

## **KM Technologies: a Medium or a Message?**

Matteo Bonifacio

(Department of Informatics and Telecommunications (DIT), University of Trento.  
bonifacio@itc.it)

Chiara Zini

(Department of Informatics and Business Studies (DISA), University of Trento.  
czini@economia.unitn.it)

**Abstract:** In this paper, adopting a structurationist perspective on technology, we explore the relationship between organizational forms and ICTs when the “matter” to deal with is knowledge production and innovation. The reason why such focus is relevant is twofold. On the one hand it has been widely underlined the importance of knowledge as strategic asset [Stewart 97]. On the other, is because we believe that many KM technology investments haven't generate the expected results and benefits [Davenport 00]. A structuration theory reading of KM technologies could provide a lens in order to draw some interesting explanations on some problematic aspects of KM implementations and, moreover, on some interesting prescriptions on how future implementations should be approached.

**Keywords:** structurationism, technology, knowledge management, communities of practice, boundary objects, innovation

**Categories:** A.1, H.1.1.0, J.4, C.2.4

### **1 Technology as a Medium or a Message**

During the '80s and '90s the ICT wave has brought under attention the problematic relationship between technology and organizational forms. Such relationship has been viewed mainly according to two perspectives [Orlikowski 91a]. On the one hand, technologies have been viewed as independent objects capable to provide “solutions” to a set of organizational problems, such as enabling better decisions, supporting faster interactions, and improving processes performance. In this sense ICTs have been proposed, according to a conduit model, as a neutral means to transport and make use of information [Boland 95]. From this perspective, technology is a mere medium that vehicles a message.

On the other hand, ICTs have been proposed as “part of the problem” rather than a solution. In fact, from a structuration theory perspective, we can read technology as both a product and a producer of social structure since it constraints human work as much as human work manipulates the use of technology [Orlikowski 91b]. More precisely, some researchers have underlined how technologies intrinsically embed organizational assumptions on how the matter they deal with (such as decisions, processes, or knowledge) should be organized. That is to say, since technology is a product of human action and manifests an institutionalised interpretation of the world, once adopted, it drives and constraints people behaviours in a way which is consistent

to such interpretation. As [Dourish 03] puts it: “I would suggest that traditional monolithic or application oriented models of system design embody a set of assumptions that can prove problematic...”. Several ethnomethodological works confirm this constraining effect, such as the paradigmatic one proposed by [Star 99] that describes “a medical history form for women that encodes monogamous traditional heterosexuality as the only class of responses: blanks for “maiden name” and “husband name”, blanks for “form of birth control”, but none for other sexual practices that may have medical consequences, and no place at all for partners other than husband to be called in a medical emergency”. A similar situation is proposed in [Bonifacio, 00] that describes how the enterprise knowledge portal of a world wide consulting firm implies the managerial assumption of knowledge as a resource that can and should be centralized in order to be controlled.

Some other researches also underlined how technologies are shaped by subjects through contingent use and situational enactments of social structure; in intuitive terms, the actual matter of the situation, such as decision making or knowledge exchange, outlines in which way technology is used. [Kaptelinin’s 96] research confirms that computer users often create their own information structures and procedures with the intention of adapting technology to personal needs. Concretely, in a case study about the practical use of the surveillance system at the London Underground [Health et al. 02] point out that: “Supervisors have a sense of the routine organization of conduct in particular domains, and draw upon that practical knowledge to see and identify problems and difficulties. [...] The supervisors’ ability to configure a relevant set of views and to see and manage events, using CCTV, is entirely dependent upon their practical knowledge and familiarity with the station” [1].

Both views of technology as a product and as a producer of social structure are synthesized in the structurationist perspective [Giddens 84] that underlines the circular relationship between agents and technology; that is, technology embeds social assumptions that tend to constraint behaviours while agents are able to shape and manipulate the structure embedded in technology. It’s in this sense that technology, rather than a solution to implement, can be better viewed as a problem to be managed since it vehicles the interpretative schemas of different organizational actors. These actors, at least users, designers, and managers, display different interest and goals, and through the implementation/adoption of technology, exercise their power in order to successfully negotiate with the other. Commonly the management or the designers wish to impose their view on the group of interest represented by users. Conversely, users are able to shape technologies in ways that were not foreseen before by managers and designers. Therefore, technology becomes a sort of “negotiation arena” in which there are multiple perspectives involved (at least designers, managers and users) attempt to find, with more or less awareness, a shared interpretation on how a process must be organized. As [Star 99] mentions: “In studies we read of the actual practices of filling in death certificates, the distinctions made by the “designer” upstream did not mach the ways that attending doctors saw the world. We came to understand how the blanks on the forms were both etheropraxial (different practices according to region, local constrains, belief) and heteroglossial (inscribing different

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[1] CCTV stand for Closet Circuit Television Equipment

voices in the seemingly monotonous form)". In this sense technology, rather than a sort of straightforward solution, is conceived as a boundary object that mediates the perspectives and interests owned by different communities. Or, quoting [McLuhan 64], technology can be considered both a medium and a message.

Symbolic aspect of technology can shed light on new features affecting its success as the extent to which it is adaptable to social conventions and practices, its capacity to represent trajectories of membership, or its contribution in weakening or strengthen the actual distribution of power. More precisely, when technology embeds new working practices, the success of its adoption are to be explained as either a successful imposition of such new practices (people adapt to technology), or as a successful manipulation of technology done by users (technology adapts to people).

## **2 A structuration theory reading of KM technologies**

The structuration theory approach to technology brings us to some conclusions on how a technology impacts an organizational form. If a technology that has to manage a "matter" is rigid, that is to say it is unable to fit how the "matter" is actually managed through existing social structures, either it changes working practices or it remains unused. In the former case (rigid/success), success of technology seems to depend on unequal power in group' relations, so that one group (i.e. the management) can impose their view on communities of users. Such situation is more probable the more knowledge can be standardized, that is, the more the knowledge of users is not specific and, thus, cannot be used as a means for negotiation. This is probably the case of most SAP implementations, that where based upon the belief that work practices could be shaped according to a vertical organization of labour.

In the latter case (rigid/failure), some case studies on large and complex firms match the predictions of a structurationist approach to KM. In fact, the more knowledge owned by users is a specific and not easily substitutable resource, the more they can sabotage the system without incurring into a retorsion. In particular, in organizations whose knowledge assets are highly heterogeneous and distributed, as in the case of 3M [Stewart 97], or Andersen [Bonifacio, 00], centralized technologies are deserted by users in favour of often anarchic but distributed solutions.

On the other hand, a "malleable" technology, such as groupware [Hutchins 91, Orlikowski 92, Karsten 98, Ngwenyama 98], is structured by social practices thus displaying how, the "matter" is actually managed by people. That is, the adoption of technology will embed and represent the way in which the social context is actually organized. However, in this case one can not predict that efficient outcomes are granted in all situations by social conducts. In fact, if power relations can easily shape the way in which a KM tool is adopted, than inter-group performance may be affected either by conflicts or by prevailing interests. The analysis conducted by [Scheepers and Damsgaard 97] provides an interesting example of this in the realm of intranet technologies: "The intranet made cross-departmental information access possible. This contradicted domination structures that were drawn upon by some divisional manager (exercising control over departmental information resources). This explains the reaction by these managers that warned their staff about spending time at Web Week sessions and positioning the intranet as "nonsessional work"."

As a corollary, successful implementations are those in which technological adoption has been approached as a process of meaning negotiation between different parts and not as a mere implementation of a solution. The problematic aspect is that, due to the context specific effects, enduring adequate negotiations necessarily means taking in to account the embodied actions (individuals' identities) and the culturally embedded relationships (groups' stories).

### **3 Prescriptive consequences**

As an interpretative lens, structuration theory would tell us that KM technologies, rather than a vehicle of knowledge represent a knowledge themselves: in short, they embed epistemological assumptions on how knowledge should be managed. In this sense, for example, traditional centralized architectures assume that knowledge is a matter whose value lies in standardization and homogeneity [Bonifacio et al. 02a]. Such view is questionable since many authors have sustained a quite different reading of organizational epistemology: knowledge is a matter whose value lies in heterogeneity and distributedness (for a review see [Bonifacio 03]). As a consequence, from a distributed perspective, the successful implementation of a centralized architecture should be read as failure since it implies that the value of knowledge has been reduced through homogenisation and standardization. For example, it would mean that the number of alternative interpretations of the world, owned by different organizational communities of practice, has been reduced weakening the potential for innovation [Brown 91]. On the other hand, an unsuccessful implementation should be read as a success: the fact that organizational communities ignore the centralized system and instead each continues to use their local and practice base solutions, means that heterogeneity has been preserved. It is to say that, in decentralization, emerging lack of coordination among communities implies production of more resources for the organization. Consistently, we can assume that innovation depends on intra-organizational dynamics, more precisely, on capability to invest in sustaining sociocultural differences. For this reason, we believe, technology trends are clearly evolving towards "distributedness" (e.g. the internet, or P2P) rather than centralization (portals, knowledge bases, ontologies) [OVUM Report 02]. In particular, there are solutions that match a distributed approach to KM (DKM) emerging both in the business and in the research field [Bonifacio et al. 02b] [Boland 94]. From this perspective, we believe that a normative reading of KM technologies would lead us to the conclusion that KM systems should be designed adopting distributed architectures which are more easily able to represent the socially distributed nature of knowledge, exploiting, as a consequence, the value of innovation.

In process terms, a structuration theory perspective can provide us some useful insights on how KM systems should be designed and implemented. First of all, as proposed by J.S. Brown [Brown 02], designers should focus on designing technologies that, rather than embedding a KM practice that derives from their particular and often unsaid view, should provide a technology able to be co-designed by users themselves. A changed view of implementation process should be an "activity based design" in order to consider "how problems arise in everyday experience and how learning successfully occurs" [Clancey 95]. As a consequence,

KM technologies should be more similar to a concept of “meta-technology”, that is, a technology that allows users to design their own practice based solutions [Suchman 95]. In this sense the KM solution should be the outcome of an appropriation process in which users and managers negotiate a shared view on how knowledge should be organized. Concordantly with this view, some studies examining technology adoption demonstrate that IT acceptance increases when there’s user involvement during design and development. Acceptance depends on the possibility to match through inter-group communication expectations, requirements, and exploitations [McKeen et al. 94; Robey and Farrow 82]. In particular, approval happens when there’s no boundaries perceptions, that is, when users and designer share values [Burki and Hartwick 01; Gefen, Ridings 03].

Moreover, the co-designed solution would represent the “knowledge” of each community as far as the technological artefact would represent the reification of each community’s practice. From this perspective, a KM implementation appears as a process of producing a knowledge which is embedded in the practice based design of the KM solution itself.

#### **4 Conclusions**

According to a structuration theory approach, technology is better seen as a medium rather than a message. It vehicles the perspectives of different organizational actors on how a particular process or task should be done. In KM terms, in this paper we argue that technology is a knowledge itself for several reasons. If technology is malleable, its adoption will embed the knowledge of “how things should be done”, that is, it appears as the reification of existing work practices. In this sense, to share knowledge would imply the sharing of a technology. Moreover, in situations characterized by different “knowledges”, a successful implementation resembles a process of knowledge creation itself, since it implies a negotiation process involving different perspectives owned by different communities. Here, the KM project itself seems an act of “managing a knowledge” as far as a successful implementation would mean the creation of a new configuration of working practices. In short, the KM process would be the result.

In a broader sense, KM technologies imply some meta-knowledge, that is, a belief on how knowledge should be collectively created and shared. For example, centralized KM technologies assume knowledge as a matter that can be extracted from its social contexts, standardized, and controlled. On the other hand, distributed technologies view the process of knowledge creation as rooted in heterogeneity, and diversity. From the latter perspective, here adopted, we predict that in knowledge intensive firms, centralized platforms will fail in favour of often anarchic, spontaneous and local solutions. Moreover, the success of a centralized architecture would imply a failure in the management of knowledge; it would mean that standardization has succeeded, weakening the adaptability and the innovation capacity of the organization.

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