

Information: a critical realist approach

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INTRODUCTION

This paper starts from a paradox. One aspect of this paradox is the way in which information is seen to play an almost magical role in transforming societies, organisations and workplaces. Visions are expressed in often apocalyptic terms of the utopia or dystopia which is to appear. The other aspect is the way in which individuals and organisations struggle to make sense of, or even cope with, the information they currently have. This emerges in headlines about 'information overload' and expresses itself in the 'productivity paradox'. This latter is the stubborn refusal of white collar productivity to rise, despite massive investments in information technology.

This second paradox is a useful introduction to the way in which it is so difficult to disentangle IT from information. Indeed, many treatments which promise to be about information are on a close reading about technology exploitation. Now, no serious treatment of information or IT can fail to take account of the inter-relationship and interdependence between the two, but there is a need to treat them as analytically distinct categories in order to examine such relationships. As Coombs, Knights and Willmott argue:

most writing on information technology draws on an 'objectivist' or determinist tradition which identifies technology as a major, if not the most important, force in transforming economic and social organization. Furthermore, it does not adequately theorise the specificity of the information dimension of I.C.T. [Information Communication Technology]; thereby failing to differentiate it from general technological change (Coombs, Knights and Willmott, 1992: 51-52)

However, this sort of note of caution has not been heeded in many mainstream accounts. Wysocki and DeMichiell's *Managing Information Across the Enterprise* promises to introduce us to a "new corporate citizen, the information enabled practitioner." but on closer reading this turns out to be "an in-depth study of how the information-enabled manager (IEMgr) will further the corporate effort to exploit information technology." (Wysocki and DeMichiell,

1997: iv, 1). The focus on information turns out to be a thin veneer over fairly conventional texts about the use of information technology.

Now, this is not to deny that such works are not important (if properly done) but that they are not answering the question they appear to pose. That question is to do with the effective use of information within modern organisations. Such a question is being tackled by the growing body of work on 'information literacy' (Mutch, 1996). This work, too, often started from a very reductionist perspective on information, but there have recently been attempts, notably that of Christine Bruce, to focus on conceptions rather than definitions. She identifies seven such conceptions, arguing that "there exists a set of varying kinds of experiences and we can expect that members of the community would experience any subset of these at different times." (Bruce, 1997: 154). The research, based on the qualitative technique of phenomenography, eschews either an explicit definition of information or any ranking of the different conceptions, but it could be argued that this is a limitation of the work. In the case of information, the argument is that "During the course of the analysis, 'information', a complex phenomenon in its own right was discovered to be the object component in each of the categories of description". (Bruce, 1997: 154). However, it would seem that we ought to be clear about what we are literate about. The use of inductive methods may enrich our debates over definition, but, particularly in the light of current debates about 'knowledge management' and the 'learning organisation' one might argue that more clarity rather than less is necessary. This seems in a way to be confirmed by a tentative, almost implicit ranking of the different conceptions:

"some of the categories are indeed more complex and more powerful than the others. On this basis it is possible to claim that the categories do become more sophisticated as we move from the lowest level of the outcome space, the information technology conception, to the topmost pair, the knowledge extension and wisdom conceptions." (Bruce, 1997: 156).

Once again, we see the shading of the use of the concept 'information' into the concept 'knowledge' (Davenport, 1997). The blurring at both ends of the continuum, that is the pairings 'data/information' and 'knowledge/information' rest on two influential sets of accounts, broadly the 'information as resource' argument and the 'information as meaning' argument. In the discussion which follows we look at each set of arguments in turn, arguing that there are elements of value in both. However, both contain significant flaws which make an exploration of an alternative approach of value. This approach is one drawn from the school of thought derived from critical realism, with a particular emphasis on the work of Margaret Archer. An outline of such an approach is attempted in the closing section of the paper.

INFORMATION PROCESSING

There is an influential school of thought, expressed most clearly by Herbert Simon, which sees information as a 'thing', to be processed just like the other inputs of the organisation. In 1976 he argued that "Nowadays, with computers everywhere, we can think of information as something almost tangible: strings of symbols which, like strips of steel or plastic ribbons, can be processed- changed from one form to another. We can think of white-collar organization as factories for processing information." (Simon, 1976: 45) More recently, Stinchcombe has argued that organisations will have to adapt themselves to the information which they deal with. This information takes on the appearance of an obdurate, external force, determining the structuring and development of organisations. On this reading, "formal structure is to be explained as information structures growing toward central sources of uncertainty" (Stinchcombe, 1990: 151). It follows, then, that the use of information in, say, the decision making process is irrelevant as, in the long run, organisations will be forced into particular patterns by the information they use:

"The variables to be explained, then, are social structural features of information and decision systems, because these can be detached from the particular decisions being made and because it is easier to generalize across organizations, and across subparts of organizations, when the value of the variable one is explaining is of the essence of the organization, rather than an accident of the decision." (Stinchcombe, 1990: 354).

The influences of systems theory are clearly felt in this reading, with information processing being central to systems functioning. The legacy of the early definition of information as part of feedback mechanisms with inherent meaning is clear. This position is stated with still greater clarity by Beninger who argues that the 'Information society' has "has exposed the centrality of information processing, communication, and control to all aspects of human society and social behavior." (Beninger, 1986: 436). Because of this he concludes that "It is to these fundamental informational concepts, I believe, that we social scientists may hope to reduce our proliferating but still largely unsystematic knowledge of social structure and process." (Beninger, 1986: 436).

We can see the clear lineage of movements such as information resource management in arguments such as these. The influence goes further, with the turning back of such concepts back onto the study of the human mind itself in the project of 'strong artificial intelligence', the notion that "the mind is just a computer program" (Searle, 1997: 9). These arguments then tend to have a resonance in the most unlikely places. In Ramtin's orthodox Marxist account of the impacts of automation, for example, he argues that computers will enable a small group of owners and managers to capture knowledge and run production processes, perhaps with the assistance of a small elite of co-opted skilled workers. Such an accomplishment is to be based on the power of computers in

general and artificial intelligence in particular, to encapsulate the rules governing production. In his words, "Automation of conception is an attempt to confine the intelligence and creativity involved in that process to an ever-decreasing body of elite 'experts'. It provides the necessary objective means for the centralization of control. It is the process of establishing productive knowledge as 'capital'" (Ramtin, 1991:78). What is problematic about this account is its divorce of the question of meaning and its formation, an omission which bedevils the attempt to reduce human activities to mere information processing.

The reductionism of the project is, therefore, its greatest limitation. This is not to argue that there is not an inevitable degree of reductionism in any social analysis. To make an analysis viable, categories have to be constructed, marginal cases and subtle nuances adapted and compromised. However, we need an analysis which does not attempt such a crude reduction of all human activity to a few simple concepts, concepts which, moreover, are vitiated by contemporary work in the areas from which they drew their original strength. Thus it is argued strongly from within cognitive science that the biological use of information as an independent causal variable is misleading both in that area and in social analysis. As Searle argues, "except for the information that is already in the mind of some conscious agent, information is relative to an observer." (Searle, 1997: 205). The notion of the brain as a symbolic processing system, it turns out, is not a very useful one. (There is a powerful critique of its failings at the level of brain biochemistry in Rose (1992)) For one thing, it fails to acknowledge the embodied nature of the brain, the way in which, for example, emotional states have an impact on brain functions (DeMasio, 1995). For another, it ignores the work that has been done on how our conceptual thinking is profoundly metaphorical in character. Because of this, as Lakoff and Johnson argue,

"When it really counts, meaning is almost never communicated according to the CONDUIT metaphor, that is, where one person transmits a fixed, clear proposition to another by means of expressions in a common language, where both parties have all the relevant common knowledge, assumptions, values, etc. When the chips are down, meaning is negotiated." (Lakoff and Johnson, 1980: 231).

The failure of the information processing model can be seen in practice with the problems faced by the attempts to manage information as a resource. In practice they have tended to be reduced, as their underlying theory tends itself, to issues of information technology (Davenport, 1997; Mutch, 1996). However, they still retain a powerful influence and act as a 'common sense' view of information. This remains true at both academic and practical levels leading one to think that Crowe, Beeby and Gammack's contention that, "the inadequacy of this view [cognition as information processing] has been accepted for some time now" is, to say the least, over-stated (Crowe, Beeby and Gammack, 1996:162). Without a more satisfactory definition, it could be argued, we will never escape the

persistent and almost Pavlovian connection of information and IT (Mutch, 1996a). It is to the information as meaning project that we turn next.

MEANING FOCUS

Karl Weick points to a failure of open systems theory to recognise that system components may, consciously or unconsciously, close themselves off from their environment. We need to understand, he argues, "the ways in which organisational inertia and organizational attentiveness to one's own past experience can continue unpunished for surprisingly long periods of time." (Weick, 1979: 239). One response to this might, of course, be that in the long run such organisations can be punished - Churella presents an interesting case study of how the U. S. locomotive builder, Alco, failed to respond to what would with hindsight seem to be clear messages about the importance of diesel traction (Churella, 1995). However, such a response would be to ignore the way in which organisations can also enact their environment, that is on the way they (and individuals) create their environment. Having created it they can then seek and store information which confirms the pattern already imposed: "If a person has an idea and looks for "relevant" data, there's usually enough complexity and ambiguity in the world that relevance is usually found and the idea is usually judged more plausible" (Weick, 1979: 156). The consequence of this 'enactment' perspective is that:

that people in organizations should be more self-conscious about and spend more time reflecting on the actual things they do ... An organization that is sensitive to the fact that it produces enacted environments will be less concerned with issues of truth and falsity and more concerned with issues of reasonableness. (Weick, 1979: 168-169)

From this foundation, Daft and Weick went on to suggest that organisations could be viewed as interpretation systems. In this model, the sorts of interpretation an organisation engages is conditioned by two dimensions: by the assumptions that it has about its environment and by the degree to which it intrudes into that environment. Organisations which, for example, assume that there is little that they can do about their environment, either to analyse or to change it, will, on this model, engage in 'undirected viewing'. The assumption that underlies the model is that "strategic-level managers formulate the organization's interpretation". (285) Now, whilst this assumption might be open to some debate, particularly as organisations move towards a greater involvement of lower level managers in strategic decisions, it has the merit of emphasising the processual character of information. As Boland argues, "Information," he argues, "is not a resource to be stockpiled as one more factor of production. It is meaning, and can only be achieved through dialogue in a human community. Information is not a commodity. It is a skilled human accomplishment" (Boland, 1987:377)

However, the problem we face is the viewing of meaning construction through the exclusive prism of subjectivity, a common feature in much contemporary social theorising (Callinicos, 1985). There is a tendency to view the construction of knowledge as being a continuous process, ignoring the extent to which much knowledge has an objective status as far as particular actors are concerned (Layder, 1997). This leads to the post-modern denial of the possibility of adjudicating between competing truth claims, leaving us with a swamp of relativism (Norris, 1995). However, even if we draw back from this sort of position, the meaning focus still has a tendency to downplay the factors outside of the individual's subjective desires and intentions. In Archer's words, it

can tell us nothing about individual characteristics such as perception, consciousness and cognition nor about the psychology of personal proclivities and antipathies. Although it may add a great deal about their exercise and even modification in social settings, these autonomous individual properties have to be granted before we can talk of their exercise or modification, and, as features emergent from the biological stratum, they themselves constrain (and enable) what can be socially expressed and modified. (Archer, 1995: 104-105)

On the one side, therefore, we need an account which considers aspects of individual cognitive processing and the potential limitations which these may place on the construction of meaning. On the other side, we need to consider the conditioning effect of structures and culture on the exercise of agency. In the construction of such an account the work of the critical realists, and in particular Margaret Archer, may be seen to offer much of value. It is to an exposition of the main outlines of their ideas that we turn next.

CRITICAL REALISM

The origins of critical realism lie with the work of Roy Bhaskar on the philosophy of science (Collier, 1994). This work only later developed an interest in applications in the social arena, and Bhaskar's work has been criticised for a certain lack of sophistication. Layder, for example, takes him to task for an excessive use of examples and analogies drawn from the physical sciences, failing to recognise epistemological debates in social science (Layder, 1990). However, before moving on to other accounts which have elaborated more rigorous approaches to social studies, it is worth outlining the key features of Bhaskar's approach. The main concern is to provide an alternative to positivism with its superficial attachment of cause and effect to 'constant conjunctures'. Bhaskar is concerned to get underneath surface appearances to isolate the generative mechanisms which are the real causal agents. This approach posits the layered nature of physical reality, with each layer having its own properties. These emerge from the previous layer but are not reducible to it. Thus, the biological strata is emergent from the physical, but new properties come into play which mean that events at that level have causal mechanisms there which

cannot be reduced to the previous level. This emphasis on emergent properties conditioned by but not reducible to the strata from which they emerge is of great significance as we ascend the hierarchy. These emergent properties have real ontological status as causal mechanisms in their own right. Further, they have a relative autonomy in that the further up the hierarchy one ascends the less predictable outcomes are. This poses an ontology of depth, in which each layer can be examined in its own right and for its interconnections and impacts on other layers.

Bhaskar's own attempts to apply these insights to the social arena have been influential, but heavily criticised (Layder, 1990). There have been suggestions about their application to areas of organisations, management and information, but these are at an early stage. (Reed, 1997; Corson, 1997; Tsoukas, 1994; Willmott, 1996). The two authors who have done most to develop the ideas are Derek Layder and Margaret Archer. Layder's work lies in the traditions of 'micro' sociology and he has a particular concern with face to face interaction. His notions of domain theory draw on an eclectic range of thinkers, from Goffman to Habermas, as well as drawing on realist notions (Layder, 1996). He himself would see his work as complimenting that of Archer, who focuses on rather grander sweeps of social change. It is clear that both sets of work have much to contribute to thinking about information, but this paper takes Archer's work as its particular focus. Her work could be seen as more centrally resting on critical realism. It is concerned to provide a framework in which the inter-relationships between agency, structure and culture can be examined. In particular, she is concerned with spelling out the conditions of possibility for either change or stasis in each of these areas, arguing that there are no necessary mechanisms linking change in one area to change in another, but conditioning mechanisms. This means that there is relative autonomy in each area and that developments in each area in turn form constraints or opportunities for other systems. There is a strong emphasis on delineating the logical relationships between system components. Systems are thus treated as having emergent properties which cannot be reduced to the conditions of their production, with Archer keen to emphasise that structure and agency are neither simply aggregate phenomena nor are they supra-human constructions. However, she would also insist that society and culture are the products of human activity, but that the majority of these humans, at any one point, are dead. That is, there is a central place for time in her work, as social interaction at any given time is carried out in conditions supplied by previous social interaction, but now elaborated in structural and cultural systems, and in turn either elaborates or reinforces those same systems. These cycles, which she calls 'morphogenetic' ("The 'morpho' element is an acknowledgement that society has no pre-et form or preferred state: the 'genetic' part is a recognition that it takes its shape from, and is formed

by agents, originating from the intended and unintended consequences of their activities." (Archer, 1995: 5) comprise three phases:

consisting of (a) a given structure (a complex set of relations between parts), which conditions but does not determine (b), social interaction. Here, (b) also arises in part from action orientations unconditioned by social organization but emanating from current agents, and in turn leads to (c), structural elaboration or modification - that is, to a change in the relations between parts where morphogenesis rather than morphostasis ensued." (Archer, 1995: 91)

This can be demonstrated graphically as follows, where T^1 , etc., represent times in the cycle. It can be seen that the starting point for analysis of a particular social interaction is not with the beginning of that social interaction, but with the elaboration of the structural factors which condition it. Similarly, social interaction contributes to the elaboration of future structures, which form the basis for future cycles:

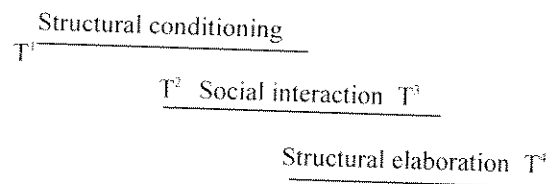


Figure 1

The methodological approach advocated is that of 'analytical dualism'. This is emphatically not to endorse philosophical dualism but to argue that a satisfactory account of the inter-relationships between social and system factors demands that we analyse the components of each separately with a focus on their logical relations and the conditions and possibilities that these allow. This focus also means that accounts which focus exclusively on the meanings held by participants will be insufficient:

"The idea that social actors, particularly in the practical (but also discursive) sense 'know what they are doing' so to speak, and that this should be taken into consideration when accounting for their behaviour, should not be confused with the idea that all sociological explanation must begin and end with an analysis of actors' reasons for their conduct." (Layder, 1990: 164)

This is a very brief account of ideas which are explicated with great verve and an impressive range over two books. Part of the problem with these ideas is not just their complexity but the way in which they are applied across a broad range of time to grand issues of religion and politics. At this scale it can be possible to make the analyses required of the logical interconnections and tensions between groups of ideas. At a smaller scale, however, one can feel a little daunted. However, Archer argues that the fundamental approach

"is not restricted to such an abstract and macroscopic task. Analytical dualism can be used by any researcher to gain theoretical purchase on much smaller problems where

the major difficulty of seeing the wood from the trees becomes much more tractable if they can be sorted out into the components of temporal cycles of morphogenesis - however short the time-span involved may be (Archer 1996: 228)

It is in this spirit that the next section proceeds to outline a preliminary application of the methods of analytical dualism to the problem of information in organisations.

POTENTIAL AND CHALLENGES

One issue that needs to be clarified before we start the attempt is the definition of the terms employed. The discussion above has indicated that this paper takes the notion of information as a process of the construction of meaning as being the most appropriate and productive approach, but that this necessitates that we are clear about both the factors involved in the production of meaning and what information is *not*. A clear definition of information as distinct from data allows us not only to understand information better, but also to give due importance to the processes of gathering and storing data - processes which often appear to be downgraded in the terminological drift which sees data rebadged as information and information as knowledge (Mutch, 1996; Redman, 1995). (One would be intrigued in this context to know what Machlup would have made of current attempts to sell 'knowledge management', given his comments that "in our modern economy we find many firms selling information services, not knowledge services" and that this derived from their totally different nature. He obviously did not foresee just what lengths language could be stretched to! (Machlup and Mansfield, 1983: 644)). It is this latter problem which is particularly important given the current focus on knowledge management and the learning organisation. What we find is that such terms often relate to information, with corresponding fantasies about the ability to store and manipulate knowledge in ever smarter uses of IT. (Raggad, 1995). The work of Mary Midgley is valuable here. She argues that the value of knowledge "must lie centrally, not just in the possessing and storing of information as a means to something else, but in understanding, in the power to systematise and use that information in large scale thinking and so in our lives." (Midgley, 1996: 70) These ideas are developed at much greater length in her *Wisdom, Information and Wonder: what is knowledge for*, in which she points to the powerful impact of the use of the term 'information' in computer science (Midgley, 1989). It is the role of such ideas in forming the perception of those employed in using information that is important. Thus, whilst we might want to insist on clearer definitions for analytical purposes, we also have to recognise the everyday usages of words and the impact that they can have. Thus, it is possible to argue that images of information can be as significant in organisational decisions as more 'objective' factors (Mutch, 1995). An adequate account of such images

would need to be based on the interplay between scholarly and popular images. The complexity of the first endeavour is illustrated by Machlup and Mansfield's massive collection which starts to draw some of the inter-connections (Machlup and Mansfield, 1983). It is here that Midgley's call for all to have "a general background map of the whole range of knowledge as a context for their own speciality, and should integrate this wider vision with their practical and emotional attitude to life tighter definition of terms" is so important - and so difficult to achieve! (Midgley, 1989: 8) However, it does point to the need to develop an adequate history of information, a challenge which is being faced in other areas (Black, 1997; Vincent, 1989). These analyses of the development and use of the language form a vital part to the cultural conditioning which operates in our model of the meaning process, based on Archer's morphogenetic cycle and sketched out below:

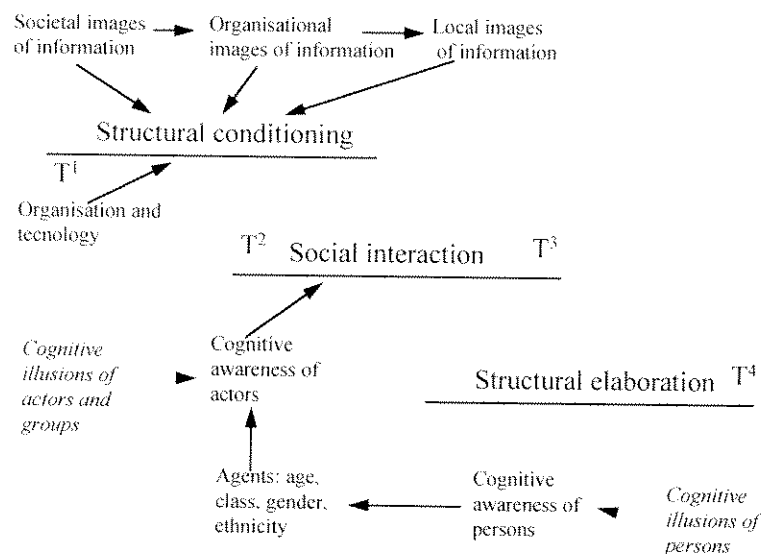


Figure 2

The discussion above relates to the societal images of information, but these will be drawn upon and mediated by the organisation. The tone for the whole organisation will be derived from a number of factors, including the product market it operates in, its history and the particular perspectives introduced by influential opinion formers. Thus, we are adopting the interpretative systems model of Daft and Weick but placing it in a broader context. The opinion formers will draw on existing images available to them from broader resources

in society in ways which might clash with or conform to those resources suggested by the development of the organisation. However, it is insufficient to regard the images of information available to actors as being restricted to those set at this level. In their turn, these perspectives are mediated by more local images, which in their turn may draw upon (perhaps opposing) societal images. These local images may correspond to a number of divisions in the organisation. To draw upon the work on corporate cultures, Sackmann argues for a cognitive definition of cultures, defining them as:

"sets of commonly held cognitions that are held with some emotional investment and integrated into a logical system or cognitive map that contains cognitions about descriptions, operations, prescriptions, and causes. They are habitually used and influence perception, thinking, feeling, and acting." (Sackmann, 1991: 34)

In her empirical work, she found seven distinct groupings, although there were shared approaches across these, notably in relation to a predominant action perspective. One would suggest, then, that an account of meaning would want to take into account the conditioning force of what is seen to constitute information within a particular context as mediated and shaped by the inter-relationships and tensions between societal, organisational and local images of information. These in their turn have to be seen as inter-relating with other structural dimensions. Whilst this paper is anxious to separate out information from technology, the latter is more than just a ghost at the feast. There is the need to acknowledge technology as a significant variable, not least in its symbolic aspect. That is, images of information which rely heavily on the information processing metaphor are powerfully reinforced by the physical, tangible presence of the technology itself. In turn, the structural dimensions of the organisation and the environment it operates in place powerful constraints on or offer resources for particular interpretations of information. Particular meanings, that is, might be supported by the images of information available and by the technology, but be suppressed because they are in contradiction with dominant power resources. Of course, that power may be exercised in the form of making certain meanings seem in valid or unthinkable from the outset, as in Lukes third dimension of power (Lukes, 1974).

These are the conditioning dimensions of structure which form the arena in which our human actors will construct meaning. We return here to the criticisms which Archer makes of social psychology in its tendency to operate with an 'over-socialised' conception of people, one which fails to consider the barriers to meaning with aspects of individual psychology might pose. This reliance on the 'discursive penetration' of individuals can be seen to lie at the heart of much social theorising in the influential lines of, for example, Habermas and Giddens. Where limitations are recognised, they are swept away as being of little concern to the social theorist (Alvesson and Willmott, 1996). However, one might wish to suggest that limitations or barriers to the formation of meaning here might be

considered to be crucial. If certain cognitive limitations prevent the full realisation of meaning, for some or all actors, then this will surely have immense practical consequences. It is here that Archer presents us with a more useful model which can act as a corrective to our over-socialised model. It is in this area that Archer suggests that we have been too broad in our definitions of agency. We tend to use it as a portmanteau term rather than, she argues, recognising the greater value of a tripartite division into persons, agents and actors. Persons are individual human beings, emergent from, but not reducible to their biological make up. A focus here enables us to attempt to integrate the insights being gleaned by those working on materialist concepts of consciousness and language which emphasise their basis in the biological structures of the brain with the work done in cognitive psychology (Dennett, 1993; Pinker, 1995; Demasio, 1995; Huber, 1991). However, as Archer argues, there are other aspects of human agency which have properties beyond a simple aggregation of individual capacities. Agents are, she argues always collective categories which can play passive or active roles and which condition the life chances of those who belong to them. Finally there is the category of actors, emergent from collective agents and enabled or constrained by the characteristics both of those groups and of the structured situations in which they find themselves. Here, therefore, might be a useful way of looking at individual reactions to information, allowing us to isolate those constraints of individual psychology from the reactions of groups and the strivings of individual actors.

There is currently considerable debate about the biological basis for consciousness which cannot be the focus for concern here - save to note that, in its information processing guise, such debates can have impacts on the image of information. However, assuming 'average' persons, that is, those whose cognitive powers have not been affected by a specific condition, the area of interest is with the cognitive illusions and biases which people accumulate in the process of coping with everyday life. In a very comprehensive review of these Brodt argues "for an even more pervasive impact of judgmental heuristics and their associated biases on personnel management decision behavior." (Brodt, 1990: 231). We could extend this focus to all managers, and the issue is the extent to which these illusions and biases, if recognised can be changed. In Mele's words, 'there is a lively debate' in social psychology about the extent to which, using particular techniques, such biases might be controlled for or even overcome (Mele, 1997). Streufert and Nogami argue that "increasing knowledge of how a flexible application of styles, of complexity, and of other structural components can modify outcomes and be trained promises to be a major benefit to I/O [industrial/occupational] psychology" (Streufert and Nogami, 1989:129) However, Brodt feels that cognitive illusions are stable and are 'quite resistant to change' (Brodt, 1990, 233). There are two areas of interest, then, for future research: the extent to which the use of information is indeed fundamentally

shaped by such cognitive illusions and the success or otherwise of interventions to reveal or challenge such illusions. One interesting point is the extent to which the impacts have been judged in the light of experimental data. Johnston, Driskell and Salas argue that our prescriptions for the use of information often derive from artificial experiments, claiming that hypervigilant search modes, characterised as disorganised and inefficient, are often more successful in naturalistic environments. They continue that training in specific techniques might be counter-productive and "that a more useful goal for training is to enhance flexibility in adapting decision-making strategies to task demands." (Johnston, Driskell and Salas, 1997: 621) This seems to call for a reflexive self awareness by participants of their styles. In this context, DeNisi's (1996) work on the use of information for performance appraisal would seem to suggest two things. One is that memory organisation and recall is more important than encoding and that interventions can be designed which make a difference (Cf Rose (1992) for a parallel argument). The second is the importance of setting cognitive factors in a broader social context. This points to the importance of the ways in which our 'ways of knowing' are formed, an area in which the work of Vygotsky seems particularly apposite (Egan, 1997).

Of course, the construction of meaning is generally a collaborative effort. However, this debate occurs between actors and we have to add to the biases which persons bring with them, those which they share as a consequence of their membership, voluntary or involuntary of collective agents. Such agents can be, in Archer's terms, either 'primary' or corporate'. The former are those groups which "neither express interests nor organize for their strategic pursuit" (259) - membership of a particular generation may have an impact on social affairs without that group necessarily pursuing any particular strategy but simply being. Corporate agents are those groups which organise to meet particular goals - professional organisations and trade unions might be particularly important in organisations. Actors are therefore influenced in their ways of knowing by overlapping and conflicting membership of a number of collectivities. Such influences are another set to take into account when examining the collective creation of meaning in particular roles as organisational actors. It is on this level that there needs to be consideration of the pressures around the construction of meaning conveniently assembled under the heading of 'group think'. Again, there are suggestions that such phenomena can be overcome with the use of appropriate reflexive techniques (Manz and Neck, 1995). However, what this discussion should indicate is that there are considerable influences involved in the construction of meaning. The model is suggested as one means of approaching this process, of separating out its parts for analysis in order to examine the inter-relationships.

CONCLUSION

This paper began by setting itself the target of providing a framework for the examination of the use of information in organisations. Such an explanation, it has been argued, needs to take due account of both agency and structure. The focus on information as meaning is seen as providing the most fruitful starting point, but existing accounts are criticised for leaning too heavily on the discursive penetration of organisational actors. The work of Margaret Archer is used to suggest a number of dimensions which compromise or constrain the full exercise of such discursive penetration, with a particular focus on images of information at a societal, organisational and local level, and on the potential cognitive limitations of individuals and groups. In the latter endeavour, Archers tripartite division of persons/agents/actors was considered to offer a useful framework. Underlying the whole model are the use of analytical dualism and temporal analysis. These methods suggest that the appropriate form of investigation is the construction of analytical narratives, narratives which in Archer's words:

are explanatory, retrodictive and corrigible accounts. Therefore analytical narratives cannot be 'grand' since the need to narrate arises because contingency affects the story and its outcome: they can never be unanalytical because what is narrated is the interplay between necessity and contingency; and they cannot be purely rhetorical because they are avowedly corrigible, dependent upon the present transitive state of knowledge and revisable in the light of new scholarship (Archer, 1995: 343).

It is recognised that this is an outline upon which much more work has to be done. In particular, the discussion has limited its coverage of the impact of organisational structures and, in particular, of the role of technology. This latter has been deliberate, with the focus on information itself being seen as a corrective to other accounts. One would hope, however, that such a focus would yield practical value as a tool in analysing the real problems that organisations face in dealing with information and its construction.

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