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THE FIRM AS A DISTRIBUTED KNOWLEDGE SYSTEM: A CONSTRUCTIONIST APPROACH

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The organizational problem firms face is the utilization of knowledge which is not, and cannot be, known by a single agent. Even more importantly, no single agent can fully specify in advance what kind of practical knowledge is going to be relevant, when and where. Firms, therefore, are distributed knowledge systems in a strong sense: they are decentered systems, lacking an overseeing 'mind'. The knowledge they need to draw upon is inherently indeterminate and continually emerging; it is not self-contained. Individuals' stock of knowledge consists of (a) role-related normative expectations; (b) dispositions, which have been formed in the course of past socializations; and (c) local knowledge of particular circumstances of time and place. A firm has greater-or-lesser control over normative expectations, but very limited control over the other two. At any point in time, a firm's knowledge is the indeterminate outcome of individuals attempting to manage the inevitable tensions between normative expectations, dispositions, and local contexts.

INTRODUCTION

There are two key questions management researchers have traditionally addressed in their studies of firms' behavior. First, in what direction should a firm channel its activities? And, how should a firm be organized? The first is a question of strategy, the second of organization design. What are the assumptions behind these questions? What do they take for granted? First, that there is a quasi-optimum (or at least, a good enough solution) in what a firm should pursue and in how it should be organized. And secondly, that the quasi-optimum can be reached if all the necessary knowledge is possessed by strategists, if a system of preferences is already established, and if the relationship between means and ends is known (Mintzberg, 1990: 180–187; Mintzberg, 1994: Ch. 5). How could these 'ifs' be turned into certainties? Only if management researchers, through their studies of aggregates of firms, could identify patterns of behavior which would then codify into 'if, then' propositional (or declarative) statements to be taken as valid under certain specified conditions (Tsoukas, 1994a: 4; 1997b). As a result, practitioners would benefit by being able to base their policies on scientific knowledge (Ansoff, 1991: 143, 146). Those policies would, ideally, also consist of 'if, then' rules (what Brown and Duguid, 1991: 41, call 'canonical practice') which would be drawn upon by organizational members in their daily practices.

The reader may have noticed that the preceding view of what traditional management research has been trying to achieve owes a great deal to Hayek's (1945, 1982, 1989) formulation of what neoclassical economics tried to do. For orthodox economists, said Hayek, to construct a rational economic order is synonymous with attempting to find the best way of allocating *given* resources. The economic problem is thus thought to be a mere problem of logic, of economic calculus. Likewise, to view firms as merely allocative devices, as neoclassical economics does, is to

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treat them as black boxes (Whitley, 1987; Vanberg, 1993): firm behavior is identified with the pattern of detectable actions a firm has undertaken in response to environmental stimuli. According to such a view, as Nelson (1991: 64) has noted, 'firms face given and known choice sets [...] and have no difficulty in choosing the action within those sets that is the best for them, given their objectives'. Issues related to *how* preferences are formed, plans are formulated, and decisions are made, are not normally explored.

It is interesting to note the similarities between a neoclassical view of firms and a behaviorist conception of human agents: just as firms are viewed as black boxes, so too are individuals. Individual behavior is assumed to be identical with the pattern of detectable body movements in response to environmental stimuli (Harre and Gillett, 1994: 2–5). Neoclassical economics and behaviorism make a nice couple: firms as well as individuals are thought to be fixed, bounded, surveyable entities whose behavior is described by the systematic input–output regularities an observer is able to ascertain.

Hayek convincingly argued that the economic problem of society is not what orthodox economics has taken it to be, for knowledge about resources can never be collected by a single mind (Jacobson, 1992). Why? Because

> the peculiar character of the problem of a rational economic order is determined precisely by the fact that the knowledge of the circumstances of which we must make use never exists in concentrated or integrated form, but solely as the dispersed bits of incomplete and contradictory knowledge which all the separate individuals possess. (Hayek, 1945: 519)

In other words, rational economic calculation does not—it cannot—take into account the factual knowledge of particular circumstances of time and space—such knowledge is essentially dispersed.

Likewise, in order for corporate planners to formulate a strategy they would need, among other things, to be in possession of knowledge which is, to a large extent, fundamentally dispersed (Mintzberg, 1990: 186; Tsoukas, 1994a: 16). Corporate planners have been historically urged by strategy researchers to cast their strategies in a propositional mold: if environmental turbulence is high, a firm needs to be strategically aggressive (Ansoff, 1991: 459); if environmental uncertainty is low, the defender strategy is the best (Miles and Snow, 1978), and so on. Propositional knowledge is necessarily concerned with *generalizations*: types of environments are connected to types of strategic behavior in types of circumstances (cf. Hayek, 1945: 524; Schauer, 1991: 18; Tsoukas, 1997b; Twining and Miers, 1991: 131). However, the circumstances of a particular firm are bound to be, at least to some extent, unique. Furthermore, inside the firm, the particular circumstances each individual is faced with are also bound to be, to some extent, unique.

How is a corporate strategist supposed to obtain knowledge of particular circumstances, and use it to formulate a strategy? One answer is that particular circumstances could be taken into account if the conditions under which propositional statements apply were made more and more refined (this is what contingency theorists try to do). This, however, would not solve our problem since even conditional generalizations are *universal* within their scope of applicability (Schauer, 1991: 24; Tsoukas, 1997b). It turns out, therefore, that the propositional type of knowledge *per se* cannot accommodate knowledge of local conditions of time and space.

If the economic problem of society is not what orthodox economics has taken it to be, then what is it? For Hayek, it is the

> problem of how to secure the best use of resources known to any of the members of society, for ends whose relative importance only these individuals know. Or, to put it briefly, *it is a problem of the utilization of knowledge not given to anyone in its totality.* (Hayek, 1945: 520; emphasis added)

Substituting 'the firm' for 'society' in the preceding quote gives us the organizational problem firms face. Of course such a formulation would need to take into account the fact that business organizations are deliberately designed systems in a way that societies are not (Hayek, 1982: 46–52; Vanberg, 1993: 189–191; Bianchi, 1994: 233–234). However, there is a similarity between a society and a firm: both face the problem of how to use widely dispersed knowledge and, therefore, how to extend the span of utilization of resources in a way that exceeds the span of control of any one mind. Such a similarity is much stronger today than at the time Hayek

was writing (in the 1940s), given the increasing importance of knowledge for the effective functioning of firms in conditions of globalized capitalism (Drucker, 1991: Ch. 1; Giddens, 1991: Ch. 1; Reich, 1991: Chs. 7–10).

The purpose of this paper is to develop further the insight that firms are distributed knowledge systems. The key question I will address is: In what sense can it be said that organizational knowledge is distributed? To provide an answer I need to enquire into how knowledge in firms is produced, used, and transformed. This, in turn, hinges on exploring the broader issue of how human agents engage in rule-bound practical activities since, to paraphrase Weick and Roberts (1993: 365), knowledge begins with actions. Hence I will explore the nature of rules and how agents know how to follow rules, as well as the structure of social practices within which rule-following takes place. My chief claim will be that firms are distributed knowledge systems in a strong sense: they are decentered systems. A firm's knowledge cannot be surveyed as a whole; it is not self-contained; it is inherently indeterminate and continually reconfiguring. As well as drawing on Austrian economics, I will develop this argument by drawing on insights from interpretive philosophy, Bourdieu's sociology, ethnomethodology, and discursive psychology.

ORGANIZATIONS AS KNOWLEDGE SYSTEMS: SOME RECENT DEVELOPMENTS

Viewing the firm as a knowledge system focuses our attention not on allegedly given resources that the firm must use but, to use Penrose's (1959: 25) language, on the *services* rendered by a firm's resources. Putting the matter in those terms implies that 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 which, in turn, invites us to inquire into the knowledge firms draw upon.

Notice how knowledge is now understood in a much broader sense than the propositional knowledge implied by the traditional perspective: practitioners do not simply use, in an instrumental fashion, already existing (propositional) knowledge; they also draw upon their own factual knowledge, as pointed out by Hayek; and, furthermore, as we will see later, they draw upon collective knowledge (Spender, 1996) of which they may not be aware. Finally, practitioners *create* new knowledge or at least they are capable of doing so (Nonaka and Takeuchi, 1995). Thus, not only are resources used differently by firms, but there is no limit to the services rendered by resources, particularly human resources: the more practitioners *invent* new ways of using their resources (themselves included), the more services they can potentially derive (Soros, 1987: Ch. 1; Tsoukas and Papoulias, 1996a: 76).

It is interesting to note how human agents are assumed to behave according to such a view of firms. Individuals are now seen as agents, active co-producers of their surrounding reality. How, therefore, agents construe themselves and their environments becomes the focus of study—hence the emphasis on the interpretation processes through which individuals attach meanings to (and, thus, define and redefine) themselves and their tasks. The researchers working within a knowledge-based perspective of firms can be grouped, broadly, in two camps: those whose work has been primarily taxonomic in character, and those who have sought to understand the nature of organizational knowledge through making analogies between organizations and human brains on the one hand, and organizations and individual minds on the other. I will briefly discuss each camp below.

The taxonomists seek to classify the different types of organizational knowledge and to draw out each type's implications. Daft and Weick (1984), for example, have suggested a model whereby organizations may be viewed as 'interpretation systems'. The authors' emphasis has been on the distinctive ways in which organizations make sense of the information they deem necessary, and have suggested the existence of four distinctive interpretation systems. Similarly, Mitroff (1990: 2) has suggested that corporations can be viewed 'as systems for the production and testing of ideas'. Drawing on Churchman's (1971) influential work, Mitroff argues that what and how ideas are produced crucially depends on the particular inquiring system that is in place in a corporation. An inquiring system is a social system that is capable of producing knowledge about itself and its environment. Churchman (1971) and Mitroff (1990) have distinguished five

possible inquiring systems and argued that firms can choose one or more among them.

Recently, Spender (1995, 1996) has suggested a 'pluralistic epistemology', seeking to capture the different types of knowledge that organizations make use of. For him knowledge can be held by an individual or a collectivity. Also, knowledge can be articulated explicitly or manifested implicitly—namely, it is, respectively, *more or less abstracted from practice.* Thus, there are four types of organizational knowledge: conscious (explicit knowledge held by the individual); objectified (explicit knowledge held by the organization); automatic (preconscious individual knowledge); and collective (highly context-dependent knowledge which is manifested in the practice of an organization).

A typology similar, in some respects, to Spender's has been suggested by Nonaka and Takeuchi (1995). Drawing on Polanyi's (1962, 1975) notion of tacit knowledge, their fundamental premise is that there are two types of organizational knowledge: tacit and explicit (see also Senker, 1993; Johnston, 1995; Grant, 1996). In organizations, they argue, 'knowledge is created and expanded through social interaction between tacit knowledge and explicit knowledge' (Nonaka and Takeuchi, 1995: 61). The conversion of tacit to explicit knowledge, and vice versa, gives rise to four modes of knowledge conversion, each one characterized by a particular content. The authors complete their model by suggesting a five-phase process whereby new knowledge is created. The process starts with the sharing of tacit knowledge by a group of individuals; tacit knowledge is subsequently converted into concepts which then have to be justified in terms of the organization's overarching mission and purpose; a justified concept is then made tangible, usually through the building of an archetype; finally, new knowledge is disseminated to others within the organization.

Although the preceding typologies have undoubtedly advanced our understanding of organizational knowledge by showing its multifaceted nature, they are also marked by certain limitations which stem, primarily, from the 'formistic' type of thinking that is inherent in any typology (Pepper, 1942: 141–144; Tsoukas, 1994b: 763–764). Typologies are based on the assumption that an observer is able to discern certain systematic similarities and differences (i.e., forms) between the objects of study. That is fine, provided we are also aware of what we lose by doing so: for formistic thinking to be possible, the conceptual categories along which the phenomena are classified must be assumed to be discrete, separate, and stable. The problem is that they hardly ever are (Pepper, 1942).

For example, just as, according to Prigogine (1989: 398), 'order and disorder are created simultaneously', so too tacit and explicit knowledge are mutually constituted—they should not be viewed as two separate types of knowledge. Contrary to what Nonaka and Takeuchi argue (1995: 62–63), tacit knowledge can indeed be linguistically expressed *if* we focus our attention to it (Polanyi, 1975: 39–41; Moss, 1995: 62–63). And vice versa: explicit knowledge is *always* grounded on a tacit component (Polanyi, 1975: 41). Tacit knowledge is not explicit knowledge 'internalized' as Nonaka and Takeuchi (1995: 69) claim, nor is it something which a firm may 'lose' during a period of crisis, as Spender (1996: 73) implies. Tacit knowledge is the necessary component of *all* knowledge; it is not made up of discrete beans which may be ground, lost or reconstituted. As I will show in the next section, to split tacit from explicit knowledge is to miss the point—the two are inseparably related.

The same applies to Spender's distinction between individual and social knowledge. *Individual* knowledge is possible precisely because of the *social* practices within which individuals engage—the two are mutually defined (Wetherell and Maybin, 1996: 224–226; Harre and Gillett, 1994: 19–21, 99–100). Indeed, if such a distinction is pushed too far one is tempted to talk, as Spender (1996: 71) does, about 'the privacy of individual thought' *vis-à-vis* the 'social' character of publicly available knowledge. The social, however, as I will argue later, following Wittgenstein's line of thinking, is not an aggregation of individual experiences but a set of background distinctions which underlie individual action.

The second group of researchers into organizational knowledge seeks to model organizations on human brains or on individual minds. Those who take the brain as a metaphor for organization tend to highlight the brain's impressively rich connectivity and, by analogy, argue for its heuristic relevance to organizations (Beer, 1981; Morgan, 1986: 77–109; Sanderlands and Stablein, 1987). A connectionist imagery has also been

invoked by certain psychologists such as Hutchins (1993: 58) who, through his research on the organization of ship navigation teams, has shown how the knowledge that is necessary to carry out the navigation task is distributed throughout the team. It is this redundant distribution of knowledge, he argues, that makes a navigation team robust enough to carry out its task even when parts of the team are temporarily inactive.

Taking the individual mind as their metaphor, Weick and Roberts (1993) have developed the notion of collective mind in order to explain the exceptionally high reliability of certain complex organizations. Following Ryle (1949), the mind for the authors is understood to be not a given property but a style of action—a pattern that is manifested in action. Just as the individual mind is 'located' in the specific activities individuals engage in, so the collective mind is manifested in the manner in which individuals *interrelate* their actions. More specifically, drawing on their research on an aircraft carrier, Weick and Roberts argue (1993: 363) that individuals 'construct their actions (contribute) while envisaging a social system of joint actions (represent), and interrelate that constructed action with the system that is envisaged (subordinate)'. Notice that, for the authors, the individual contributions and the collective mind which they enact are mutually constituted: a contribution helps enact the collective mind to the extent to which it is closely (or heedfully) interrelated with the imagined requirements of other contributing individuals in a situation of joint action. This is the main reason why the collective mind is an *emergent joint accomplishment* rather than an already defined representation of any one individual: the collective mind is constituted as individual contributions become more heedfully interrelated in time. Being an emergent phenomenon, the collective mind is known in its entirety to no one, although portions of it are known differentially to all. Hence, as Weick and Roberts (1993: 365) remark, the collective mind is a distributed system.

The connectionist-cum-distributionist stream of research avoids the dichotomies inherent in the typologies of organizational knowledge. Furthermore, it avoids what Hayek (1982: 14) called 'the synoptic delusion', namely the assumption that knowledge can be surveyed by a single mind, highlighting instead the emergent character of organizational knowledge. However, Weick and Roberts do not address the questions of how individuals construct their actions, and what individual representation is based upon. In short: how does the distributed character of social systems come about? To explore these questions one would need to inquire into the nature of practical action, particularly as it occurs in the context of rule-bound social practices. The rest of the paper will be devoted to exploring those issues from a constructionist sociological perspective.

KNOWLEDGE AND ACTION: RULES, PRACTICES, AND TACIT KNOWLEDGE

Following Vickers (1983; 42–43), let us imagine a stock controller. What does he do? Clearly, he is formally charged with the task of replenishing supplies of raw materials when their level falls to a certain predetermined point. His job is to adjust the rate of incoming materials by reference to the rate at which they flow outwards. Is that all a stock controller does? Not quite. For Vickers (1983: 42–43), a stock controller's job is more complex than it may seem at first:

> He must get good value for his money, yet keep good relations with his suppliers. He must be sensitive to changing nuances in the requirements of the users but only insofar as they can be contained within a practicable buying policy. He must try out new supplies and new suppliers without disturbing uniformity of products and the goodwill of established contacts [. . .] The buyer [in other words] has to regulate relations not only between flows of material but also between people; nor can the one be reduced to the other.

A stock controller's actions are part of a complex practical activity which involves the intentional use of both language and tools. Looking at his actions over time, we can discern a pattern; there are certain regularities in a stock controller's behavior, which indicate that he follows certain rules in carrying out his job. But these rules (whatever they may be) do not just give shape to his actions; they function as normative constraints, namely as criteria by which his behavior may be guided and assessed. How does the stock controller know how to follow those rules? He knows because he has been trained to follow them: he has acquired certain skills which enable

him to engage in the normatively bound activity that his job entails.

To put it more generally, a stock controller, a production scheduler (Starbuck, 1985), a photocopier repair technician (Orr, 1990), a blacksmith (Harper, 1987; Keller and Keller, 1993), a forest ranger (Pea, 1993), a ship navigator (Hutchins, 1993) or a physician (Engestrom, 1993), each engages in a particular *discursive practice*. As Harre and Gillet (1994: 28–29) note, 'a discursive practice is the use of a sign system, for which there are norms of right and wrong use, and the signs concern or are directed at various things'. Why call a practice discursive? Because a practice is what it is by virtue of the background distinctions that are embodied in it (Taylor, 1985: 34; Tsoukas and Papoulias, 1996b: 855); the meaning of those distinctions is established through their use in discourse (Harre and Gillett, 1994: 26). For example, even apparently trivial dialogues such as: '*Chairman*: Do you have the minutes? *Secretary*: Yes, here they are. I think 2.4.3 is what you will need' (Scollon and Scollon, 1995: 20) are based on a set of distinctions with reference to what is taken to constitute proper behavior (Tsoukas, 1997a). For the dialogue to be meaningful to the participants and intelligible to outsiders, one needs to know the meaning of certain utterances as they tend to be used in a particular discourse over time.

In what sense does a stock controller *know* how to follow rules? One way of answering this question is to suppose that somewhere in his mind there is a premise that tells him how to do certain things. Or, to put it more generally, the human agent may be seen as 'primarily a subject of representations: representations about the world outside and depictions of ends desired or feared' (Taylor, 1993: 49). According to this view, understanding resides in the head; the agent is the focus of representations. Indeed, the cognitivist approach has been largely based on such an assumption (cf. Harre and Gillet, 1994: 13–16; Taylor, 1993: 46).

However, if a thought resides somewhere in the head telling the agent how to follow a rule, how is it possible that a particular rule, no matter how well illustrated its use may have been, may always be misunderstood in its application? For example, I am asking a friend to follow the rule '+2' as in the series: 0, 2, 4, 6, 8, 10, etc. My friend may continue the series until she reaches 1000, and then write: 1004, 1008, 1012. If I say that what she is doing is wrong, she might respond by saying that her understanding of the rule was: 'Add 2 up to 1000, 4 up to 2000, 6 up to 3000, and so on' (Wittgenstein, 1958, para. 185; Taylor, 1993: 46; Stueber, 1994: 15–16; Winch, 1958: 29–30).

One way of answering the preceding question is to say that another rule is necessary to determine how the first one is to be applied. This is not a satisfactory solution, however, because it leads to infinite regress. Another way out of this tangle would be to say that a rule follower would need to be shown in advance all the possible misinterpretations of a rule. This, however, is again problematic for it would require that we have 'an infinite number of thoughts in our heads to follow even the simplest instructions' (Taylor, 1993: 46). Clearly, this is impossible. The only sensible solution we are left with is to accept that the 'application of rules cannot be done by rules' (Gadamer, 1980: 83). This is what Garfinkel (1984) wanted to underscore with his 'et cetera principle': no set of rules can ever be self-contained, complete. Thus we are led to the conclusion that every act of human understanding is essentially based on an unarticulated background of what is taken for granted (Taylor, 1993: 47). It is when we lack a common background that misunderstandings arise, in which case we are forced to articulate the background, and explain it to ourselves and to others (Winograd and Flores, 1987: 36–37).

If this conclusion is accepted, it means that the common sense view (or 'representational' or 'intellectualist' or 'rationalist' view, as it is variously called by philosophers) that we understand the world 'out there' by forming representations of it 'inside' our minds, which we subsequently process, is seriously deficient (Rorty, 1991; Tsoukas, 1997a). It does not mean, of course, that we never form representations of the world, but that such representations are 'islands in the sea of our unformulated practical grasp on the world' (Taylor, 1993: 50). According to this view, the human agent's understanding resides, first and foremost, in the practices in which he participates. The locus of the agent's knowing how to follow a rule is not in his head but in practice, that is to say, his understanding is implicit in the activity in which he engages.

A quartermaster, for example, does not need

to form explicit representations of his sensing instruments. His ability to act comes from his familiarity with *navigating* a ship, not by his representation of the navigation instruments in his mind (Hutchins, 1993). The world for him is, to use Heidegger's (1962) expression, 'ready-to-hand', and it is so through the social activity into which the practitioner engages. The social activity (e.g., navigating, hammering, teaching, nursing, stock controlling), not the cognizing subject, is the ultimate foundation of intelligibility (Winograd and Flores, 1987: 33).

How exactly is the unarticulated background related to human understanding? Polanyi (1962, 1975) provides an interesting answer. When I am aware of something, he argues, I know it focally, as a whole. But I know it by integrating certain particulars, which are known by me subsidiarily. I integrate the particulars tacitly. Tacit knowing has a from–to structure: the particulars bear on the focus *to* which I attend *from* them. Thus, tacit knowing requires three elements: subsidiary particulars, a focal target, and a person who links the two. When, for example, I probe with my stick into a cavity, I 'attend subsidiarily to the feeling of holding the probe in the hand, while the focus of [my] attention is fixed on the far end of the probe' (Polanyi, 1975: 36). For my attention to focus on something (on anything), the subsidiaries must remain 'essentially unspecifiable' (Polanyi, 1975: 39): the moment I look at them I cease to see their meaning.

To sum up, three themes have emerged in the discussion thus far.

First, all articulated knowledge is based on an unarticulated background, a set of subsidiary particulars which are tacitly integrated by individuals. Those particulars reside in the social practices, our forms of life, into which we happen to participate. Before we are cognizing subjects we are *Daseins* (beings-in-the-world). An utterance is possible only by the speaker's dwelling in a tacitly accepted background.

Secondly, a practitioner's ability to follow rules is grounded on an unarticulated background. Hence the rules an *observer* is able to postulate in a practice (rules-as-represented) are different from the rules actually operating in the activities of the *agents* (rules-as-guides-in-practice).

And thirdly, the unarticulated background in which we dwell is known by us through our having been *socialized* into it by others. The background understanding that socialization imparts to us is not only cognitive but also embodied (Taylor, 1993: 50); we acquire particular skills through training our bodies to relate in certain ways to the world (Polanyi, 1975: 31). Through our socialization into a practice, we internalize a set of background distinctions which are constitutive of the practice. By dwelling in a set of distinctions 'we are dwelling in our own memory and indirectly in the numberless experiences through which we learnt the language in the first place' (Moss, 1995: 3). Hence, the process of learning is constitutive of what is learnt (Williams, 1994: 200).

THE STRUCTURE OF SOCIAL PRACTICES: POSITIONS, DISPOSITIONS, AND INTERACTIVE SITUATIONS

We have explained so far what it means to know a rule in the context of practical action, but where do those rules come from? Moreover, if rules do make social life patterned, where does novelty come from? These questions are particularly important for organizations, since in them one finds both order and disorder, stability and change (Cooper, 1986; Stacey, 1996). In this section these questions will be answered and, by doing so, the distributed character of organizational knowledge will be shown.

Attempting to synthesize the work of Parsons, Bourdieu, and of several ethnomethodologists, Mouzelis (1995: Ch. 6) has suggested that social practices be viewed as consisting of three dimensions. First, the social position or role dimension, namely the normative expectations that are associated with the carrying out of a particular role. Thus, in the case of the stock controller, this would involve the normative expectations held of him by his superiors, his peers, and his associates in other firms. To find out about those normative expectations one would need to inquire into how the stock controller has been socialized into his particular role through formal and informal means.

Secondly, the dispositional dimension, namely the system of mental patterns of perception, appreciation, and action, which has been acquired by an individual via past socializations and is brought to bear on a particular situation of action.

This is Bourdieu's notion of *habitus*. More specifically, 'the *habitus*', says Bourdieu (1990: 54):

> a product of history, produces individual and collective practices—more history—in accordance with the schemes generated by history. It ensures the active presence of past experiences, which, deposited in each organism in the form of schemes of perception, thought and action, tend to guarantee the 'correctness' of practices and their constancy over time, more reliably than all formal rules and explicit norms.

For Bourdieu it is the 'active presence of the whole past', that which gives social practices both a continuity and 'a relative autonomy with respect to external determinations of the immediate present' (Bourdieu, 1990: 56).

In other words, history leaves its marks on how actors see the world; every time we act, we do so by means of the habits of thinking we acquired through our past socializations. At any point in time, our habits of thinking have been historically formed through our participation into historically constituted practices. Thus, to understand why our stock controller behaves the way he does, we need also to inquire into his *habitus*: the past socializations to which he was subjected in the context of his involvement in several social practices (e.g., education, family, religion, etc.).

Finally, the interactive–situational dimension, namely the specific context of a social activity within which normative expectations and the *habitus* are activated. This dimension is similar to Goffman's (1983) 'interaction order' and, according to Mouzelis (1995: 104), it is what gives social interaction its open-ended character. Thus, to complete our inquiry into why the stock controller behaves the way he does, we would also need to investigate the dynamic unfolding of his concrete interactions with others, within a particular sociotemporal context.

Stepping back to view the stock controller's behavior as a whole, no doubt we will notice that it is patterned—certain actions tend to be repeated. In the course of his role-related socialization as well as through his past socializations (i.e., his *habitus*) he has developed certain ways of thinking which are activated every time he acts. From this we might be tempted to formulate the rules underlying the stock controller's actions and argue that the rules-as-represented completely describe his practice. But this would be a mistake for, as argued in the previous section, the rules-as-represented are always formulated from the point of view of the observer. There is an important asymmetry between the rules-as-represented and the rules-as-guides-in-practice (Bourdieu, 1990: 39; Boden, 1994: 42; Taylor, 1993: 55–57), which can be put in terms of the law of requisite variety (Ashby, 1956: 206–213): a practice is always richer than any formal representation of it. The time-related aspects of a stock controller's practice as well as the rich variety of his experiences cannot appear in a formal account, just like the experience of driving through a place cannot be captured by a map (Taylor, 1993: 56–57; Tsoukas, 1997b).

It is the richness of experiences associated with any particular role that Vickers (1983) highlights with his example of the stock controller. For an observer, the latter regulates the flow of incoming and outgoing materials, and certain rules can be inferred from studying his behavior. However, at the same time, there are other things that the stock controller does, or might want to do, which cannot be formally represented by rules. His concern is also with maintaining a web of human relationships which, strictly speaking, is not part of the job *per se* but, without it, he would have been unable to do his job properly.

If at this point the reader feels somewhat uneasy, this is because there is something elusive about social practices, no matter how replete with regularities they may be: at any point in time, one cannot offer a comprehensive description of a social practice, since to do so presupposes first that one is able to foresee all future events that may occur in a practice, and secondly, that one possesses an unambiguous language which can faithfully reflect what is going on. Both of these presuppositions do not apply. As Popper insightfully (1988: 12–16, 24) pointed out, in order to be able to predict an event one would have to state with sufficient accuracy what kind of data one would need for such a prediction task, which is impossible to do (that is why lotteries are unpredictable games!—see also Penrose, 1994: 22–23). In other words, our problem is not only that we do not know enough but, more fundamentally, that we do not know what we need to know. This kind of 'radical uncertainty' (Piore, 1995: 120), or second-order ignorance, adds additional force to Hayek's insight that in a social system knowledge is essentially

dispersed. It is dispersed not only in the sense that knowledge is not, and cannot, be concentrated in a single mind but, also, that no single mind can specify in advance what kind of practical knowledge is going to be *relevant*, when and where.

Moreover, a social practice has no essence, or intrinsic nature, which can be faithfully captured by language (Rorty, 1991: 100). What, at any point in time, a social practice is depends on how human agents interpret it to be (Morgan, 1986; Rorty, 1991; Soros, 1987; Tsoukas and Papoulias, 1996a). As noted in the previous section, language is constitutive of reality—there is no privileged position from which reality might objectively be viewed. As marriage counsellors know all too well, different interpretations constitute different realities (Shotter, 1993; Watzlawick, Weakland, and Fisch, 1974). Thus, at any point in time, what is going on in a social system is not only not fixed but is inherently indeterminate. Several transactions take place at once, and no one is in a position to fully describe them in advance. As MacIntyre (1985: 98) aptly remarked, there is no single game that is played but several, and 'if the game metaphor may be stretched further, the problem about real life is that moving one's night to QB3 may always be replied to with a lob across the net'.

The indeterminacy of social practices has been richly illustrated by Orr (1990) in his ethnographic study of photocopy repair technicians. In their work, technicians need to make use of the explicit rules (i.e., rules-as-represented) provided to them by their repair manuals. The activity of repairing photocopiers, however, occurs in a social context the details of which cannot be fully described *ex ante*. In attempting to repair the machine, the technician needs to attend simultaneously not only to the strictly technical aspects of the machine but also to the social context within which it functions. He needs to inquire about how the customer has been using the machine. He must also perform a delicate balancing act in striving to gain and maintain the customer's trust in him and, at the same time, to maintain his reputation in the community of technicians (see Brown and Duguid, 1991: 43; Orr, 1990: 173; Vickers, 1983: 42–45). In a particular interactive situation one or more of those concerns may become salient, although there is no way of telling in advance if, when, and what will exactly happen (Tsoukas, 1997b).

Given that positions and dispositions entail, each in their own way, certain types of quasi-automatic behavior on the part of actors (Mouzelis, 1995: 112), how are we to account for the diversity of actors' behavior? For example, why do not all photocopy repair technicians act either in the same manner, or totally differently, when they try to repair a broken machine? Clearly, they do not behave randomly or erratically, but neither do they behave uniformly; there is both consistency *and* diversity across the technicians' patterns of behavior (Orr, 1990). Why is this the case?

The answer lies in the effort agents make to manage the unavoidable tensions between social positions (roles), dispositions and interactive situations (Mouzelis, 1995: 105). Through the explicit rules associated with a particular role as well as through training and informal socialization, a firm attempts to define the normative expectations of the technicians' role, thus, in effect, trying to homogenize their behavior. But normative expectations are extremely unlikely to be identical to an individual's *habitus*.

The set of dispositions of each individual technician (i.e., his *habitus*) is the result of past socializations, reflecting the diverse social contexts each technician has gone through in the course of his life. The history of each technician will, no doubt, have left its mark on how he tends to think and behave. It is the persistence of this historically formed habit of thinking and acting that Bourdieu points out, when he underlines its 'relative autonomy with respect to external determinations of the immediate present' (Bourdieu, 1990: 56).

Normative expectations and dispositions are activated within particular interactive situations, and how such activation occurs is a *local* matter. Human agency is '*always* and *at every moment* confronted with specific conditions and choices. Those conditions are not [. . .] simply historically given, but are instead made relevant (or irrelevant) as a local matter' (Boden, 1994: 13; emphases in the original). Boden draws our attention here to a valuable ethnomethodological insight: human agents *select out* on the one hand what they understand to be the *relevant* aspects of both their role-related normative expectations and their sets of dispositions, and on the other those *relevant* aspects of the local conditions within which their actions take place, and they try to fit the two together.

Thus, social structure, understood as a set of normative expectations and dispositions, is neither ignored nor seen as exogenous to action (Giddens, 1984). On the contrary, as Boden (1994: 5) elegantly observes, 'the tiniest local moment of human intercourse contains *within* and *through* it the essence of society, and vice versa' (emphases in the original; see also Wetherell and Maybin, 1996: 245). But how social structure is instantiated is always a local matter: '*how*, *where*, with *whom*, and even *why* particular aspects of social structure, biographical elements or historical conditions are *made relevant* in concrete situations is a matter of members' methods' (Boden, 1994: 46, 215; emphases in the original). Although she does not say so, what Boden alludes to is the distributed character of organizational knowledge: agents possess local knowledge which cannot be surveyed as a whole and, furthermore, part of their knowledge originates from outside the organization.

But how concrete are 'concrete situations'? How particular are 'particular circumstances'? How relevant are 'the relevant aspects of local conditions'? The answer is: infinitely concrete; infinitely particular; infinitely relevant. As pointed out earlier, a social practice is inherently indeterminate. One can indefinitely go on and on redescribing it (Rorty, 1991: 100–103); it all depends on how many, and how fine, viewing positions one takes. The reason, however, why we are not paralyzed by a potentially infinite number of redescriptions is that they are brought to an end by the institutional context within which they are enunciated (Schauer, 1991: 18–22).

For example, a photocopier may be described in all sorts of ways, but only a few descriptions are selected out by the engineers of a photocopier company for the purpose of issuing a repair manual. The purpose of the task at hand, and the institutional context within which it occurs, impose limits on how a photocopier may be described. The fact, however, that only a few descriptions are selected does not mean that there are not others (Tsoukas, 1997b). Indeed, in certain conjunctions of circumstances other descriptions may become central (e.g., I use the machine not only to make 'official' copies but also to make copies for my friends; the machine is not just a machine but also an object over which I, its official user, have control, while others have not, etc.). The point to note here is that no one can know in advance what are going to be the relevant descriptions of a machine within a particular context. The diagnosis and, therefore, the action a technician will undertake, are irredeemably local.

AN ILLUSTRATION: 'INDUSTRY RECIPES'

A rich description of what Taylor (1993: 57) calls 'the "phronetic gap" between the formula and its enactment' has been offered by Spender (1989), in his study of several British firms in three industries. Firms in a particular industry, Spender argues, draw upon an 'industry recipe', namely a shared pattern of managerial judgements concerning issues of product, technology, marketing, personnel, etc. An industry recipe is closely tied to the field of experience in which it is generated and enables managers to make sense of their particular environment. A recipe emerges as 'an *unintended consequence* of managers' need to communicate, because of their uncertainties, by word and example within the industry' (Spender, 1989: 188; emphasis added).

An industry recipe is essentially a discourse, developed over time within a particular industry context. To use a term mentioned earlier, a recipe consists of a set of background distinctions tied to a particular field of experience. The distinctions pertain to a number of issues which managers in a firm must grasp if they are to 'get things under control' (Spender, 1989; 181). For example, Spender (1989: 191–192) points out the different ways in which firms in different industries segment their markets or, to put it differently, the market-related distinctions which are drawn in particular industries. Thus, in the dairy industry the market is segmented into territories; in the forklift rental industry the market is segmented by the variety of user needs. Likewise, in every industry there are different distinctions made between different kinds of employees firms must employ. For example, the dairy industry distinguishes between the transients and long-servers; the foundry industry between skilled and semi-skilled moulders.

Through a process of socialization, managers internalize industry-specific distinctions. Managers are introduced into a universe of meanings which is not related to their firm-specific roles

as such, but pertains to the broader industrial field within which their roles are carried out. To paraphrase Wetherell and Maybin (1996: 228), internalizing industry-specific distinctions is not 'a matter of learning definitions in dictionaries, or knowledge which might be gained from [...] books. [Recipes] are always embedded in conversations and social interactions'. The recipe is learned within the context of discursive practices. It forms the unarticulated background which underlies managers' representations of their firms; it is the '"tacit knowledge" that enables managers to construct some order in a hostile environment' (Whitley, 1987: 134). Or, to use Bourdieu's language, the recipe is part of each manager's *habitus*, namely, it is part of the set of dispositions which a manager has historically acquired, ensuring 'the active presence of past experiences' (Bourdieu, 1990: 54).

An industry recipe offers managers not only a vocabulary but also a grammar. Says Spender (1989: 194): 'The essence of the recipe is more in the way its elements come together and synthesize into a coherent rationality than in the particular elements themselves'. But such a rationality offers 'mere guidance' (Spender, 1989: 192); it is 'open and somewhat ambiguous' (Spender, 1989: 194). A firm's circumstances are bound to be different and 'may prevent it acting in the way the recipe implies' (Spender, 1989: 192). As a result of the particular conditions within which a firm operates (remember that particularity and relevance are in the eye of the beholder), its managers will have to improvise (Weick, 1993). How managers understand a recipe is always influenced by 'immediate circumstances and local agendas' (Boden, 1994: 18). As Spender (1989: 192) notes, 'the strategist is forced to make a *personal judgement* about the *relevance* of the recipe to his firm's situation' (emphasis added). It is this tension between the industry-specific *habitus* and the *local* conditions within which it is instantiated that explains why a firm's strategy is neither a replication of an idealized industry recipe nor, an *ex nihilo* construction.

It needs to be said that a manager's *habitus* includes more than the distinctions involved in an industry recipe: it also includes the dispositions that stem from past socializations he has been through in his life. Spender's study was not designed to go into biographical details of the managers involved. Nor did it address the tension between the normative expectations of specific managerial roles and managers' historically acquired dispositions. But, if what has been said so far is accepted, one can see how such additional evidence might fit in.

For example, the by now legendary manner in which the Post-it notepads were developed by 3M (see *The Financial Times*, 30 May 1994) is a good illustration of how the innovative capacity of a firm depends on its members' efforts to alleviate tensions between positions, dispositions, and interactive situations (for similar examples see Mintzberg and Waters, 1982, 1985). Thus, to understand Arthur Fry's key contribution to the development of Post-it notepads, one needs to know about his 3M formal position as a chemist, and the normative expectations associated with such a role (among those expectations was 3M's well-known policy for encouraging innovation through 'bootlegging'). One also needs to know about Fry's religious disposition (part of his historically formed *habitus*). Normative expectations and dispositions were activated within the local context of a church in Minnesota. Fry used to sing in a church choir and realized how convenient it would be if he had a sticky, yet easily removable, note to mark the pages in his books of religious hymns. The invention of the Post-it note pads can be conceptualized as the outcome of what Schutz (1964) called the 'congruency of relevances' (cf. Boden, 1994: 192)—an outcome which is inherently contingent and locally produced.

CONCLUSIONS

My claims in this paper have been as follows.

First, the resources a firm uses are neither given, nor discovered, but created (Buchanan and Vanberg, 1991; Bianchi, 1995; Joas, 1993). It is not so much the resources *per se* that are important to a firm as the services rendered by those resources (Penrose, 1959). The services depend on how resources are viewed, which is a function of the knowledge applied to them. The carriers of such knowledge are a firm's routines (Nelson and Winter, 1982) and, from the point of view of how novelty emerges, a firm's members. Hence, a firm can be seen as a knowledge system (Grant, 1996).

Secondly, the organizational problem firms face

is the utilization of knowledge which is not, and cannot be, known in its totality by a single mind (cf. Hayek, 1945, 1982, 1989; Tsoukas, 1994a).

Thirdly, the firm is a *distributed* knowledge system. A firm's knowledge is distributed not only in a computational sense (Kiountouzis and Papatheodorou, 1990; Hutchins, 1993), or in Hayek's (1945: 521) sense that the factual knowledge of the particular circumstances of time and place cannot be surveyed as a whole. But, more radically, a firm's knowledge is distributed in the sense that it is inherently indeterminate: nobody knows in advance what that knowledge is or need be. Firms are faced with *radical uncertainty*: they do not, they cannot, know what they need to know. Viewed this way, firms are not only distributed, but decentred systems—they lack the cognitive equivalent of a 'control room' (Stacey, 1995, 1996).

Fourthly, a firm's knowledge is distributed in an additional sense, namely that it is partly derived from the broader industrial and societal context within which a firm is embedded (Granovetter, 1992; Spender, 1989; Whitley, 1996). Furthermore, a firm's knowledge is continually (re)constituted through the activities undertaken within a firm. The latter's knowledge is not, and cannot be, self-contained. The reason is as follows. Social practices within a firm consist of three dimensions: role-related social expectations, dispositions, and interactive situations. A firm has (greater or lesser) control over normative expectations, whereby the behavior of its members is sought to be made consistent across contexts. However, a firm has no control over its members' dispositions, which are derived from their past socializations in contexts outside the firm. Finally, the normative expectations and dispositions of the members of a firm are instantiated within particular interactive situations, whose features cannot be fully known by anyone *ex ante*, but are actively shaped by practitioners as they confront local circumstances. Thus, a firm's knowledge is emergent (Weick and Roberts, 1993): it is not possessed by a single agent; it partly originates 'outside' the firm; and it is never complete at any point.

Fifthly, normative expectations, dispositions, and interactive situations are inevitably in tension. There are always gaps between these three dimensions (Boden, 1994: 18); between 'canonical practice' and 'noncanonical practice' (Brown and Duguid, 1991); between 'universalistic' and 'particularistic' practices (Heimer, 1992: 146–154); between 'formal' and 'substantive rationality' (Weber, 1964); between 'ideal' and 'practical action' (Boden, 1994); between 'rules-as-represented' and 'rules-as-guides-in-practice' (Taylor, 1993); between the 'model of reality' and 'the reality of the model' (Bourdieu, 1990: 39). Those gaps are closed only through practitioners exercising their judgement: they select out what they take to be the relevant features of each one of the three dimensions making up social practices, and attempt to fit them together.

From the preceding analysis, it follows that how normative expectations, dispositions, and interactive situations are matched is always a contingent, emergent, indeterminate event. From a research point of view, what needs to be explained is not so much 'why firms differ' (Nelson, 1991) (they inevitably do), as what are the processes that make them similar—how the infinitude of particularities is tamed, how tensions are managed, and gaps are filled; how, in short, in a distributed knowledge system coherent action emerges over time (Araujo and Easton, 1996).

Finally, as for its management implications, viewing the firm as a distributed knowledge system helps us refine our view of what organizations are and, consequently, of what management is about. Organizations are seen as being in constant flux, out of which the potential for the emergence of novel practices is never exhausted—human action is inherently creative. Organizational members do follow rules but how they do so is an inescapably contingent-cum-local matter. In organizations, both rule-bound action and novelty are present, as are continuity and change, regularity and creativity. Management, therefore, can be seen as an open-ended process of coordinating purposeful individuals, whose actions stem from applying their unique interpretations to the local circumstances confronting them. Those actions give rise to often unintended and ambiguous circumstances, the meaning of which is open to further interpretations and further actions, and so on. Given the distributed character of organizational knowledge, the key to achieving coordinated action does not so much depend on those 'higher up' collecting more and more knowledge, as on those 'lower down' finding more and more ways of getting connected and interrelating the knowledge each one has. A

necessary condition for this to happen is to appreciate the character of a firm as a discursive practice: a form of life, a community, in which individuals come to share an unarticulated background of common understandings. Sustaining a discursive practice is just as important as finding ways of integrating distributed knowledge.

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