

## BACK TO THE FUTURE: FROM KNOWLEDGE MANAGEMENT TO DATA MANAGEMENT

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### ABSTRACT

*This paper argues for a return to fundamentals as we enter the new millennium. It argues that the field of Information Systems should no longer be distracted from its natural locus of concern and competence, or claim more than it can actually achieve. More specifically, and as a case in point, we eschew IT-enabled Knowledge Management, both in theory and in practice. We view Knowledge Management as the most recent in a long line of fads and fashions embraced by the Information Systems community that have little to offer. Rather, we argue for a refocusing of our attention back on the management of data, since IT processes data - not information and certainly not knowledge. In so doing, we develop a model that provides a tentative means of distinguishing between these terms. This model also forms the basis for on-going empirical research designed to test the efficacy of our argument in a number of case companies currently implementing ERP and Knowledge Management Systems.*

**Key words:** *data, information, knowledge, data management, knowledge management, knowledge management systems, ERP systems, transdisciplinarity, case study research.*

### 1. INTRODUCTION

In reflecting on key issues and related fundamental concepts for the new millennium, there is an understandable tendency to embrace the latest fads and fashions uncritically. This is especially so in a relatively new field such as Information Systems (IS) where advances both in technology and its application occur rapidly and incessantly. Back at the very first ICIS, Peter Keen bemoaned the lack of a cumulative tradition in IS (Keen 1980; see also Keen 1987). Notwithstanding, this trend has continued in the two decades since. Thus, for example, prior to Keen's pronouncements - during the 1970s and early 1980s -

many embraced database technology as *the* solution to our corporate information needs (Martin, 1982). Later, during the 1980s and into the 1990s, we willingly embraced the notion that IT could lead to a sustainable competitive advantage (e.g., Porter & Millar, 1985). More critical reflection (e.g., Ciborra, 1994) emerged later. Similarly, Business Process Reengineering (BPR) was proffered as the means to achieve order-of-magnitude improvements in business performance (Davenport, 1993). Again, however, critical evaluation has brought the earlier claims into question (Davenport, 1996; Sauer, Yetton & Associates, 1997).

More recently, the solution to the provision of necessary information across functions, business units and geographically dispersed organizations has been identified as ERP systems (Holland, *et al.*, 1999). A related trend in the late 1990s and into the current decade has been the emphasis on Knowledge Management (KM) and Knowledge Management Systems (KMS) (e.g. Marshall, 1997; Alavi & Leidner, 1999). Here, the astute capture – and, more importantly, *creation* – of organizational knowledge is said to lead to innovation in the development of new products and services (e.g., Nonaka & Takeuchi, 1995). There is even talk of wisdom management (under the guise of human resource management) these days! (Turner, 2000).

One can argue with some justification, therefore, that the IS field has been populated by example after example of one fad after another. There has thus been a tendency to embrace new concepts, sometimes at the expense of long standing issues<sup>1</sup>, sometimes at the expense of past learning about IS design and implementation. So, for example, while Davenport (1996) refers to BPR as ‘the fad that forgot people’, so KM has been criticized for emphasizing technology at the expense of people (Swan, *et al.*, 1999).

In this paper, we consider these two related current trends (ERP and KMS) and attempt to demonstrate that not only do they fail to learn from the past, but that they are in fact more potentially regressive than progressive. We argue that this is because these new, so-called, radically transforming approaches have been considered in relative isolation from the more general business strategy and management of change issues and have tended to be considered from a single rather than a transdisciplinary perspective. The paper is organized as follows. We first reflect critically on the emergence and impact of ERP and KMS. This critique forms the basis for the section that follows, which presents an argument for refocusing attention – through a transdisciplinary lens – on the management of information and data rather than knowledge. In so doing, a distinction is made between the three terms. Implications for the field of IS and for further research are then identified.

## 2. ERP AND KMS: A CRITICAL REVIEW

As far as ERP systems are concerned, many organizations have accepted the pronouncements of software suppliers that the homogenization of processes will ensure ease of data extraction (mining) throughout the organization. This is also so presumably throughout the network of organizations with which strategic alliances have been formed, or through which electronic commerce is conducted (Jarvenpaa & Tiller, 1999). ERP system benefits are said to include their ability to make knowledge available wherever it is needed (unlike in the past where different IS across functions and geographical locations made this difficult). Companies are thus lured by the suggestion that they can gain competitive advantage from the astute management of their knowledge base. Yet from whence is lasting competitive advantage likely to emerge? from implementing the same processes as everyone else? from efficiency alone? Where is that ‘unimportant’ knowledge about a key customer – existing or potential - that will retain their business or cement the deal? Is it not likely to be hidden in the deep recesses of the minds of key individuals who know their customers, but who might find it difficult to articulate or who might not recognize its significance?

In other words, what is often ignored in the promotion and underlying philosophy of ERP systems is the recognition that ERP is essentially a standardizing approach, promoting the use of common solutions and definitions across an organization. While this may well improve efficiency, it does so at the expense of

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<sup>1</sup> Compare some of the key IS management issues that have persisted over time with others that have waxed and waned. See, for example Brancheau, *et al.* (1996); Watson, *et al.* (1997).

innovation (Clark & Staunton, 1989), just as organizing bureaucratically did earlier in the last century (Burns and Stalker, 1961). Once such systems are implemented, individuality and creativity are frowned upon as consistency and conformity become paramount. And yet innovation and the need to respond flexibly to environmental changes are precisely the central tenets of most stated business strategies.

### 3. ON TRUTH AND KNOWLEDGE

We can consider this issue in more detail by analyzing what is meant by knowledge and hence KM. A common definition of knowledge is 'justified true belief' (Nonaka & Takeuchi, 1995). Yet belief is, by definition, a human phenomenon. It is questionable whether other animals 'believe' and 'think', but it is certainly the case that computers don't believe. Of course, computers and IS have human beliefs embedded in their operation and they can be used to communicate these beliefs across widely dispersed communities. But this is precisely what is important – that these are the beliefs of those who designed the system or input the 'knowledge'. The point is that belief refers to an individual's or group's idea about what is 'truth'. While the individual or group may believe that this 'truth' is justified, 'truth' is always problematic. In the Social Sciences there is increasing acceptance that the search for 'truth' and 'laws' of behavior is a redundant exercise because what is truth is socially constructed (Gergen, 1999). This means that the idea that 'knowledge' can ever be simply transferred through an IT system is misplaced. A particular version of 'truth' can be transferred but, were this to be understood by the intended recipients (and this in itself is unlikely), it may not be accepted given alternative 'justified true beliefs'.

In other words, truth - and hence knowledge - is always contestable. Yet it is precisely this contestability of knowledge that ERP systems and KMS attempt to obscure and deny. The suggestion is that by introducing standard processes (through the pain-stacking activity of process mapping) there can be sharing of 'best practice' knowledge throughout a global organization. While this may achieve efficiency it can stifle innovation. It is the contestability of knowledge and truth that leads to innovation and creativity. Where 'knowledge' is uncontested and its 'truth' accepted then the necessity to search for alternatives will fade from view.

### 4. BACK TO BASICS

As we seek new fundamental concepts for the new millennium, there is already speculation as to what will be the next 'fashion' in IS. On the contrary, we contend that the IS community should resist either defining or diffusing 'new' glamorous rhetorics. Instead, we argue that the real challenge is to promote the notion that what can be transferred and shared using IT is not knowledge, not even information, but data. The reason for this is that, by definition, to become information data have to be interpreted (Checkland, 1981; Land, 1982). Unlike 'knowledge' (which is presumed to be distilled 'truth'), or information (which requires the human act of interpretation), data need to be 'made sense of' (Weick, 1993). Making sense of data will involve debate and dialogue (Senge, 1990) such that 'truth' can be negotiated in the particular problem/opportunity domain. This suggests the importance of social capital, since it is within 'communities of practice' (Brown & Deguid, 1991) that such debate and dialogue will take place.

Where there is little disagreement about the 'truth' of some information then the resulting solutions/decisions can be enacted in a relatively straightforward manner. This is obviously efficient if the new context of information use is similar to the context in which these solutions/decisions were previously implemented. However, the above arguments suggest that an attempt be made to focus on the contestable nature of 'truth' in order to ensure that previously defined recipes are not mindlessly re-enacted in situations where they are no longer appropriate, and where underlying assumptions are no longer relevant. After all, the easy acceptance of previous solutions and 'world views' was nearly the downfall of IBM in the 1970s and may well be part of the current problem for Marks and Spencer in the UK. In both instances, taken-for-granted assumptions about the business failed to be surfaced and questioned. As a result, a particular mindset dominated strategic decision making. The point is that information that is strategic not only supports or enables existing business strategies but also – critically – *questions* the taken-for-granted assumptions on

which such strategies are based (Galliers, 1991). Where there is disagreement then it is clear that what is truth needs to be renegotiated in the particular context so that the solution/decision is reformulated (or even entirely reconstituted). However, an absence of disagreement does not necessarily mean that agreement exists, since, where communication is restricted (cf., ‘knowledge silos’) or limited, any disagreement that does exist may never actually be surfaced. In such situations innovation is unlikely.

## 5. PEOPLE AND TECHNOLOGY

Refocusing on ‘data’ management does not deny the remarkable technological advances that have been made in recent years. After all, what organization would – or could – attempt to survive without IT in this day and age? (Land, 1996). If the preceding argument is accepted then what appears to be needed is an approach that takes into account both the special properties of people *and* technology, rather than posing the issue in terms of people *versus* technology. Of course, there is a wealth of cumulative knowledge on socio-technical systems that has emerged from decades of research undertaken by, for example by the IFIP WG 8.2 community (e.g., Mumford, 1994). However, to examine the complex, emergent issues confronting the IS field in the new millennium - specifically those concerned with the inter-relation of people and IT - suggests a need for inter- or trans-disciplinary approaches (Gibbons, 1994). This said, interdisciplinarity is not without its problems and pitfalls, given the differing – sometimes opposing – philosophies, assumptions and approaches of the participants in such efforts (Newell & Galliers, 2000). For example, there is a tendency for Organizational Behaviorists to dismiss IS as being too ready to embrace tools, techniques and technology at the expense of human beings and theory (e.g., Swan, *et al.*, 1999). Similarly, there are those in the IS field who argue for a clear demarcation for their ‘discipline’ (e.g., Adam & Fitzgerald, 1996). Notwithstanding, there appears much to be gained from a critical and transdisciplinary approach to complex phenomena such as ERP and KMS (Galliers & Swan, 1999), and the development of a joint research agenda for IS and Organizational Behavior (OB) would appear to hold some promise

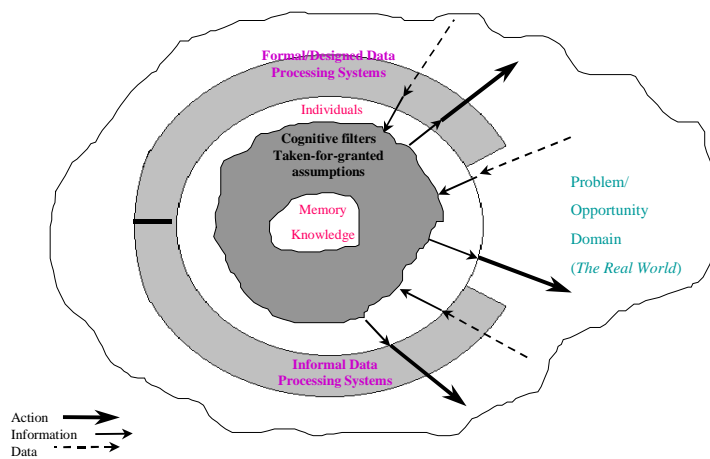


Figure 1. Visualizing data, information and knowledge

Thus, by drawing on the lessons that emerge from theoretical and empirical research undertaken by both the OB and IS communities, we develop a model which attempts to illustrate the:

- interpretive nature of data and information;
- distinction between data, information and knowledge;
- point that people inform themselves and become more knowledgeable by interpreting data directly from the ‘real world’, and through both informal (e.g., social interaction) and formal data processing systems (only some of which will be IT-based) , and
- importance of context (or problem/opportunity domain) in making sense of individuals’ knowledge.

This model appears as Figure 1 below. At its centre are people who will perceive the ‘real world’ (and take action in it) through their own, unique cognitive filters. Note that knowledge provides the means by which they can interpret the data they receive, either directly or through formal or informal data processing systems. The implication is that, when we talk of KMS, we are actually referring to no more than data processing systems. Such systems only make sense once meaning is inferred. This occurs through the application of both tacit and explicit knowledge (Nonaka & Takeuchi, 1995).

Another means of distinguishing between the terms *data*, *information* and *knowledge* is to identify their characteristics. An attempt to do so is provided in Table 1 below.

| <b>Data</b>                | <b>Information</b>               | <b>Knowledge</b>      |
|----------------------------|----------------------------------|-----------------------|
| Explicit                   | Interpreted                      | Tacit/embedded        |
| Exploit                    | Explore                          | Create                |
| Use                        | Build/construct                  | Rebuild/reconstruct   |
| Accept                     | Confirm                          | Disconfirm            |
| Follow old recipes         | Amend old recipes                | Develop new recipes   |
| No learning                | Single-loop learning             | Double-loop learning  |
| Direction                  | Communication                    | Sense-making          |
| Prescriptive               | Adaptive                         | Seminal               |
| Efficiency                 | Effectiveness                    | Innovation/redundancy |
| Predetermined              | Constrained                      | Flexible              |
| Technical systems/networks | Socio-technical systems/networks | Social networks       |
| Context-free               | Outer context                    | Inner context         |

**Table 1:** Key characteristics of data, information and knowledge

## 6. IMPLICATIONS AND FURTHER RESEARCH

Reflecting on current developments in KMS and ERP, we suggest that much is to be gained from refocusing on the management of data rather than KMS *per se*. The transdisciplinary approach we advocate may prove to be a useful means of resolving the long-standing dilemma between efficiency and innovation. Such technology as ERP systems can help us to diffuse and use data in a more integrated way across and between (globally) dispersed organizations. However, it needs to be recognized that it is data that is being relayed, and not knowledge. This is so because the need for these data to be interpreted and negotiated in each distinct or new context will then be more readily appreciated. When the contexts are very similar and stable then these data can more readily be reused without much reinterpretation. When the contexts are different and dynamic, as will typically be the case in organizations that cross national, and hence cultural boundaries (Hofstede, 1980), then the search for meaning and reinvention will be crucial. In doing this the interactive relationships between IT, business strategy, processes, structure, and people both within and between organizations will be evident, and means by which the surfacing of knowledge can be facilitated become more crucial.

Case research aimed at developing this line of reasoning and testing its utility in organizations that are concerned about their management of knowledge is currently underway. More specifically, we are investigating organizations that have implemented ERP systems with a view to ascertaining whether those which recognize the contestable nature of knowledge obtain greater benefit from their IS than those that do not. Preliminary evidence points to the view that they do. Benefit is measured in terms of improved communication, knowledge sharing and knowledge creation, and innovation. This particular research project forms part of a transdisciplinary research programme that focuses more broadly on the interaction of people

and IT. By drawing on both the OB and IS literatures, as we have done in this paper, the programme aims to shed new light on the complex issues concerned with organizational competitiveness, the management of change and the effective use of IT as we enter the new millennium.

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