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## **Understanding Sustainability as Knowledge Practice**

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### **Introduction**

The research reported here grows out of the concern and pressures felt by the construction sector as it tries to respond to a complex and intensifying sustainability agenda. These pressures are seen by the industry itself as implying a need for new knowledge, new work practices and new ways managing knowledge.

In the construction industry, sustainability is still seen as a novel and contestable concept, with no settled or focused understanding of what it means, the drivers that propel it, the bounds of its operationalization or the locus of its practice (Kibert, 1999). A sustainability agenda may be drawn very narrowly, as say low energy consumption, or it may go beyond, to consideration of environmental management and audit systems, or yet wider still to ecological sustainability, economic viability and social acceptability (Spencer-Cooke, 1998). At whatever level this is addressed (and even if these levels are not agreed), this produces new knowledge challenges for construction professionals and managers as well as their clients. Thus we see the industry's own discourse often pointing to the need for knowledge management within newly envisioned work practices, leading to the diffusion and adoption of new sustainable ideas and concepts throughout the supply chain, and on the basis of both market pull and supply push (Egan, 1998; Movement for Innovation, 2001). And yet, when there is concrete realization of sustainability aims it often results in half-hearted attempts to apply learning from pilot, high profile or prestige sustainable construction projects. This approach, when taken naïvely, seems to offer little prospect of fostering knowledge processes that can afford the travel of knowledge. More generally through our research we see the construction industry, in facing the challenge of sustainability, as characterised by the need to communicate *across* project, firm and professional boundaries. Achieving effective arrangements for communication in itself requires overcoming structural divisions and cultural constraints (Bresnen and Marshall, 2001). Understanding the modalities by which knowledge can be made mobile across such interfaces is particularly pressing.

## **Conceptual Foundations**

We are concerned here with the prologue to knowledge management as it is usually understood. That is, with understanding how the industry operates as a knowledge culture, and how it understands the role of knowledge and knowledgeable practice within its current activity and as a (potential) route to innovation. Whilst the literature gives us many categorisations of knowledge and knowledge management from which we can draw (Alavi and Leidner, 2001; Earl, 2001; McAdam and McCreedy, 1999; Schultze, 1998), these do not always serve our interests in this study. Schultze (1998) uses Burrell and Morgan's (1979) framework in order to identify a two fold typology of knowledge within the debate: objectivist and subjectivist, but for this research context such an objectivist versus subjectivist account is too binary and premature. In our preferred constructivist approach, subjectivity and objectivity are interlocked in a reciprocal social relationship (Schultze, 2000). Social reality in which knowledgeable practices are sought and found is understood in terms of an ongoing dialectical process with individuals simultaneously externalising their being into the social world, and internalising the social world as objective reality (Berger and Luckman, 1966). In Weick's (1995) terms, individuals make sense of their world by interacting within it. In contrast to approaches which codify, e.g. tacit knowledge into explicit knowledge (Nonaka and Takeuchi, 1995), or to map, share or disseminate knowledge (Seemann, 1996; Vail, 1999), we perceive knowledge as containing, expressing and inscribing accumulations of meaning and experience available for appropriation. Still, we recognise that any abstraction or translation of knowledgeable action removes it from a given context - knowledge being what made action appropriate in *that* situation at *that* time (Introna, 1997).

Knowledge management is therefore understood here as enhancing the potential for new (knowledgeable) practices that are envisioned, pursued and disseminated, with other actors encountering these new practices and learning from them to develop their own local knowledge. Knowledge creation is not simply a codification and dissemination effort, nor is it driven only by personal explorations, but involves the ability to interact with and convince (or be convinced by) others. Hence, in this research, the construction community as much as the construction process forms the focal component of this study. The sharing of knowledge across boundaries – a key concern within knowledge management (Ciborra and Andreu, 2001; Van Looy *et al.*, 2002) enabled both by actors, boundary spanners, and artefacts, boundary objects. (Brown and Duguid, 2001) – is of particular concern in this domain.

## **Research Approach**

The key problématique that this research has developed is how individuals and groups within the construction industry can be assisted to make knowledgeable interpretations (envisioning) in its complex organizational environment. An initial 16 semi-structured interviews with construction industry professionals have been undertaken. They have mainly been with senior members of organizations representing the main construction interests: developers, clients, architects, design engineers, quantity surveyors and contractors. The organizations are from both the public and private sector, and ranged from single partner practices to international firms. In addition the research team have attended five construction industry workshops on sustainability or knowledge management and examined organizational policies on sustainability and knowledge. In the section below we summarise some of our preliminary findings from this work.

Based on this fieldwork, and in line with the epistemology outlined above, we have built conceptual models developed through soft systems methodology (SSM) (Checkland, 1981; Checkland and Scholes, 1990). These models have been used to identify patterns in the knowledge activities (including knowledge needs) undertaken or understood by our respondents. Through SSM's rich pictures and root definitions we identify both responsible actors, transformations for which they are responsible, and knowledge resources they (seek to) appropriate.

## **Current Status and Findings**

### **Interfaces: sociality and physicality**

Construction engineers describe themselves as specialists in the installation of physical components of construction, with contractors' activities organised around these components. Designers see their role as to select and provide a plan for the integration of these components. The industry's regulation, research and processes appear as focused around such defined roles, components and structures, and construction practice is enacted in their integration. For our interviewees the important issues associated with achieving sustainability, usability and durability reside at the points of physical and processual integration. But they also acknowledge that these challenges are strongly linked to the social integration of people, skill and expertise. But the relatively rigid structures of the industry pose a challenge with embedded expectations afforded by established roles and changing knowledge practices within this industry is understood as requiring them to be challenged. As one interviewee expressed it: *"Construction is ultimately a very complex, multi-disciplinary activity and there is a need to integrate the kind of design and management processes in terms of skill and the knowledge that people bring."* Understanding such activity draws upon works in knowledge management concerning institutionalisation of activity and action (Hasselbladh and Kallinikos, 2000), and the creation and destruction of, communities of practice (Wenger, 1998).

### **Knowledge using and knowledge creating**

Our interviews revealed differences between firms in their perceived ability to create and use knowledge. The large firms we investigated do have an explicit commitment to R&D and regularly participate in academic research projects. They see innovation as led by academia and see themselves as acquiring knowledge for their own use and as contributing to industry 'best practice' programmes, both in order to improve their reputation for innovation and to build their market. The small firms, by contrast, see themselves as knowledge consumers, using the research output published in trade magazines and industry reports. They see their knowledge practices largely in terms of retaining individual staff who have acquired competencies and expertise through practice. They feel isolated from knowledge networks because of their scale and the nature of their work - usually with other SMEs and rarely with large knowledge rich partners. Although they identify the need for networking with similar firms, these networks have not been established.

### **Market following and market creating**

For many of our respondents, innovation (and sustainability in particular) is not seen as a way of repositioning their firm or building competence, but as a risk to be managed. Sustainability innovations are, at best, responses to quirky clients seeking (usually) prestige projects, or as a response to a more strenuous regulatory environment (building codes). The designers interviewed are, mostly, individually committed to improving construction sustainability, but frustrated by the lack of demand from clients. Designers do not see their firms as able to create new markets through

such innovation. Rather they wish to position themselves such that, as (or if) demand for sustainable products increases, they can demonstrate an ability to deliver and tender for such work. Their description of their market position is that they can exploit a reputation for being able to innovate rather than being able to sell packaged and black boxed innovatory design solutions. This debate provides a macro-level contrast to the much criticised concept of intellectual capital markets (Davenport and Prusak, 1998; Stewart, 1998), in which groups trade in knowledge.

### **Conclusions and future work**

This ongoing research project on knowledge management for sustainability within the UK construction industry has begun investigating individuals, groups and organizations as homogeneous creators and users of knowledge. In an effort to understand knowledgeable activities in their social settings, we have found that issues of roles, structures, markets, industry perceptions and institutionalised approaches shape and constrain knowledge practices, leading to market following for some firms and data-rich knowledge-poor activities. These issues are being explored further through a second round of interviews.

At this stage in our project, and given its ambition to marry technology to intervention, we still need to translate these contextually rich understandings we have gained by using SSM to explore our findings, into the sparse language of modelling tools and the even sparser language of programming. How best to achieve these transformations is a current concern of our research.

During the conference presentation we intend to contrast themes from knowledge management theory with our initial research findings (as introduced in this paper), providing a clear path through this collection of concepts by means of critical reflection with our stated theoretical foundations.

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