

# Knowledge Creation and the Web: Factors Indicating Why Some Intranets Succeed Where Others Fail

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In today's highly dynamic business environment, organizational creativity is one of the most important sources of competitive advantage. Although the unpredictability of creativity makes it difficult to plan for, it may still be possible to facilitate knowledge creation given that we understand what affects it. In this paper, seven enabling factors of organizational creativity are identified and discussed. These factors are then compared to the specific characteristics of intranet technology in order to find out when and how this environment may stimulate creativity. The conclusion is that intranets are most likely to contribute by providing a variety of information in dynamic and unpredictable environments. However, standard management literature instead unanimously prescribes organizational convergence as the default strategy for the modern manager. Our analysis suggests that this control approach not only conflicts with some of the creativity-enabling factors but also clashes with the fundamental principles underpinning the web. The organizational implication of the conclusion presented in this paper is that only in organizations where management has embraced an updated attitude towards information management, can the corporate intranet truly contribute to knowledge creation and creativity. Copyright © 2003 John Wiley & Sons, Ltd.

## INTRODUCTION

Organizations' ability to create new knowledge is regarded as a primary source of competitive advantage already today and increasingly so in the future, and finding ways to actively support the process of organizational knowledge creation is therefore an activity that should be prioritized. The works of scholars from a multitude of disciplines have suggested that access to a rich variety of information stimulates creativity (cf. Bawden, 1986; Kanter, 1988; Nonaka and Takeuchi, 1995). It further seems that new knowledge, in contrast to most organizations' desire to control and struc-

ture their information environments centrally, emerges from and thrives on the serendipitous mixing that occurs in more uncontrolled bottom-up settings. The World-Wide Web (hereafter the web) is an enormous source of such bottom-up provided, cross-disciplinary, and mostly uncontrolled information. When organizations adopt Internet technology to set up intranets, they have what seems to be a good foundation for knowledge creation. Intranets were indeed also quickly hailed as the ultimate solution to many organizational issues, including anything from dissemination of management vision to integration of seemingly incompatible computer systems (Scott, 1998). Although intranets have enthusiastically been implemented in fields as diverse as medicine, law, manufacturing, and education, the reports concerning actual business value have been largely anecdotal (Ryan and Martin, 1997). Instead, we receive reports of

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poor utilization and information feudalism that block information and knowledge sharing (cf. Newell *et al.*, 1999). Some of these conflicting views can probably be attributed to the fact that 'intranet' is a term with many associations and it has been used to include technologies such as Lotus Notes, E-mail, and file sharing in general. In this paper, when we speak of intranets and Internet, we focus entirely on the web-based part, i.e. services based on the hypertext transfer protocol (HTTP). This is explained further in section three.

Regarding the relationship between KM and information technology such as intranets, scholars have come to contradictory conclusions. On the one hand, representatives of the information system (IS) community claim that perhaps the most far-reaching impact on the organization an intranet can have is on the organizational knowledge-creation process (cf. Scott, 1998). On the other hand, from the field of organization science are heard voices suggesting that intranets are encouraging fission instead of integration and are in fact reinforcing existing barriers to knowledge sharing (Newell *et al.*, 1999). These seemingly conflicting views on the possibilities of the intranets call for a further investigation of the relationship between intranets and aspects of KM such as knowledge creation. This paper, therefore, describes an attempt to develop a framework for organizational knowledge creation and then use this theoretical base to examine the characteristics of intranet technology in order to understand the potentials of an intranet and under what conditions it can facilitate (or hinder) organizational knowledge creation.

The structure of this paper is as follows. In the next section, the author will outline seven enabling conditions for knowledge creation in an organizational context that are found in the literature. The following section, identifies and describes the characteristics of the intranet. Using that as a theoretical backdrop, the next section compares and evaluates the enabling factors with regard to intranets and in the penultimate section, we discuss the organizational implications of these relationships. The conclusions are summarized in the final section.

## ENABLING FACTORS FOR KNOWLEDGE CREATION

One very distinctive aspect of true creativity is that it tends to show up where it is least expected. Obviously, you may have creative meetings or brainstorming sessions where you sit down and produce innovative decisions or new solutions to known problems, but these are exploitations of

familiar concepts—you start with a given problem. Even when given 'creativity-boosting' methods such as brainstorming, lateral thinking, and guided visualization, it is (close to) impossible to come up with a truly new and creative idea out of sheer will-power. Unpredictable as it may be, creativity can still be promoted. Managing creativity is about raising the probability for creative acts to happen by stimulating the factors that works in favour of creativity (Robinson and Stern, 1998). We are now about to discuss seven of those factors found in the literature.

### No-preconceptions principle

Creativity incorporates a large element of surprise and the opportunity to innovate and the source of innovation are both uncertain and unpredictable (Kanter, 1988). It is therefore impossible to know in advance who will be involved in a creative act, what the act will be, when it will take place, or how it will occur. In their report on corporate creativity, Robinson and Stern (1998) refer to this condition as the 'no-preconceptions principle'. By presenting numerous examples of how violation of this principle have hampered corporate creativity: e.g. by appointing teams of 'creative' workers while excluding others equally likely to be creative (predicting who); by trying to control and steer the result of creativity (predicting what); or by establishing quotas for how many creative ideas to produce per month (predicting when), the authors claim the no-preconception principle to be fundamental to creativity.

### Autonomy

Planned actions can only take an organization in directions already anticipated. To reach the unexpected, companies must go beyond what is scheduled and put their trust in the unplanned actions that are often the results of user initiatives. Studies have shown that personal interests rather than official job descriptions are what governs much of the activity the regular employee choose to engage in during an ordinary day (Stenmark, 2001a). Companies should, therefore, allow and encourage their employees to take actions by promoting entrepreneurship. When frontline-employees are empowered to act *autonomously*, creativity is facilitated (Nonaka and Takeuchi, 1995).

### Serendipity

Many commentators have stressed the importance of serendipity as a creative-enhancing factor.

However, most authors over-emphasize the 'accident' part and overlook the equally important role of 'sagacity', i.e. the acute mental discernment that comes from being well prepared and having an aptitude for remembering details. The original, richer meaning of the word is more helpful when it comes to understanding creativity (Robinson and Stern, 1998, pp. 78–83). An accident can only result in a useful invention if someone is able to recognize its potential.

How, then, can companies stimulate and promote serendipity? Robinson and Stern (1998) suggest three approaches: First, increase the frequency with which potentially fortunate accidents can happen by encourage tinkering, experiments and empirical research work not as separate events but blended into the ordinary work. Second, increase the awareness of the accidents that do happen by paying attention to the unexpected and carefully examine exceptions to accepted schemes and inconsistencies within established theories. Third, and finally, increase the domain of sagacity by actively creating redundancy, i.e. an unused potential for change.

### **Diverse stimuli**

It is impossible to tell in advance what stimuli will spark an innovative idea since what stimulates one person may not even be noticeable to another. Trying to feed stimuli to the employees will, therefore, only have a limited effect on creativity and can in fact violate the no-preconceptions principle. Though taking off-target courses may increase serendipity, it does not necessarily provide the stimulus needed to set off creativity. By regularly hosting cross-functional meetings instead, encouraging contacts with customers and vendors, welcoming outside visitors, and supporting all sorts of other activities that expose the employees to new input, the organization can provide for their employees to receive stimuli whilst performing their ordinary work.

A long-known finding is that it seems that the most creative persons are those who spend more time with people who do not share their values and beliefs (Petz and Andrews, 1966), and it is remarkable how many scientists, who have made important contributions, have had wide and diversified interests, or have changed from one field or subject to another (Bawden, 1986).

### **Rich information provision**

Although information may be seen as yet one stimulus among many others, it has a more profound

importance. Bawden (1986) points out the importance of the preparedness that comes from being informed. The more information that has been assimilated the more likely it is that a happy accident will be recognized and utilized. Again, the information does not have to be restricted to facts closely related to the problem or task at hand. On the contrary, information apparently unrelated to the current problem seems to be particularly important for major conceptual breakthroughs. Bawden further advocates the unstructured reading of various sources of information in order to receive inspiration or accidentally run into new pieces of information. Such browsing may be seen either as purposive (in the sense that one is deliberately seeking information on a specific topic), capricious (in the sense that one searches randomly without having a particular goal), or exploratory (indicating that one is literally searching for inspiration) (Bawden, 1986).

### **Internal communication**

Although the importance of outside contacts as sources of diverse stimuli and rich information provision has been stressed earlier, internal communications is also vital to organizational creativity. When the people involved in information sharing all belong to the same organization, and thus can be expected to share certain objectives, there is a greater incentive to cooperate.

Traditionally, corporate communication channels were implemented to promote vertical information dissemination only. However, if only such official channels are used, people in different part of the organization will never interact. Fortunately, unofficial means of communication usually exist and companies need only more actively support activities and places where employees that normally do not work together can meet informally and share stimuli and ideas. By being aware of ongoing activities, the employees gain sufficient understanding of the capacity of the organization and are thus able to tap into the organization's resources. However, for such unanticipated cooperation to work, the company must adopt a policy that prioritizes internal information and knowledge sharing. All employees, including managers, must understand the importance of helping colleagues asking for advice (von Krogh, 1998), and all employees should have equal access to corporate information (Nonaka and Takeuchi, 1995).

### **Motivation**

It appears that when people are primarily motivated by their own interest in the work and the

enjoyment of that activity, they are more creative than they are when primarily driven by some goal imposed on them by others. The use of extrinsic motivation such as rewards or bonuses tend to cause a focus on the reward rather than on the task at hand, and winning the reward becomes more important than finding the most creative solution (Stenmark, 2000). Such suggestions are consistent with the findings that helped Amabile form what would become the cornerstone of the social psychology of creativity—the intrinsic motivation hypothesis (Amabile, 1983). Her latter book, supported by overwhelming empirical evidence, upgraded this initial hypothesis to a general law of human behaviour—the intrinsic motivation principle (Amabile *et al.*, 1996). Robinson and Stern (1998) also stress the importance of intrinsic motivation and point to the strong correlation between the use of intrinsic motivation and high participation in the improvement processes.

Rewarding creative work must be done skilfully since it presents a delicate balance between intrinsic and extrinsic motivation. The rewards should be used to recognize the competence or the work ability of the group or individual, and the reward should be used to motivate further work and not act as a bribe. Encouraging work-focused feedback (as opposed to person-focused feedback) and discouraging excessive initial critique of new ideas both foster a positive attitude towards creativity (Stenmark, 2000). By demonstrating that innovations and creativity are valued by communicating the potential of the work and accomplishments that have been made, intrinsically motivated user initiatives could be further propelled.

We have so far identified and described seven enabling conditions for corporate creativity and knowledge creation. The question now is if some or all of these can be facilitated and supported by a corporate intranet. The remainder of this paper is concerned with this relationship.

## TECHNICAL CHARACTERISTICS OF AN INTRANET

While the Internet emerged out of the ARPANET started in the late 1960s, intranets are the result of the growing number of companies beginning to run TCP/IP on their intra-organizational networks in the mid-1990s (Slevin, 2000). Although the Internet and the intranets alike host a number of different applications and services, the discussion in this paper is focused on the HyperText Transport Protocol (HTTP)-based service known as the web. The web was originally developed to be '*a pool of human*

*knowledge, which would allow collaborators in remote sites to share their ideas . . .*' (Berners-Lee *et al.*, 1994, p. 76). What propelled the creation of the web was Berners-Lee's observation that work and information flows were organized into hierarchical management structures while the actual interactions needed to get the job done showed more resemblance to a web of evolving interconnections. In his view, the traditional information systems in use did not model what went on in the real world (Slevin, 2000). Because of Berners-Lee's intentional design, the web differs in many important aspects from the information systems that reigned prior to 1990—a fact acknowledged by many commentators (cf. Lyytinen *et al.*, 1998; Damsgaard and Scheepers, 1999). From a technological point of view, the web has three unique features that distinguish it from other IS/IT environments, and there is a fourth aspect in which the intranet—on which we focus in this paper—differs from the Internet. This gives the intranet four distinctive characteristics; it is hyperlinked, networked, flexible, and organizationally bounded.

### Hyperlinked

The ability to create hyperlinks to other resources is perhaps the most significant feature of the web and something that allows it to transcend both printed media and other computer paradigms. The web was initially invented to allow scientists and researchers to communicate, collaborate, and exchange information in a transparent way. Much of this transparency is due to the hyperlink concept, which is partly responsible for the success of the web by providing easy access to documents (Baecker, 1993). Any object anywhere in the web may be easily addressed and thus likewise easily accessed. This 'superconnectivity' aspect enables single individuals as well as large organizations to distribute information equally easily (Turoff and Hiltz, 1998).

### Networked

The web obviously is highly networked in the sense that it is distributed both physically and in authority. The client/server architecture and the uniform resource locator (URL) allow information to be placed anywhere in the network, making the physical whereabouts of data transparent to the user. The web, being distributed and not relying on a single focal point, is thus always available although individual servers may be temporarily off-line. Further, there is no central management or predefined hierarchy structure, which means

that anyone can publish anything. Web users are, therefore, not restricted to be simply information consumers, but may almost as easily be information providers, publishing whatever they have to share.

**Flexible**

The web is a bottom-up driven technology, based entirely on open and publicly accessible standards. The access mechanism of the HTTP protocol enables anybody—even end-users—to develop add-ons, which in turn guarantees adaptivity and access to both proprietary formats and types not yet existing.

Web technology is malleable, also, in the sense that it is multi-purpose, unlike many other IS solutions such as, for example, payroll systems (Damsgaard and Scheepers, 1999). To function as a multi-purpose tool the web is not restricted to text only, but is instead very media-rich, allowing a variety of forms and formats including images as well as video and audio. The web does not require the installation of any proprietary products or protocols; a standard web browser and a TCP/IP connection are all that are needed. Information may then be displayed independently of network or server topology. The open standards, the in-place world-wide net, and the availability of open source and free-to-use software for both servers and clients make an intranet both a flexible and a relatively inexpensive implementation (Scott, 1998).

**Organizationally bounded**

In a strict *technical* sense, an intranet is a subset of the Internet, and, therefore, shares all of the above characteristics. In addition, the intranet is organizationally bounded and accessible only by users from within their own organization. This is an important factor from a KM perspective since it enables the organization to more freely share information not intended for competitors. Intranet users belonging

to the same organization can also be presumed to share certain objectives and, to a higher degree, subscribe to the same set of values and beliefs. Intranet users differ in these aspects from Internet citizens, and the intranet can be seen as providing a minimum level of coherence that is absent on the web as a whole.

**INTRANETS AND ORGANIZATIONAL KNOWLEDGE CREATION**

We shall now try to relate organizational knowledge creation and creativity as discussed above to the specific characteristics of an intranet to see where and under what circumstances an intranet may facilitate creativity. Unlike the framework suggested by Scott (1998), who uses Nonaka’s SECI model exclusively (cf. Nonaka and Takeuchi, 1995), the schema presented here has a broader base, and by paying attention also to the characteristics of an intranet, it adds further depth to our understanding of when and how intranets can be utilized.

Table 1 illustrates where the particular characteristics of an intranet do (checked intersections) and do not affect the enabling conditions, and below we shall discuss what aspects of organizational creativity an intranet is likely to be able to support. Although Table 1 only gives a crude and somewhat simplified view of the interrelationships between the different entities, it still provides a useful base for further discussion. Judging from Table 1, it seems the no-preconception principle and rich information provision are the aspects best matched by the characteristics of the intranet and these shall therefore be discussed first. Thereafter follows the aspects of serendipity, diverse stimuli, and internal communication.

**The no-preconception principle**

The no-preconception principle stipulates that it cannot be decided beforehand who will be

Table 1 Mapping enabling conditions and web characteristics

Intranet characteristics	Creativity-enabling factors						
	No-preconception principle	Autonomy	Serendipity	Diverse stimuli	Rich information provision	Internal communication	Motivation
Hyperlinked	✓		✓	✓	✓		
Networked	✓	✓	✓	✓	✓	✓	
Flexible	✓	✓	✓	✓	✓	✓	
Organizationally bounded	✓				✓	✓	

involved in a creative act, what the act will be, when it will take place, or how it will occur. It is, therefore, imperative that innovation and knowledge creation is not limited to a certain group of people, to a specific geographical location, or to a scheduled occasion. The uncertainty aspect of creativity that the no-preconceptions principle expresses, further suggests that static organizational and pre-defined information-related groupings can hinder creativity. While traditional information systems often relied on well-defined user domains and strictly enforced access control, the intranet architecture signals other values, and innovative organizations use intranets to quickly form groups based on common interests rather than on formal structures (Curry and Stancich, 2000).

Web technology affords a bottom-up approach to information dissemination and does not restrict publication rights to management functions only. The web does thereby acknowledge that anyone in the organization may have valuable information to share. The fact that this fundamental feature may have been disabled by company policies has nothing to do with the technology *per se*, but says more about the culture and the management mindset in the organization. Web-based information is not being pushed to the users in a predefined or centrally controlled manner. Instead, users interactively pull whatever information they find interesting or useful from wherever it may be published. By distributing responsibilities, not singling out any technical platform in particular, and allowing access to organizational members only so that otherwise sensitive information might be openly shared, the intranet can be said to honour the no-preconceptions principle.

### Rich information provision

Web technology provides at-your-fingertips accessibility to a variety of targeted as well as peripheral and speculative information, and the web can therefore be said to support rich information provision. The networked aspect makes documents and reports from departments in remote geographical locations as easy to access as the ones from the group next to you, and people who may never meet in person due to physical distance may meet in virtual 'team-rooms' and share thoughts and ideas electronically. Again, the flexibility and openness caters for a variety of information formats, ranging from static HTML homepages and PDF files, via chat functions to dynamically created news feeds and live broadcasts.

In traditional systems, information was targeted at a narrowly defined audiences in an attempt to

provide the right information to the right people at the right time. This model is now obsolete. In today's turbulent environment it is impossible to decide what information is relevant and/or to whom (Malhotra, 2000). Instead, *all* information is made available to *all* employees. For example, at Olivetti they see the intranet as an excellent tool to ensure that researchers have access to the largest possible amount of information (Scott, 1998). In such an environment even hypotheses not currently supported by either experimental evidence or theoretical frameworks may be published for discussion rather than as proven facts. Web-based forums dedicated to open exposure of embryo ideas and tentative solutions are examples of such initiative (cf. Stenmark, 2001b; 2002).

### Internal communication

Bottom-up IT environments such as the web help to blur the boundaries between formal and informal communication by offering support for lateral or horizontal information systems (Bawden, 1986). An intranet could, therefore, be an important tool for within-company communication, enabling peer-to-peer information sharing. The open architecture can further enhance within-company communication by connecting previously incompatible user communities (i.e. Mac, PC, and Unix users), thereby giving users access also to information from outside their suborganization. Since the web not only simplifies access to reading material but also enables decentralized information publishing at grass-root level, as any user can post information and thereby share his or her experiences. The fact that the intranet by definition is organizationally bounded and shielded from the outside world by security devices such as firewalls also enables more sensitive corporate information to be shared. This mechanism enabled Ford, for example, to use their intranet to link developers in Europe, Asia, and the US for the development of the 1996 Taurus (Cortese, 1996).

### Serendipity

By allowing tinkering, serendipity can be stimulated and the hyperlinked concept of the web enables the sort of casual browsing that gives the user easy access to cross-disciplinary and seemingly unrelated information that can help upset existing routines. Also the networked and flexible aspects of the web contribute to serendipity. The chance that an unexpected piece of information should cross your path increases on an intranet since web technology enables anyone to publish

anything, and the flexibility of the web further enables a cross-fertilization. This should increase awareness of exceptions and inconsistencies. The relative ease with which a potentially very large audience can be reached, attracts and encourages information providers from all kinds of fields, thereby increasing the domain of sagacity.

### Diverse stimuli

Although it is impossible to tell in advance what stimuli will spark an innovative idea, it is generally recognized that more and diversified stimuli increases the chances for creative ideas. The concept of hyperlinks makes the web a pull-oriented technology, which means that it does not try to deliver stimuli based on some pre-established rule. A networked technology such as the web can span geographical borders, allowing input from different cultures to mix and add to the variety of possible stimuli. By clicking on hyperlinks, the user effortlessly receives these inputs, which due to the flexibility and transparency of the web, can come in a variety of media formats, including images, video, and audio, thereby providing stimuli in many different shapes.

### Autonomy

For organizational members to act autonomously they must be empowered with decision-making rights and encouraged to engage in entrepreneurship. Such an approach opens for unexpected information needs and joint ventures between unforeseen parties. The networked architecture of the web supports such contacts and can therefore be said to support autonomy.

It can also be argued that the flexibility and openness of the web, which enables everyone to be a producer of both information and services, promotes autonomy.

## DISCUSSION

The two creativity-enabling conditions best matched by the specific characteristics of the intranet are the no-preconception principle and rich information provision. The values connoted by these two factors are unpredictability and diversity, respectively. However, although intranets may empower people to make things happen rather than to have things happen to them, web technology does not accomplish this in and of itself (Slevin, 2000). This becomes obvious when we look at how today's intranets have been implemen-

ted and managed, and note the discrepancy between theory and practice. Many intranets are little more than electronic bulletin boards, actual use is sporadic at best, and the technology is used primarily to share internal documents (cf. Lai and Mahapatra, 1998; Newell *et al.*, 1999). It is thus not surprising to see headlines such as 'Why do intranets fail?' (Duffy, 2001). However, as we have tried to put forward in this paper, intranet policies are separated from and should not be confused with the technology *per se*. Below we shall discuss in more depth the clash between technology characteristics and management policies, some emerging alternative approaches, and finally touch upon other remaining obstacles.

### The clash between new and old paradigms

While the World-Wide Web still can be said to maintain the principles outlined when originally designed, i.e. heterogeneity, non-centralization, distributed and remote access (Berners-Lee, 1989), the intranets have been subjected to the standardization and control urge that shaped organizations of the industrial age. Like the machines it produces, industry is most comfortable when there is stability, order, and control. This mechanistic management approach finds expression in the needs for control and measurement advocated by the management literature at large. In Ciborra's critical review of the literature on the management of corporate infrastructures, it is concluded that the centrality of control is one of the basic tenets. However, although most commentators prescribe increased control as the management strategy to follow, this advice does not fit with new degrees of complexity required in the post-modern organization, but is instead a result of single-loop learning (Ciborra, 2000, pp. 38–39).

In his studies, Ciborra has focused on management of infrastructure in general but it is obvious that the academic literature on intranets follows the path of careful alignment outlined by the management-infrastructure literature. For example, Hinrichs (1997) concludes that the ability to manage the intranet effectively is one of the most significant constraints to further development. Curry and Stancich (2000) similarly argue that intranets 'must be well managed and planned, not allowed to evolve merely in an *ad hoc* manner, which can too often be the case' (p. 250). Damsgaard and Scheepers (2000), also subscribe to this view, and claim that intranet content and use must be controlled via standardization and formalization. Unless procedures and routines are established and enforced, the intranet will collapse, they argue, and therefore

rationalisation and management control must be the superordinate goals.

However, in today's environment where rapid changes, uncertainty, and new challenges are integrated parts of the every-day work, creativity becomes even more important. The creation of new knowledge requires a different type of information system and, as described above, the web was deliberately designed to break with the reigning paradigm. Managerial efforts to force the intranet into the old IS mould therefore violate the principles upon which the web architecture rests.

### A new intranet management model

New technology must also be paired with an updated management approach. Research has showed that even when intranet technology is introduced to support existing power structures, during the course of the process subtle but nonetheless real attitude changes begin to occur (Cecez-Kecmanovic *et al.*, 1999). However, such changes take time and it seems plausible that organizations where an open attitude already exists can better leverage the technology. Management in an organization with a climate open to creativity is characterised by open-mindedness, respect for diversity, understanding of employees' point of view, appreciation of ideas, encouragement of proactivity, provision of feedback, and clarifying of objectives (Roffe, 1999). To be successful in terms of creativity and knowledge creation, a change of management style seems important.

To support creativity and knowledge creation in a dynamic and interlinked environment, companies should take a different approach to their intranets and abandon the traditional view more suited for stable situations. When the information environment is opened up, it allows the employees more room to be creative rather than merely fulfil duties (Slevin, 2000). It turns out that letting control go and not having an explicit owner can enable the intranet to flourish. The intranet at Anadarko Petroleum became a device for breaking free of hierarchies and stirring up innovative ideas when they allowed people to post personal content, engage in collaboration and create new ideas online (Anders, 2001). Similarly, when the director of technical communities at Schlumberger, Ltd., describes their intranet he says, 'It's fairly chaotic, and that's good' (Anders, 2001). However, is still rare to see management actively sponsoring such an approach, and one reason for this may be that top executives are not prepared for the cultural changes that an unleashed intranet may bring about. Intranets tend to flatten organizations by

the medium's ability to ignore and by-pass traditional and hierarchical communication channels, and although it may be politically correct to empower your employees by providing direct access to information, this has some radical implications that are not always appreciated by senior executives (Duffy, 2001).

### Remaining organizational hinders

There are intersections in Table 1 that are not checked, for example in the autonomy and motivation columns. This is not so say that intranets work *against* motivation and autonomy; instead, one interpretation is that the implementation of an intranet would *per se* not be enough to provide intrinsic motivation or inspire autonomous and self-initiated activities. However, people who are already motivated and acting autonomously may obviously still benefit from an intranet, since the technology does not in any way counteract such initiatives.

Much of what is discussed above thus requires a level of redundancy not often found in today's organization. Serendipity, and the chances of the 'happy accident' occurring or being detected, can, as we have seen above, be increased with a technology that allows casual browsing. However, in today's anorectic organizations there is little room for undirected 'surfing'—a fact that in the long run may seriously hamper creativity. As pointed out by Nonaka and Takeuchi, redundancy conflicts with the Western idea of efficiency (Nonaka and Takeuchi, 1995).

What also remains a major problem to solve, if companies adopt a more liberal information sharing policy, is the issue of information overload. If organizations are already experiencing information glut in controlled environments, imagine the situation should the information politics be less stringent. This problem is often marginalized or ignored by technology evangelists who promote the use of IT in KM-related work (cf. Scott, 1998). Though redundancy of information helps creativity, it also increases the risk of being flooded with useless information (Nonaka and Takeuchi, 1995). Acknowledging the importance of new managerial attitudes towards intranet use, technology still has a role to play. In addition to opportunities for browsing, large pools of information also need more sophisticated information retrieval (IR) tools. The personal nature of creativity must be supported by an equally personal approach to information retrieval. The power of future IR tools must be released to the end users, who are the ones doing the creative work. Without such tools,

intranets may never elevate themselves above the electronic bulletin board level.

## SUMMARY AND CONCLUSIONS

This paper refers to an attempt theoretically to examine when and how intranets can be useful in knowledge-management work. First, it presents a theoretical framework for organizational knowledge creation based on seven key factors found in the literature: the no-preconceptions principle; autonomy; serendipity; diverse stimuli; rich information provision; internal communication; and, finally, motivation.

Second, the paper points out the characteristics of the intranet as being hyperlinked, networked, flexible, and organizationally bounded. When pairing the seven factors for organizational creativity and knowledge creation with the four distinctive features of the intranet, it is concluded that unpredictability and diversity are the labels that best describe the most favourable IT environment for knowledge creation.

However, although intranet technology has the potential to support creativity, the way in which today's corporate intranets are implemented instead works against some of the fundamental principles behind creativity. The idea of strong management control that permeates management literature in general is present also in the intranet literature. When concerns about under-utilized intranets are raised, the medicine prescribed has always been that of tighter centralization and more stringent control. It has been argued in this paper that such conceptions not only clash with basic principles for creativity but also violates the ideas underpinning web technology.

Corporate intranets are likely to become useful knowledge creation environments only in organizations where the management dares to let go of its control desire and empower the organizational members to take a more active role in the design of the information landscape.

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