have developed to *draw distinctions* in the process of carrying out their work, in particular *concrete contexts*, by enacting sets of generalizations (*propositional statements*) whose application depends on historically evolved *collective understandings* and experiences. The more propositional statements and collective understandings become instrumentalized (in Polanyi's sense of the term); and the more new experiences are reflectively processed (both individually and collectively) and then gradually driven into subsidiary awareness, the more organizational members dwell in all of them, and the more able they become to concentrate on new experiences, on the operational plane.

Having developed the notion of organizational knowledge and shown its links with personal knowledge and human action, we will proceed below to empirically investigate these claims through a case study.

ORGANIZATIONAL KNOWLEDGE IN ACTION: A CASE STUDY

Research Setting

A case study on organizational knowledge was undertaken at the Customer Care Department at Panafon, Greece's leading mobile phone operator. The company was formed in 1992, employs 900 people, and is controlled by the UK-based Vodafone group. With more than 2 million subscribers, Panafon holds a 38 per cent share of the mobile phone market in Greece, one of the fastest growing markets in Europe (*Financial Times*, 28 December 2000). The company is listed on the Athens stock exchange and provides a wide range of standard and enhanced GSM services as well as services such as voice mail, short message services, personal numbering and data, fax transmission services, and internet-related services (Panafon, 1998).

The quality of customer care is, along with price, network coverage, and range of services, a determining factor for customers to choose to subscribe to one of the three providers of mobile telecommunications services in Greece. Considering the great importance of Customer Care for Panafon's ability to maintain and attract customers, the empirical part of this study is focusing on organizational

knowledge within the Customer Care Department (CCD), although the latter is not what might be called a knowledge-intensive department. This however, is immaterial for us, since, as was hopefully made clear in the preceding section, knowledge is *de facto* implicated in all types of organizational work (Wenger, 1998). Indeed, one of our claims in the preceding section has been that human action in organizations (all kinds of organizations) *necessarily* draws on organizational knowledge, namely on sets of generalizations underlain by collective understandings, activated in particular contexts. Of course, this is not to deny that there are, indeed, important differences between organizational forms concerning the dominant types of knowledge to be found in each one of them (Lam, 2000). But, such differences are not analytically relevant in the context of the present argument, just like differences between societies are not analytically relevant in the context of an inquiry that sets out to investigate the structuring and enactment of social relations (Garfinkel, 1984).

The Customer Care Department (CCD) has been in operation since the commencement of Panafon's commercial operation, and it was the first customer care centre in Greece to operate 24 hours a day. Today the CCD has a total of 250 employees and consists of four call centres. The volume of calls to CCD has increased significantly in recent years, due to both the growth in the customer base and new services introductions. Currently, the department receives an average of 60,000 calls a day, although volumes fluctuate by month of the year, day of the week, time of the day, and maturity of service. Operators, working in eight-hour shifts, are responsible for answering calls about specific Panafon services according to their experience and training on the corresponding services.

The aim of CCD is to provide information support to Panafon subscribers, including directory inquiries, connection through directory assistance, secretarial messaging services, general information on the company's services (e.g. tariffs, network coverage), voice mail inquiries, as well as general information and assistance, including information about mobile phones, to both contract and pre-paid customers. Customer care is provided by Customer Care Operators (hereafter referred to as operators), all of whom have been formally trained in Panafon's products and services and in the techniques of providing customer support. In addition, operators have received on the job training before taking on their duties.

Data Collection and Analysis

Data collection was conducted in two phases. In Phase I, we participated in a two-day induction programme, designed for new employees. Our aim was to familiarize ourselves with the company, and get an overall picture about its operation, products and services, departments, etc. In Phase II data about the CCD were collected using unstructured and semi-structured interviewing and document review. In addition, Phase II involved extensive on the job observation, and review of relevant work-related material.

Observation took the form of sitting with operators when they were on and off the phones as well as attending their coffee breaks, and taking notes on their work practices. Operators were encouraged to give explanations about what they were doing, and these descriptions were supplemented with questions probing particular issues, especially for explanations and clarifications both for the use of the available technology and work manuals, and for operators' initiatives and tacit understandings in dealing with customer calls. Materials reviewed included the

work manuals provided by Panafon to employees and operators' personal notes. Detailed interviews in Phase II were taken from three Customer Care Operators, the fault coordinator, the shift supervisor, and supervisor of one of the four call centres, as well as three employees at Engineering and one at Operations & Support departments who work in contact with Customer Care. Qualitative techniques were used to analyse the data collected, in line with the recommendations by Miles and Huberman (1984).

Knowledge Practices within Panafon's Customer Care Department

To answer most customer queries, operators draw upon electronically provided and printed information. Concerning electronically provided information, operators use computerized databases containing pertinent information for each of the services provided by CCD. For example, for general inquiries concerning contract customers, the computerized database contains, among other things, information about which services the customer has subscribed to and who is his/her service provider. This information enables operators to help customers identify whether, for example, a customer has indeed subscribed to a particular service the customer has inquired about (e.g. whether the customer has subscribed to having voice mail). The system can also help operators to activate the connection of pre-paid customers or even to activate call recognition for these customers if they wish.

The system is also used in the case of directory inquiries. Everyday operators are required to check their computer screens for new information that may have become available (concerning, for example, network coverage problems, tariff changes, etc), which operators need to know about in order to answer customer queries accurately and efficiently. As for the printed material operators draw upon, it consists of company manuals containing information about a range of issues, such as details about all services provided by Panafon, countries in which roaming may be activated, information on different types of mobile phones, etc.

Drawing on both printed and electronically available information, operators are, in principle, in a position to handle customer queries. As an experienced operator put it:

> Answers to 95 per cent of the questions we are asked exist somewhere in the computer system, or in the manuals, or somewhere. Most likely the subscriber will be given the information he wants. The only question is how fast this will be done.

Indeed, the question of speed is an important indicator of high-quality service since, if a particular customer is served quickly, he/she will very probably be a satisfied customer. Prompted to explain what she meant by 'somewhere', the above mentioned operator carried on exalting the significance of 'work experience' in that it provides operators with a repository of instances upon which they may regularly draw in their work.

Viewed this way, the information systems used by the operators include not only the organizationally provided technical means for accessing relevant information, but also the informal memory system (both individual and collective) which has gradually been built over time, consisting of the individual stocks of experience held by each operator, and by the stories shared in their community. As the operators often pointed out in their interviews with us, accessing that informal

collective stock of knowledge is a valuable source of information for them. This is quite important because it highlights the significance of the web of social relations at work, since it is within those relations that such informal knowledge is preserved and drawn upon (Davenport and Prusak, 1998).

Indeed all operators interviewed emphatically mentioned how important it is for them to be able to draw upon the accumulated experience and knowledge of one another at work. We noticed that operators, while carrying out their tasks, often consulted one another about matters unknown to them. Communication about work-related issues occurs also during their breaks. It is noteworthy that such communication occurs naturally; it is part of the informal story telling that goes on among operators. Narrating work-related episodes to one another about, for example, awkward customers and uncommon questions tackled creates an environment in which the ties of community are reinforced, collective memory is enriched, and individual knowledge is enhanced. Researchers such as Orr (1996), Weick (1995), Brown and Duguid (1991), and Wenger (1998) have also mentioned the strong links between community ties, individual learning, and story telling.

Providing customer support is not as easy a job as it might first appear. Operators must be able to continuously provide efficient, courteous and helpful customer support services to subscribers – at least that is the official company policy. Moreover, customers are rarely 'sophisticated' mobile phone users, which often makes communication between operators and customers difficult: customers do not always express themselves in a clear and articulate manner, whereas sometimes they are not even sure what exactly they want. For example, we noticed that when asking for information, several customers tended to provide plenty of contextual details while describing their query. Often such contextual information was, strictly speaking, redundant and actually tended to blur, to some extent, the point of their query.

Customer queries, thus contain some ambiguity. Such ambiguity requires that operators be adept in helping customers articulate their problems, probe them further in order to get customers to clarify what they want, and locate the appropriate information that will answer customers' queries. As well as doing all this, operators must be courteous towards customers and efficient in carrying out their tasks. Given that, as stated earlier, information about customers' calls normally exists 'somewhere' in the call centre, the primary task for the operator is to dispel the ambiguity surrounding customer calls and understand what the problem really is, and how, consequently, it ought to be solved. Even seemingly simple problems require diagnostic skills on the part of operators.

For example, a particular customer complained that he did not have the identification call service, whereby a caller's phone number appears on the receiver's mobile phone display, although he had paid for it. This could have been a technical problem (i.e. something wrong with his mobile phone), it could have been an error on the part of the company in having failed to activate that service, or it could have been the fact that certain callers did not wish that their phone numbers appear on other people's mobile phone displays. An inexperienced operator would probably have investigated all preceding possibilities. An experienced operator, however, would know that the first two possibilities were not very common and would, therefore, focus on the third. Indeed, through appropriate questioning, the particular operator observed first asked the customer about the extent to which

the problem appeared and, when told that it tended to occur only in relation with a certain caller, the operator was immediately able to reach the conclusion that the caller, in all probability, did not wish for his/her number to be identified. The operator's ability to see through a customer's query, that is to make ever-finer distinctions, is an important skill, which is developed and constantly refined on the job.

Through experience and their participation in a 'community of practice' (Brown and Duguid, 1991; Wenger, 1998), operators develop a set of diagnostic skills which over time become instrumentalized, that is to say, tacit. This enables them to think quickly, 'on their feet', and serve customers speedily. Over time, operators learn to dwell in these skills, feel them as extensions of their own body and thus gradually become subsidiarily aware of them, which enables operators to focus on the task at hand.

For example, for operators to become effective in their job, they need to develop sophisticated perceptual skills in the context of mediated interaction (Thompson, 1995). Hearing only a voice deprives an operator of the multiple clues associated with face to face communication. The message a customer conveys to the operator is communicated not only through words but also through the tone of voice and other associated verbal clues. An operator realizes that she is dealing with an unhappy customer, a confused customer, or a puzzled customer not only by what they say to her but also by *how* they say it. High quality service means that the operator has instrumentalized her ability to discern such nuances in customer behaviour (i.e. to draw fine distinctions) and act accordingly.

An operator's perceptual skills, therefore, in understanding what is going on at the other end of the line is very important. It may be perhaps interesting to note that operators had refined their perceptual skills to the extent that they could tell straight away whether the caller at the other end was an electrical appliances retailer acting on behalf of a customer or whether it was the customer himself/herself. Recognizing nuances in callers' voices and acting accordingly (for example, to pacify an angry customer, to reassure a panic-stricken customer, or to instruct an utterly ignorant customer) was an important part of an effective operator's skill.

The tacitness of operators' knowledge was manifested when they were asked to describe how and why they tackled a particular problem in a particular way. To such questions, operators were at a loss for words; 'you feel it', 'you know so', 'I just knew it', were some of the most often repeated expressions they used (cf. Cook and Yanow, 1996). Such knowledge was difficult to verbalize, let alone codify. Although operators did make use of the information systems provided by the company, they did so in a manner whose distinguishing features were, on the one hand, the exercise of operators' judgement in diagnosing problems, while, on the other hand, the way in which operators' judgement was exercised had been crucially shaped by the overall company culture. Given that the latter placed heavy emphasis on high quality service, which was constantly reinforced through corporate announcements, induction programmes, training, and performance appraisal systems, the operators had internalized a set of values which helped them orient their actions accordingly.

Operators were drawing on a plethora of data and information (in Bell's sense of these terms), provided to them by the company in an electronic and printed

form. Such data consisted of discrete items (e.g. addresses and phone numbers), while information consisted of generic propositional statements in the form of 'if this problem appears, then look at this or that' (Devlin, 1999). What was interesting to notice was the transformation of such information to knowledge by the operators themselves. To enact abstract 'if, then' statements, operators had to take into account the particular context of their conversation with a caller and quickly make a judgement as to what is required. To do so, the operators did not simply (and mindlessly) put the organizational rules into action, but they adapted those rules to the circumstances at hand.

As argued earlier, the encounter of a formalism with experience necessitates the exercise of human judgement, out of which new experience emerges, which is drawn upon on subsequent occasions. If Polanyi's claim that all knowledge is personal knowledge is accepted, it follows that, at least as far as organizational knowledge is concerned, there always is an improvisational element in putting knowledge into action. Indeed, this is the sense in which Bell differentiates knowledge from information: the former involves an active re-arrangement of the latter; it 'involves judgements, and judgements are derived from the knowledge of the "that it is so", or from a theory of the subject' (Bell, 1999, p. lxiv).

For example, through her experience, one operator knew that a particular type of mobile phone presented certain problems. The same operator also came to know that the set of instructions to customers to activate another type of card-based mobile phone were perceived as somewhat confusing by several customers. Having such knowledge, and faced with a particular problem, an operator might first ask what type of mobile phone a particular customer had been using and, depending on his/her answer, the operator would then proceed accordingly. Notice that such knowledge was not to be found in the official information system: it rather developed as a result of operators repeatedly facing (and learning from) particular types of problems to which they developed (i.e. they improvised) particular solutions.

As Orlikowski (1996) has persuasively shown, operators improvise in order to meet the demands of their tasks more effectively. Several operators observed were constructing their own personal information systems, which contained photocopies of the relevant corporate manuals plus personal notes. The latter consisted of notes they had taken during their training, and notes on which they had scribbled answers to customer queries they had faced in the past without, at the time, being able to locate the requisite information through the use of the formal information system. This is an important point that has not been given adequate coverage in the literature on knowledge management, although the phenomenon of 'improvisation' per se has received attention (Orlikowski, 1996; Weick, 1998): alongside formal organizational knowledge there exists informal knowledge that is generated in action. This type of knowledge (what Collins (1990) calls 'heuristic knowledge') is gained only through the improvisation employees undertake while carrying out their tasks. Heuristic knowledge resides both in individuals' minds and in stories shared in communities of practice. Such knowledge may be formally captured and, through its casting into propositional statements, may be turned into organizational knowledge. While this is feasible and desirable, the case still remains that, at any point in time, abstract generalizations are in themselves incomplete to capture the totality of organizational knowledge. In action, an improvisational element always follows it like shadow follows an object.

DISCUSSION AND IMPLICATIONS

From the preceding analysis it follows that what makes knowledge distinctly organizational is its codification in the form of propositional statements underlain by a set of collective understandings. Given, however, that individuals put organizational knowledge into action by acting inescapably within particular contexts, there is always room for individual judgement and for the emergence of novelty. It is the open-endedness of the world that gives rise to new experience and learning and gives knowledge its not-as-yet-formed character. As Gadamer (1989, p. 38) has perceptively noted, at issue is more than the correct application of general principles. Our knowledge of the latter is 'always supplemented by the individual case, even productively determined by it'. What Gadamer points out is that 'application is neither a subsequent nor merely an occasional part of the phenomenon of understanding, but codetermines it as a whole from the beginning' (p. 324). In other words, individuals are not given generalizations which must be first understood before being put into application afterwards. Rather, individuals understand generalizations only *through* connecting the latter to particular circumstances facing them; they comprehend the general by relating it to the particular they are confronted with. In so far as this process takes place, every act of interpretation is necessarily creative and, in that sense, heuristic knowledge is not accidental but a necessary outcome of the interpretative act.

A condition for organizational members to undertake action is to be placed within a conceptual matrix woven by the organization. Such a conceptual matrix contains generic categories (e.g. 'service quality', 'happy customer', 'efficient service') and their interrelations (e.g. 'high quality service makes customers happy'). By categorizing and naming the situation at hand, organizational members begin to search for appropriate responses. Commenting on Joas's (1996) *The Creativity of Action*, McGowan (1998, p. 294) aptly remarks: 'My judgement takes the raw data and raw feels of the present and names them. I decide to take this action because I deem this situation to be of this kind. The novelty of situations, the newness of the present, is tempered by this judgement'. Of course my judgement may be wrong. After all, it is only a guide to action, a tentative hypothesis, which may prove erroneous. The expected results may not occur; I need to reflect on this fact and revise my judgement. In other words, categorization and abstraction are conditions of possibility for human action (Lakoff, 1987). But categories *qua* categories may fail to match the particularities of the situation at hand. However, the abstract indeterminacy of categories is not a problem in practice, for it is situationally dealt with by the practical reasoning of competent language users. What gives organizational knowledge its dynamism is the dialectic between the general and the particular. Without the general no action is possible. And without the particular no action may be effective (McCarthy, 1994, p. 68).

If all organizational work necessarily involves drawing on knowledge, then the management of organizational knowledge must have been a time-old managerial activity. In a sense this is as true as the realization that marketing has been around since the dawn of the market economy. But, in another sense, this is not quite the case, if by management we mean the distinctly modern activity of purposeful coordination of socio-technical processes. For organizational knowledge to be managed, an unreflective practice needs to be turned into a reflective practice or, to put it differently, practical mastery needs to be supplemented by a quasi-

theoretical understanding of what individuals are doing when they exercise that mastery.

An unreflective practice involves us acting, doing things, effortlessly observing the rules of our practice, but finding it difficult to state what they are. In that sense we are all unreflective practitioners: in so far as we carry out the tasks involved in our practice, we do so having instrumentalized, appropriated, the tools (i.e. abstract rules and collective understandings) through which we get things done. As Strawson (1992, p. 5) elegantly notes:

> When the first Spanish or, strictly, Castilian grammar was presented to Queen Isabella of Castile, her response was to ask what use it was. [Her response was quite understandable since] the grammar was in a sense of no use at all to fluent speakers of Castilian. In a sense they knew it already. They spoke grammatically correct Castilian because grammatically correct Castilian simply *was* what they spoke. The grammar did not set the standards of correctness for the sentences they spoke; on the contrary, it was the sentences they spoke that set the standard of correctness for the grammar. However, though in a sense they knew the grammar of their language, there was another sense in which they did not know it.

What was that? If Queen Isabella had been asked to judge whether a particular sequence of Castilian words was grammatically correct, she would have to state the rules of the language in terms of which she would need to make her judgement. The speaking of Castilian sentences by the Queen and her subjects showed that they, indeed, observed such rules, but they could not easily state what they were, unless there was a grammar available.

The point of this example is that we may have (unreflectively) mastered a practice but this is not enough. If we need to teach efficiently new members to be effective members of the practice, or if we need to reflect on ways of improving our practice, or if we want to rid ourselves of likely confusions, then we need to elucidate our practice by articulating or making explicit its rules and principles. Knowledge management then is primarily the dynamic process of turning an unreflective practice into a reflective one by elucidating the rules guiding the activities of the practice, by helping give a particular shape to collective understandings, and by facilitating the emergence of heuristic knowledge.

Without any doubt the management of organizational knowledge today certainly implies the ever more sophisticated development of electronic corporate information systems, which enable a firm to abstract its activities and codify them in the form of generic rules (Gates, 1999). In this way, a firm provides its members with the requisite propositional statements for acting efficiently and consistently. Ideally, on this view, an organizational member should have all the information that he/she needs, instantly. To a considerable extent that was the case in the call centre under study, although the relative simplicity of operators' tasks does not make it look like an impressive achievement.

However, the above is only one aspect of organizational knowledge management. Another less appreciated aspect, one that has hopefully been made more evident in this paper, is the significance of heuristic knowledge developed by employees while doing their job. This type of knowledge cannot be 'managed' in the way formally available information can, because it crucially depends on

employees' experiences and perceptual skills, their social relations, and their motivation. Managing this aspect of organizational knowledge means that a company must strive to sustain a spirit of community at work, to encourage employees to improvise and undertake initiatives of their own, as well as actively maintain a sense of corporate mission. To put it differently, and somewhat paradoxically, the management of the heuristic aspect of organizational knowledge implies more the sensitive management of social relations and less the management of corporate digital information (Tsoukas, 1998). In addition, the effective management of organizational knowledge requires that the relationship between propositional and heuristic knowledge be a two-way street: while propositional knowledge is fed into organizational members and is instrumentalized through application (thus becoming tacit), heuristic knowledge needs to be formalized (to the extent this is possible) and made organizationally available. Managing organizational knowledge does not narrowly imply efficiently managing hard bits of information but, more subtly, sustaining and strengthening social practices (Kreiner, 1999). In knowledge management digitalization cannot be a substitute for socialization.

NOTE

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