Social exchange for knowledge exchange

A paper based on doctoral research *Common knowledge: an exploration of social learning in distributed organisations*

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Hazel Hall
Senior Lecturer
School of Computing
Napier University
319 Colinton Road
Edinburgh
EH14 1DJ

E-mail: h.hall@napier.ac.uk
Web: http://www.bim.napier.ac.uk/esis/about_us/hazel.html

1 Introduction

1.1 Interest in issues related to motivating knowledge exchange

The factors that motivate people to codify and share knowledge for the benefit of others have been identified as a priority area for individual companies (Smith & Farquhar, 2000, p. 27). They represent the most commonly discussed topic amongst practitioners and academics at conferences on knowledge management (KM) (Prusak, 1999, p. 6) and highlight an important area for knowledge research (Holsthouse, 1998, p. 277). To some the encouragement of employees to contribute knowledge is more important than the issues related its capture, storage and dissemination (see for example Boisot & Griffiths, 1999).

While academics may theorise over the relative importance of motivating knowledge sharing, organisations need to find ways to encourage individuals, who have complete discretion over how they handle their knowledge assets, to use them for the benefit of the firm by sharing what they know openly and freely. They want to discourage knowledge hoarding – both wholesale and partial - and knowledge loss caused by employee departure. The sharing of information and knowledge is important to efforts in social learning. It is argued that with straightforward access to common resources employees can execute routine tasks quickly; they can aggregate previously disconnected pieces of information to facilitate innovation in working practices, product design or service delivery; and they can be liberated from the fear of losing important intellectual assets if valued colleagues leave the firm.

1.2 Doctoral research on motivating knowledge exchange

Doctoral research in this area can respond to corporate goals identified by earlier studies in KM and organisational learning. Cohen (1998), for example, refers to 100 knowledge projects, most of which had as one of their three main aims that of developing "a knowledge-intensive culture by encouraging and aggregating behaviors such as knowledge sharing (as opposed to hoarding) and pro-actively seeking and offering knowledge" (Cohen, 1998, p. 27). Similarly, a study of 431 US and European organisations cited "Changing people's behavior" as one of the biggest difficulties of KM (Ruggles, 1998, p. 87). It has also been argued that to date too much emphasis in KM research has been placed on tacit knowledge and the *individual* as opposed to *teams of individuals* working together. Since innovation driven by knowledge creation is achieved by groups there is a "need to examine more closely both tacit knowing and creativity as they are expressed by members of groups – singly and collectively" (Leonard & Sensiper, 1998, p. 115). A study of factors that motivate the codification and sharing of knowledge should consider those which influence both individual and group behaviours.

1.3 Scope of this paper

This paper draws on published studies to present detail on incentives for knowledge sharing as offered to individuals and to groups. Typically, these studies have tended to focus on barriers to knowledge sharing, rather than enabling factors (Homburg & Meijer, 2001, p. 1). The review findings presented here highlight incentives for knowledge sharing set against a discussion of social exchange theory. The incentives range from direct employee rewards to enabling conditions such as systems, project structures or the cultural environment within firms (Von Krogh, 1998, p. 136). Also examined in this paper is the appropriateness of each type of incentive as far as it is discussed in the literature. The material reviewed to date is drawn from the academic disciplines of business studies, information science, information systems, organisational science, psychology, strategic management and sociology. It includes a number of recent case studies which serve to illustrate how incentives for knowledge sharing act in practice. The case studies cited most frequently in this paper are shown in Table 1.

Table 1: Recent case studies which discuss incentives to knowledge share

Case	Focus	Reference
Scott Paper and Champion International	Comparison of incentive systems to bring about change in organisations	Beer & Nohria, 2000
Scottish Enterprise	Use of space as a factor for innovation and KM	Bruce, 2000
Toyota motor component suppliers	Creation and management of knowledge sharing over a network of firms	Dyer & Nobeoka, 2000
Academics in a university	Determinants for the use of collaborative technologies for information sharing	Jarvenpaa & Staples, 2000
Distributed technical support staff at a university	Efforts of geographically distributed teams to knowledge share	Sawyer, Eschenfelder, & Heckman, 2000
Schlumberger	KM practice	Smith & Farquhar, 2000
Three technical computer newsgroups	Understanding what motivates people to codify knowledge to help others	Wasko & Faraj, 2000

This paper is derived from PhD research undertaken at Napier University and sponsored by KPMG.

2 Theoretical framework of the doctoral research

2.1 Exchange theory

This research project draws upon exchange theory for its theoretical framework. Exchange theory derives from economics' rational choice theory and the study of relationships and "exchanges". It argues that individuals evaluate alternative courses of action so that they get best value at lowest cost from any transaction completed. There are various forms of exchange theory, but all have in common the same analytical concepts and assumptions as summarised in Table 2.

Table 2: Analytical concepts and assumptions of exchange theories

Concept	Assumptions
Exchange actors	• individuals or corporate groups such as a company • can be particular people, for example a named friend • can be an interchangeable holder of a structural position, for example, the chief knowledge officer of a company
Exchange resources	• the currency of exchange • may be tangible or intangible • may be perceived as gifts • when given to another the exchange resource is known as a *cost* • when received, or produced as a result, the exchange resource is known as an *outcome*
Exchange structures	• dependent relationships that support the exchange
Exchange processes	• interactions required to conduct an exchange • comprise exchange opportunities followed up by exchange transactions (negotiated or reciprocal) • may lead to an exchange relation when there is a series of exchanges between parties

(Detail derived from Molm, 2001, pp. 260-262.)

2.2 Social exchange theory

2.2.1 The development of social exchange theory and emerging perspectives

In particular, the doctoral work undertaken seeks to examine knowledge sharing incentives with reference to *social* exchange theory. The analytical concepts and assumptions shown in Table 2 are valid in social life where people (actors) can only obtain what they need and value (resources) through dependent relationships with others (structures).

It is explained that "the philosophical roots of social exchange begin with the assumptions of utilitarian economics, broaden to include the cultural and structural forces emphasized by classical anthropologists, and enter sociology after further input and modification from behavioral psychology" (Molm, 2001, p. 262). The various disciplines of sociology, microeconomics, behavioural psychology and anthropology have developed "flavours" of social exchange theory "in the extent to which they assume a 'rational actor model', derived from microeconomics, or a 'learning model', adopted from behavioral psychology" (Molm, 2001, p. 261). Each shows a different degree of interest in the three specific exchange structures: (1) direct exchange where two actors are dependent on one another; (2) generalised exchange where there are more than two actors and reciprocal dependence is indirect; and (3) productive exchange where both actors must participate in order to benefit, for example in co-authoring a book (Molm, 2001, p. 261). One significant aspect in which social exchange theory differs from classical microeconomic theories is that long-term relationships are of interest, whereas the microeconomic theories were developed on the assumption that exchanges take place between people who do not know one another (Molm, 2001, p. 260). For example, early anthropological exchange theorists were particularly interested in generalised exchange (Molm, 2001, p. 261). Original social exchange theory did not take into account information or knowledge as an exchange resource (Jarvenpaa & Staples, 2000, p.132).

Early work describes social exchange in the form of gift giving. In 1950 Mauss discussed the obligations and expectations of the exchange - giving, receiving and repaying - as a group activity in non-Western cultures (Mauss, 1990 translation). In a "gift economy" to exchange gifts is a moral obligation. In the foreword to the 1990 translation of Mauss' *Essai sur le don*

Douglas explains that there "are no free gifts: gift cycles engage persons in permanent commitments that articulate dominant institutions" (Mauss, 1990 translation, p. ix). Even if "people do things for one another out of a spirit of building something between them, rather than spreadsheet calculated quid pro quo" (Rheingold, 1993, p. 59) gifts are still visible and subject to scrutiny (Mauss, 1990 translation, p. xiv).

In the 1970s Ekeh took up the themes discussed by Mauss pointing at the encouragement of social cohesion through social exchange:

> "Every social exchange transaction creates social bonds that not only tie one person to another and to society but one segment of society to another… the morality of exchange comes to be recognized in its own right and individuals behave in conformity to it in their social and economic activities… such morality of social action [is not] restricted to "primitive" societies. It informs social action in modern society… it is a fundamental morality that is gained from social exchange processes and it is common to all societies" (Ekeh, 1974, pp. 32-33).

Since the 1970s the themes of power (including bargaining, reward and punishment power) and explaining structural change through the examination of the structure of relations - including coalitions and seeking alternative partners (Molm, 2001, p. 260) - have become dominant in sociologists' interests in social exchange theory (Molm, 2001, p. 270). Much of this research (for example Janssen, 2000) refers back to the work of Blau (1964). Some theorists have devised experiments to predict social exchange activity and its impact under a range of conditions (particularly with reference to power relationships). Others have used social exchange theory as a starting point for examining related areas such as commitment, trust and affective ties (Molm, 2001, p. 270), for example Nooteboom (1996). Research on the link between leadership and empowerment in the workplace (Keller & Dansereau, 1995) or power over corporate governance (Westphal & Azajac, 1997) might also be cited as examples of work related to these dominant themes.

Emerging perspectives on social exchange theory identified by Molm (2001) include:

- risk and uncertainty inherent in exchange (particularly generalised exchange and reciprocal exchange)
- trust and commitment
- the emergence of affective ties between exchange partners and their ability to transform the structure and form of exchange
- the relation between structure and agency
- the production of structural change
- how change affects interactions
- how structural history of a network influences its current impact
- exchange relations of multiple value
- developmental stages in exchange relations

2.2.2 Social exchange theory and knowledge sharing

Work that alludes to social exchange theory, yet does not treat information or knowledge sharing as one it main themes, may still touch on these aspects. For example, investigations on the relationship between job demands and innovative work behaviour in the domain of organisational psychology discusses knowledge sharing since knowledge sharing contributes to innovation processes (Janssen, 2000). Similarly a study of two types of social exchange, namely "perceived organisational support" and "leader-member exchange", in which the relationships between employees and their organisations, and employees and their supervisors are considered, treats information as one of the exchange resources of the relationships (Wayne et al., 1997). Marketing academics have used social exchange theory to analyse processes that encourage and inhibit word-of-mouth information flows (Frenzen & Nakamoto, 1993).

Some researchers, most notably from the disciplines of management and organisational studies, have also started to look more closely at knowledge sharing with reference to social

exchange theory. For example, Nahapiet & Ghoshal (1998) argue that exchange is one of two processes that result in the creation of all new resources (paragraph 30). The other is combination, for which exchange is a pre-requisite (Nahapiet & Ghoshal, 1998, paragraph 32). The discuss the certain conditions need to be satisfied for exchange and combination to take place, namely that:

(1) "the opportunity exists to make the combination or exchange" (Nahapiet & Ghoshal, 1998, paragraph 37),
(2) "those parties must expect such deployment to create value" (Nahapiet & Ghoshal, 1998, paragraph 38);
(3) "those involved must feel that their engagement in the knowledge exchange and combination will be worth their while" (Nahapiet & Ghoshal, 1998, paragraph 39).

This matches the analytical concepts and assumptions described in Table 2 where (1) above relates to *exchange processes* and (2) and (3) relate to *exchange resources*.

Nahapiet & Ghoshal (1998) also discuss the concept of the knowledge market. A knowledge market exists where knowledge sellers work out whether it is worth sharing their knowledge with a knowledge buyer. Knowledge buyers work out whether they are able to offer something in exchange such as help in the future. In this knowledge market exchanges make social capital as well as intellectual capital: "social capital is created and sustained through exchange… social capital facilitates exchange" (Nahapiet & Ghoshal, 1998, paragraph 41).

Research by Constant et al., published in the information systems literature in 1994, refers explicitly to social exchange theory, advocating support for an exchange and expressive theory of information sharing. Their goal was to understand the factors that encourage and inhibit information sharing in organisations that make extensive use of technology. Their work has recently been extended from an information systems perspective by Jarvenpaa & Staples (2000), who consider in greater detail contextual aspects of information and knowledge sharing such as the information culture of organisations and task interdependence of individuals. In their recent paper they express surprise that few others have built on Constant et al.'s work. They explain that they found "very few articles that make reference to the Constant et al.'s theory of information sharing and have been unable to locate any substantive extensions to the work" (Jarvenpaa & Staples, 2000, p. 148). A search on the ISI citation databases on 30th March 2001 revealed nine instances of Constant et al.'s paper being cited. Given that this listing included Jarvenpaa and Staples' own work, as well as three other papers published in 2000, it is likely that when Jarvenpaa and Staples were conducting their literature search and review they would only have had knowledge of the five earlier papers published between 1996 and 1998. It is claimed that the "Constant et al. theory is an important piece of work that has yet to receive the attention that it deserves in information and knowledge management literature" (Jarvenpaa & Staples, 2000, p. 148).

2.2.3 Social exchange theory and information science

The previous sections have demonstrated that social exchange theory has served as backdrop to research in a number of subject area domains. However, as is the case with the discipline of information systems, it would appear that social exchange theory has not yet been discussed widely, nor explicitly, in the context of information science.

It is believed, however, that although research in information science is not generally situated with social exchange theory, it is a discipline that addresses issues of relevance to its concepts and assumptions. For example, studies of scholarly communication represent it as a social process where actors share information and have social relationships through research communities and invisible colleges (Borgman, 2000, p. 144). Equally research on the processes of scholarship consider how and *why* scholars publish (Meadows, 1998). Similarly citation analysis refers to the social connectivity of researchers and its impact on the development of knowledge bases. Aspects of these relationships, such as trust as a basis for co-operative work (Davenport & Cronin, 2000), it might be argued, depend to a degree on social exchange.

There is a body of research by information scientists on information sharing across networks. One of the best known researchers in this area is Haythornthwaite who "addresses information exchange in computer-mediated environments – who talks to whom about what and via which media – and how these information exchange support or constrain group activities such as accomplishing work goals, achieving community, and engaging in the co-construction of knowledge" (Haythornthwaite, no date, paragraph 1). She uses a social network approach which "considers the *interactions* (social network "*relations*") that occur between people as the building blocks that determine social behavior. It is not an individual's behavior, but rather their behavior with others that is the important unit of analysis. Thus to understand how people work together, form communities or gain access to information, it is necessary to examine the types of interactions they engage in. The interactions show us patterns, and the patterns reveal how social groups organize themselves to accomplish certain goals" (Haythornthwaite, no date, paragraph 2).

Scholarly acknowledgement has been observed in the information science literature as a form of gift giving: "we might think of gift giving and reciprocation in the context of scholarly communication as being modulated by social relations" (Cronin, 1995, p. 107). Acknowledgements are gifts given in recognition of earlier gifts of help (Cronin, 1995, p. 18). Cronin (1995) also demonstrates how collaborative working in the research environment is motivated by the expectation of "exchange" as summarised in Table 3.

Table 3: Motives for collaboration: a summary

access:	to special equipment or facilities to special skills to unique materials (e.g. chemical compounds) to visibility Recognition
efficiency in:	use of time use of labour
to gain experience	
to train researchers	
to sponsor a protégé	
to increase productivity	
to multiply proficiencies (thereby increasing access to source of support, visibility, recognition)	
to surmount intellectual isolation	
need for additional confirmation of evaluation of a problem	
need for stimulation or cross-fertilization	
spatial propinquity	
accident (serendipity)	

Source: (Cronin, 1995, p.7).

Other reasons for collaboration include accessing sources of funding (often this is a requirement of research bids) (Cronin, 1995, p. 8) and because it is only possible to progress research in particular areas by collaborative disciplines, e.g. biotechnology (Cronin, 1995, p. 7). Although not stating it explicitly, Cronin describes exchange processes where there are actors (collaborative researchers) in exchange relationships (predominantly direct and and/or productive) who exchange resources.

More recently a study of knowledge sharing across distributed computing support staff at a university presented in a publication of the American Society for Information Science and Technology (Sawyer et al., 2000) has made direct reference to social exchange theory, and also to the work of Constant et al. (1994) described above.

3 Resources of exchange in knowledge markets

If it is assumed that knowledge is a private good then it is up to the owner of that good to decide whether to share it or not. To entice people to share their knowledge, in terms of a social exchange transaction, these *actors* need to be persuaded it is worth entering into a *transaction* in exchange for some kind of *resource*. Boisot & Griffiths (1999) explain that "the capture of knowledge involves more than simply making it easier for employees to articulate their idiosyncratic experiences and know how. It involves creating an incentive structure making it worth their while to do so" (Boisot & Griffiths, 1999, p. 662).

Resources of exchange in knowledge markets can be described in a number of ways. Mauss (1990) saw them as gifts:

> "The producer who carries on exchange feels once more – he has always felt it, but this time he does so acutely – that he is exchanging more than a product of hours of working time, but that he is giving something of himself – his time, his life. Thus he wishes to be rewarded, even if only moderately, for this gift. To refuse him this reward is to make him become idle or less productive"
>
> (Mauss, 1990 translation, p. 77).

Coleman (1990) visualises a repayment system where obligations are represented as credits to be traded between individuals. There must be an exchange at some point, otherwise donors will withdraw their participation: they will not support free-riders (Dyer & Nobeoka, 2000, p. 349; Weisband et al., 1995, p. 194).

For the purposes of this paper the rewards have been classified as explicit/hard rewards and soft rewards. It should be noted that the majority of papers cited in this section make no reference to social exchange theory.

3.1 Explicit/hard rewards for social exchange in knowledge markets

It is argued that organisations should explicitly offer to repay individuals who engage in knowledge sharing activity (Samitt, 1999, p.50; Van der Spek & Kingma, c2000, p.27). The reward might be in the form of a "hard" tangible benefit, such as enhanced pay, stock options or a bonus. Examples of individual companies which explicitly reward knowledge sharing by awarding explicit/hard rewards are shown in Table 4.

3.1.1 Economic rewards as exchange resource

Perhaps the most obvious explicit reward systems for knowledge sharing are those which involve economic incentives such as increased pay, or bonuses in the forms of cash or stock options. Systems for awarding economic rewards for knowledge sharing are not necessarily tied to financial indicators such as increased revenue or stock values. Beer & Nohria (2000) highlight companies that work on commitment-based contracts with their employees. Such incentives might include a skills-based pay system and shared rewards in order to pull all workers into a shared community of purpose. The idea is that individuals are motivated through commitment, and pay is used as a fair exchange.

3.1.2 Access to information and knowledge as exchange resource

Another tangible reward of participating in knowledge-sharing ventures is access to the information and knowledge shared by the other contributors. There is "the expectation being that one will get valuable knowledge in return for giving it… you need to contribute knowledge to become part of the knowledge networks on which your success depends" (Cohen, 1998, p.31). The quality of the informal information accessed in this way is often regarded as superior in industry (Hall, 1994) and has been proved to be valuable in the generation of research ideas (Cronin, 1995, p.6).

Examples from the cases cited in Table 4 each demonstrate that individuals in a knowledge sharing group have access to “the collectively-owned capital, a ‘credential’ which entitles them to credit, in the various senses of the word” (Bourdieu, 1986, p. 249) through their shared ties. In addition *privileged* access to information and opportunities can be obtained through “weak ties” (Granovetter, 1973) and “friends of friends” (Boissevain, 1974; Nahapiet & Ghoshal, 1998, paragraph 6) in this knowledge market.

3.1.3 Career advancement/security as exchange resource

Career advancement can be tied to various factors, including the extent to which individuals hoard or share their expertise (Von Krogh, 1998, p.140.) With specific reference to the building of online knowledge tools it has been suggested that in some circumstances workers might actually sabotage systems over fears of job security (Davenport & Klahr, 1998, p.206). For this reason firms use career advancement as an explicit reward for knowledge sharing. An individual’s performance, as well as the act of helping other colleagues to perform well, is acknowledged.

Table 4: Examples of explicit/hard rewards for social exchange in knowledge markets

Exchange resource		Source
Economic rewards	*Scott Paper:* financial incentives, e.g. increased pay, bonuses, stock options	Beer & Nohria, 2000, p. 137
	IBM: bonus split between knowledge originator and knowledge user *Knowlton International*: beenz currency bonuses in "knowledge economy methodology"	Berry, 2000, p.45-46
	Toyota component suppliers: cost savings and increased profits through collaborative knowledge sharing	Dyer & Nobeoka, 2000, p. 359
Access to information and knowledge	*Toyota component suppliers*: production related knowledge made available to any member of the network	Dyer & Nobeoka, 2000, p. 358
	Inter-company collaborations: expectation of resultant faster innovation; internal expertise and learning capabilities can be benchmarked against those of collaborator firms	Powell, 1998, p. 230-231
	Schlumberger: "because team members can see [information sharing] advantages for themselves they are motivated to contribute"	Smith & Farquhar, 2000, p. 24
	News groups and mailing lists: anticipation of help	Wasko & Faraj, 2000
Career advancement and/or security	*McKinsey and Andersen Consulting*: partnerships awarded on the basis of votes from colleagues who value co-operation over an ability to compete	Hargadon, 1998, p. 255
	Toyota component suppliers: expectation of future work from Toyota	Dyer & Nobeoka, 2000, p. 363
	Cable and Wireless: web author skills set positioned as desirable; consideration of including intranet responsibilities in employee objectives linked with incentives	Milner, 2000

3.2 Soft rewards for social exchange in knowledge markets

Alternatively employees can win "reward" in more subtle ways, for example in enjoying the personal satisfaction of holding membership of a thriving knowledge-sharing community. Some rewards are more appropriate for individuals than for groups and vice versa. Examples

of individual companies which reward knowledge sharing by awarding soft rewards are shown in Table 5.

3.2.1 Enhanced reputation as a resource for social exchange

A human obsession with reputation and status lies behind an important "soft" reward for knowledge sharing: acknowledgement from peers (Nowak & Sigmund, 2000, p. 819). Reputation can be "given" by a higher status actor to another of lower status through the act of collaboration in academic work (Beaver & Rosen, 1978. p. 69) and in business both at the level of the firm (Powell, 1998, p. 231) and that of the individual (Berry, 2000, p. 45). Since career progression depends to some extent on reputation, providing rewards that promote reputation might be seen as a more subtle flavour of the explicit reward of career advancement/security as discussed above.

3.2.2 Personal satisfaction as a resource for social exchange

For KM initiatives to succeed it is argued that they should be designed to contribute to employee satisfaction (Van der Spek & Kingma, c2000, p. 21.) It has to be acknowledged that some people simply gain pleasure as result of demonstrating their own altruistic and pro-social behaviour, and often also enjoy seeing the positive results of their efforts (Rioux, 2000, p. 71-72; Wasko & Faraj, 2000, p. 166).

Table 5: Examples of soft rewards for social exchange in knowledge markets

Exchange resource	Examples	Source
Enhanced reputation	*News groups and mailing lists*: possibility of raising the reputation of the profession as well as individuals; individual reputation building seen as long term	Wasko & Faraj, 2000, p. 168
	IDEO: engineer describes the benefits of spreading about knowledge and skills as higher visibility and winning the reputation of being an attractive work colleague	Hargadon, 1998
	Drug development: the more emphasis that was placed on staff publications and external reputation the faster the rate of new products to market	Henderson & Cockburn, 1994
	Distributed technical support staff at a university: a member of staff "worked very hard to post "impressive" answers to questions posted to the listerv… the goal was to increase the amount of respect the Central IT specialists had for him so that they would be more attentive to his help requests in the future"	Sawyer et al., 2000, p. 197
	Unilever: flattery used to entice people to work together for project work	Von Krogh, 1998, p.147
	Schlumberger: contributors to the intranet "news" pages are recognised for their efforts in having their name highlighted in the text	Smith & Farquhar, 2000, p. 24
	Informal information sharing on the web: sharing gives individuals an opportunity to demonstrate their prowess	Rioux, 2000, p.72

Table 5: Examples of soft rewards for social exchange in knowledge markets (contd)

Exchange resource	Examples	Source
Personal satisfaction	*McKinsey*: pride of Rapid Response Team in meeting requests within 24 hours	Hargadon, 1998, p.222
	Informal information sharing on the web: sharing gives individuals a feeling of satisfaction	Rioux, 2000, pp. 71-72
	News groups and mailing lists: sharing gives a individuals a feeling of satisfaction	Wasko & Faraj, 2000, p. 166
	Wagon Wheel Bar in Silicon Valley: "knowledge trading operates according to the logic of gift than commercial exchange" and "professional commitment [of staff from competitor firms] to solving technical problems is greater than their commitment to their employers"	Boisot & Griffiths, 1999, pp. 663-664

4 Organisational factors as conditions for exchange

Exchanges take place under certain enabling conditions. A number of studies refer to the encouragement of knowledge-sharing with particular emphasis on strategies to change people's behaviour (for example, Cohen, 1998; Constant et al 1994; Ruggles, 1998) rather than extrinsic reward systems: "[s]ystems based on extrinsic rewards quickly turn moral obligation into acts of self-interest, and could potentially destroy the open provision of knowledge in a community" (Wasko & Faraj, 2000, p. 170). The environments believed to be most conducive to aggregating desirable behaviour are identified as those that:

- make knowledge sharing as an explicit responsibility
- encourage experimentation
- value all contributions, regardless of the originator's status
- promote communities for knowledge sharing
- furnish employees with appropriate information and communication technology (ICT) tools

Unlike the earlier examples, they do not rely on straightforward reciprocity of individuals trading knowledge as a private good. Rather, they provide conditions in which knowledge can begin to be regarded as a *public* good. In these circumstances exchanges are motivated by moral obligation and community interest, rather than self-interest (Wasko & Faraj, 2000, p. 155). Aspects of each of these types of organisational incentive are discussed below.

4.1 Knowledge sharing as an explicit responsibility

It has been argued that knowledge sharing is more likely to be encouraged in employees who know that this is a requirement of their jobs and that to knowledge share is an entirely legitimate activity (Bruce, 2000; Constant et al., 1994, p. 401; Davenport, 1997, p. 207; Davenport & Klahr, 1998, p. 207; Liedtka et al, 1997, p. 54; O'Dell & Jackson Grayson, 1998, p.157; Sawyer et al., 2000, p. 201). There should be two main responsibilities for the individual: (1) to acquire expertise and (2) to disseminate it (Von Krogh, 1998, p.144). Encouragement and formalisation of knowledge sharing activity can be generated through various activities as shown in Table 6.

Table 6: Making knowledge sharing an explicit responsibility - means

Means of making knowledge sharing an explicit responsibility	Discussed by:
Organise pro-active training and project debriefings	Von Krogh, 1998, p.145
Lead by example	Davenport, 1997, p. 101; Smith & Farquhar, 2000, p. 27-28
Provide mentoring and assisting	Leonard & Sensiper, 1998, p.123
Demonstrate senior management buy-in, particularly with reference to measuring the ultimate value of knowledge sharing activity	Savinson, 2000; Smith & Farquhar, 2000, p.27
Set time aside specifically for people to learn, share and help one another: "unless capturing and sharing information are built into the work processes, sharing will not happen"	O'Dell & Jackson Grayson, 1998, p.157

Examples of this in particular organisations are shown in Table 7.

Table 7: Making knowledge sharing an explicit responsibility – case study examples

Case study example	Discussed by:
General Electric: using the negative terms of "stealing" and "copying", taking the ideas of others is, perversely, legitimised	Joachim, 2000, p. 44
Distributed technical support staff at a university: group members are not *obliged* to share knowledge with one another and this accounts in part for the lack of knowledge sharing within the group	Sawyer et al., 2000, p. 194
Citibank: not until the company assigned employees the responsibility of entering content on a particular database did the knowledge-base begin to grow	O'Dell & Jackson Grayson, 1998, p.164

4.2 Experimentation as a legitimate activity

Risk taking is very important to organisations hoping to create new knowledge since "distinctly new knowledge comes from experimenting" (Fahey & Prusak, 1998, p. 272). Often organisations are constrained by established standardised approaches to collecting and structuring data, and to transferring information. This results in an emphasis on simply refining and sharpening what is already known (Fahey & Prusak, 1998, p. 272). Employees retreat into purely analytical modes of operating with "such strong preferences for analysis over intuition that no one dares offer an idea without "hard facts" to back it up" (Leonard & Sensiper, 1998, p.126). Permission to experiment at the local level is therefore important.

In environments that sanction experimentation there is "greater openness to the potential for value creation through exchange" (Nahapiet & Ghoshal, 1998, paragraph 63). For example, Sawyer et al. (2000) demonstrate that where trust is strong, participants in knowledge sharing exchange relationships are more willing to expose themselves and ask questions in "clique markets" built on trust. They explain that "[c]lique markets are private markets in which all parties have such credibility that all exchanges occur without hesitation. The seller automatically assumes that the buyer will reciprocate at some point in the future" (Sawyer et al., 2000, p. 196).

Experimentation can be encouraged by various means as shown in Table 8.

Table 8: Experimentation as a legitimate activity

Organisations should:	View supported by:
Support local initiatives even if they are not completely in line company policy	Van der Spek & Kingma, c2000, p. 27
Permit failure, should this be an outcome of experimental work	Beer & Nohria, 2000; Leonard & Sensiper, 1998, p. 126; Van der Spek & Kingma, c2000 p. 33
Provide autonomy so that people are able to step out of their designated roles as they wish in the pursuit of new knowledge	Merali, c2000, p. 86; Nonaka, 1994, p. 18; Von Krogh, 1998, p. 141.
Provide genuine opportunities for free dialogue	Nonaka, 1994, p. 25
[In online environments] provide anonymity in the to encourage people to put forward controversial ideas	Stephenson & Davies, c2000
Promote success stories related to the business results of knowledge sharing	Van der Spek & Kingma, c2000, p. 28
Promote novel business models, such as franchised team working, which can encourage individuals to test out new ways of working whilst offering a degree of support	Allan & Ward, c2000, p. 94-5
Create environments where trust is strong	Sawyer et al., 2000, p. 196

With respect to status, several studies have found that computer mediated exchanges lower social inhibitions and barriers to communication (Weisband et al., 1995, paragraph 3, paragraph 66). However, Weisband et al's study showed that conducting interactions online (as opposed to face-to-face) did not automatically result in participants regarding one another as equals, nor treating their contributions as of equal status (Weisband et al., 1995). Indeed, in some cases wrongly attributed status led to the stereotyping of participants according to the believed characteristics of the mistaken identity. The study makes several suggestions on how to maximise information sharing in an online environment. Masking status is one strategy since status similarity is positively related to knowledge sharing (Cohen & Zhou, 1991) and equal exchanges (Mauss, 1990 translation, p. 83). Particular recommendations are made for online environments. For example it is concluded that "an organization seeking to be "flat" and to emphasize cooperation should probably not use an electronic mail program whose headers include names and organizational position" (Weisband et al., 1995, paragraph 69).

4.3 Environments that value all contributions, regardless of the originator's status

Early work by Levi-Strauss on social exchange theory and reciprocal relationships identified that generalised exchanges operate when the actors hold equal status (Levi-Strauss, 1969). The problems of undue regard to status in this context are discussed in more recent work, for example Leonard & Sensiper (1998). Organisations need to play down the idea that the higher the status of an individual the more valuable their knowledge is. If this message can be spread widely, those who would normally be too shy to contribute, or to seek out the knowledge of others due to the shame of exhibiting their ignorance, may respond by sharing their questions and answers (Hargadon, 1998, p. 225; Wasko & Faraj, 2000). The conditions need to be such that potential knowledge sharers know that "in a knowledge-based community everybody is a contributor and knows something useful" (Merali, c2000, p. 86).

4.4 Communities

Explicit reward systems, and organisational strategies to encourage knowledge sharing, may be considered as deliberate managerial interventions. Individuals are meant to respond to the requirements of their posts and may be rewarded or chastised accordingly by supervisors who watch the activities of their charges. Snowden (c2000), however, argues that this is an

outdated way of managing staff. He quotes Drucker: “In the knowledge economy all staff are volunteers, but our managers are trained to manage conscripts” (Snowden, c2000, p. 9).

To enhance knowledge sharing staff need to be managed differently as teams working in *communities* that operate under certain environmental conditions (Snowden, c1998, p. 14). A number of authors discuss the significance of the “community of practice” as an organisational form that is driven in part by the desire to share expertise by interested and passionate participants (Davenport & Hall, 2001 in press). Merali (c2000) lists the requirements for a self-organising community to develop. When individuals are encouraged to share knowledge in communities the barriers to knowledge transfer witnessed in cultures that value *personal* technical expertise and knowledge creation (as described by O'Dell & Jackson Grayson, 1998, p. 157 and Von Krogh, 1998, p.136) are weakened (Jarvenpaa & Staples, 2000, p. 132).

Communities can promote strong ties (Galegher et al, 1990; Hansen, 1999, paragraph 14; Snowden, c1998, p.14; Wellman & Wortley, 1990) and social capital (such as shared norms, obligations, trust and identity) within groups to provide the important environmental conditions for knowledge exchange (Constant et al., 1994; Liedtka et al., 1997, p. 56; Nahapiet & Ghoshal, 1998; Nonaka, 1994, p. 24; Wasko & Faraj, 2000, p. 170). Wayne et al. (1997) point out the relevance of this to social exchange theory: “[f]ollowing social exchange theory… [e]mployees who feel that they have been well supported by their organizations tend to reciprocate by performing better and engaging more readily in citizenship behavior” (p. 90) (where knowledge sharing might be included as an aspect of “good citizenship”). These conditions in turn support commercial achievement: for example, at an American law firm an emphasis on social norms of openness and teamwork, loyalty to the company and cooperation between staff was deemed key to business success (Starbuck, 1992).

The role of communities in creating shared identity, fostering commitment/obligation and co-dependence and supporting social interaction to create conditions for knowledge exchange is discussed below.

4.4.1 Communities and shared identity

Shared identity is particularly important in the creation of strong co-operative communities (Dyer & Nobeoka, 2000, p. 352; Kogut & Zander, 1996; Nahapiet & Ghoshal, 1998, paragraph 68; Westphal & Azajac, 1997, p. 177). Identity derives from individuals or teams having a common purpose so that they choose to commit themselves to the aspirations of the knowledge-based community and each becomes an invaluable resource for the group (Merali, c2000, p.82). They have “concern for collective processes and outcomes, thus increasing the chances that the opportunity for exchange will be recognized. Identification, therefore, acts as a resource for influencing both the anticipation of value to be achieved through combination and exchange and the motivation to combine and exchange knowledge” (Nahapiet & Ghoshal, 1998, paragraph 68). The actual frequency of cooperation may grow over time as the perceived opportunities for exchange are made more visible (Nahapiet & Ghoshal, 1998, paragraph 68). These points are illustrated by the Toyota network case study, in that the network comprises companies with a common identity and purpose (Dyer & Nobeoka, 2000, p. 352 and p. 357).

It should be noted, however, that whilst strong shared identity can enhance knowledge sharing, the knowledge that is shared may not be of the highest quality and “the strong norms and mutual identification that may exert a powerful positive influence on group performance can… limit its openness to information and to alternative ways of doing things, producing forms of collective blindness that sometimes have disastrous consequences” (Nahapiet & Ghoshal, 1998, paragraph 14). Strong community identity, then, can compromise the creation of intellectual capital, in that this is a process is reliant on diversity (Leonard-Barton, 1995). For example, weakly tied individuals are more likely to have more varied network connections and thus may find it easier to search and identify knowledge on a number of topics. They can share the results of these searches. However, it may be more difficult for them to respond for requests for high-level help and thus contribute a valued degree of exchange (Hansen, 1999, paragraph 14). Hansen’s (1999) research on strong and weak ties concluded that each has

"respective strengths and weaknesses in facilitating search for and transfer of useful knowledge across organization subunits… Strong interunit ties provide the highest relative net effect (or least negative effect on completion time) when the knowledge is highly complex, whereas weak interunit ties have the strongest positive effect on completion time when the knowledge is not complex" (Hansen, 1999, paragraph 77).

4.4.2 Communities and shared commitment/obligation and co-dependence

Participants understand that the viability of their community depends on their commitment to it. This is "embodied in the willingness of individuals to share information and knowledge with other members of the community" (Merali, c2000, p. 81). If no contributions are made the results are drastic: the community will not live. However, each time that someone contributes to knowledge sharing the outcome not only increases common knowledge based on the contribution, but also the trust amongst community members increases. As trust increases more participants become willing to share and so further contributions will be made (Nahapiet & Ghoshal, 1998, paragraph 41): "trust breeds cooperation, and cooperation itself breeds trust" (Nahapiet & Ghoshal, 1998, paragraph 64). The giving and receiving of trust is in itself an act of sharing where individual parties are willing to make themselves vulnerable because they believe in the "good intent and concern of the exchange partners… their confidence and capability.. their reliability… and … belief in their perceived openness (Nahapiet & Ghoshal, 1998 paragraph 62). Dyer and Nobeoka (2000) note that firm trust sets up relationships characterised by mutual causality which applies equally to group identity, "both a cause, and a consequence, of collective learning processes" (Dyer & Nobeoka, 2000, p. 352). Thus a further incentive to contribute in a community is the expectation of stronger relationships with partners and access to higher quality knowledge in the future.

The debate in the literature as to how far a community should extend is pertinent to the question of vitality. In the case of an online community, it is argued that there must be controls on membership so that expertise is not diluted by those of marginal use to the community as a whole (Snowden, c2000, p. 13; Wasko & Faraj, 2000, p. 169). However, those at the margins, such as lurkers on a listserv, can later become integrated into the main group, bringing fresh ideas: "People learn by taking a position on the periphery of skilled practice and being allowed… move slowly into the community and the practice involved" (Brown & Duguid, 1998, p. 107).

Community members who are meshed together in relationships of co-dependency reach the point of knowledge sharing sooner than those who operate more independently (Constant et al., 1994; Hansen, 1999, paragraph 18). In the community setting each originator of high quality knowledge recognises the threshold at which it makes sense to publish. This is determined to an extent by peer pressure: "I codify at the point where the socialisation pressure of the ecology forces me to volunteer my knowledge" (Snowden, c2000, p. 16.).

4.4.3 Communities and support for social interaction

In any environment knowledge sharing depends on social interaction. It is argued that the easier it is for individuals to interact socially the more likely that interactions - both social and directly work-related – will take place. This is particularly important for the sharing high-value or high-risk information: "When information is judged to be free of moral hazard, transmitters ignore the characteristics of the social tie and freely share the information. But, when information is judged to present a hazard, transmitters adopt exchange rules appropriate to the social relation" (Frenzen & Nakamoto, 1993, p. 373).

Rioux's work highlights the strength of friendship of those who willingly share information found on the Web for others (Rioux, 2000). Personal friendships allow a degree of "free-riding" - although it could be argued that maintaining a friendship is the exchange provided here. This is illustrated in the study of distributed technical staff: "The unwritten rules that you should only ask a question if you have tried really hard to answer it yourself, or that you should only ask easily answerable questions, did not seem to apply in these special relationships" (Sawyer et al., 2000, p. 196). Relationships that go back a long way in time are

important: in science formal collaborations may derive from long-held personal ties (Powell, 1998, p. 235).

Citing the work of Lawler & Yoon (1993, 1996), Molm points out that "frequent, successful negotiations between two actors produce positive emotions that are attributed, in part, to the relationship itself". She adds that "when relationships become objects that are valued in their own right, they take on characteristics of 'productive exchange'; that is, the benefits each actor obtains from exchange are based partly on what they jointly contribute to their collective good (productive exchange). Those benefits include not only the original domains of extrinsic value, but new, emergent domains of intrinsic value" (Molm, 2001, p. 269).

Table 9 summarises how ease of social interaction can be achieved.

Table 9: Means of achieving social interaction

Organisations should:	Advocated by:	Example:
Provide clear rules on the operation of the community	Dyer & Nobeoka, 2000, p. 364	The Toyota network publishes clear rules for the community participants (Dyer & Nobeoka, 2000, p. 364).
Make provisions for shared cognition	Nahapiet & Ghoshal, 1998, paragraph 10	Provision of a common framework of language for the classification of information to enable "diverse units to talk to each other more effectively about their business problems" (O'Dell & Jackson Grayson, 1998, p. 165)
Encourage social events for staff – when individuals enjoy social relationships with their colleagues they find it easier to share knowledge on serious issues	Von Krogh, 1998, p. 145	The Toyota suppliers association has a PR/sports committee to encourage friendships to develop (Dyer & Nobeoka, 2000, p. 353)
Co-locate staff[1]	Allen, 1984; Kraut et al., 1990	
Provide opportunities for colleagues to create shared history in order to develop "prior relationship" histories	Krackhardt, 1992	

4.5 Provision of information and communication technologies (ICT)

Computer hardware and software vendors promote a variety of products for KM applications (Hall, 2001 in press). Of these, intranets are identified most readily as key platforms for knowledge sharing and as tools for formalising distributed cognition (Jarvenpaa & Staples, 2000, p. 130). The potential benefits of intranet implementation are well known and discussed widely by commentators in business and computing (for example, Smith & Newman, 2000), as well as in associated domains such as information science (for example, Hall & Jones, 2000). Leidner (2000) highlights that the "application of IT to KM assumes that experts in the firm, if located by someone in need of knowledge, will readily share knowledge with intrafirm

[1] It is recognised that electronic virtual communities are essential in some disciplines, for example, biotechnology where multiple authorship of research papers is common (Zucker et al., 1996; Powell, 1998, p. 233), and it is technically possible for people to telecommute from just about anywhere. However, "experience suggests that knowledge workers still want and need to work and live in close proximity… the clustering of high-tech work in Silicon Valley and the Northeast [provide] evidence that face-to-face relationships are still the only truly effective way to transfer tacit knowledge" (Cohen, 1998, p. 37). Certain knowledge-transfer activities which rely on factors such as observation or awareness of body language can not be achieved remotely (Holsthouse, 1998, p. 277-8). This would, for instance, apply to brainstorming (Leonard & Sensiper, 1998, p. 118) or in cases where there is potential for misunderstanding (O'Dell & Jackson Grayson, 1998, p. 157).

strangers" (Leidner, 2000, p. 103). Earlier studies of organisations introducing ICT to encourage knowledge sharing have proved that this is not straightforward (for example Newell et al., 1999; Orlikowski, 1996). Providing the facilities is only part of the story. This section discusses ease of use, usefulness of action and critical mass as factors to encourage knowledge sharing with specific reference to online facilities.

4.5.1 Ease of use and the usefulness of action

In general individuals are motivated to act when (a) it is easy to do so and (b) the usefulness of acting is obvious (Snowden, c2000, p.10). These factors of convenience and perceived potential benefit are by no means unique to organisational learning, but applicable in much of everyday human activity. Examples to illustrate these factors with reference to knowledge sharing are outlined below. Whether it is easy (or not) to knowledge share depends on the method by which potential contributors contribute. In the case of online systems the interface presented to potential contributors is important: "sharing should … be higher when the technology attributes and conditions decrease the psychological costs of sharing (e.g. user friendly systems)" (Jarvenpaa & Staples, 2000, p. 131, summarising Constant et al, 1994).

The broad theme of "ease of use" can be extended to argue that tools for knowledge sharing should be integrated into communities to match the levels of formality operated in the work groups that they serve (Wasko & Faraj, 2000). If this advice is not heeded in systems design, contributions to the knowledge bases held on intranets will lose the opportunity to provide information derived from socially-embedded, and often the more valuable and unique, know-how of colleagues. This problem is compounded if the organisation seeks to "control" the use of electronic media (Boland & Tenkasi, 1995, p. 359; Brown & Duguid, 1998, p.106; Newell et al, 1999, section 4; Orlikowski et al., 1995, p. 424; Scheepers & Damsgaard, 1997, p. 16). Local control – in terms of content, branding and location and use of shared resources - is important to establish and maintain identity[2] (see 4.4.1 above).

4.5.2 Critical mass

The importance of developing critical mass to motivate knowledge sharing is well illustrated by efforts with intranet development. One way of convincing employees of the usefulness of an intranet is to use it as the *sole* platform for certain applications (Lamb, 1999, section 5.1). Another is to promote the credibility of sources made available by recognising and publishing the names of contributors (Smith & Farquhar, 2000, p. 29) (as well as doing so to promote reputation as described above).

Some companies have discovered that they need to introduce new systems slowly. At the Chevron Corporation, for example, a partial intranet solution was created for sharing information on good practices. This was instigated after the failure of a scheme where people were expected to record their experience online. It was felt that really important and useful information for improvement is actually too complex to put online so the solution was to provide a pointer database that would allow users to identify potentially helpful individuals named on the system and encourage follow-up off-line (O'Dell & Jackson Grayson, 1998, p.164). This recognises that multiple contexts are required for the creation of a knowledge market for exchanges and acknowledges work earlier work in KM on the "shareability" of knowledge (Nonaka, 1994, p.20).

5 Conclusion

From this review of the literature it can be concluded that a number of incentives motivate knowledge sharing. These fall into two broad categories: (1) straightforward reward systems and (2) organisational factors. Firms may use a combination of these factors in their efforts towards organisational learning, and may vary them according to the firm's current activities.

[2] In a more recent study it was discovered that heavy information users and sharers prefer structured information flows. It is suggested that this is because they require reliable access to information and knowledge of others (Jarvenpaa & Staples, 2000, p. 129).

Financial incentives achieve faster short-term results and are therefore useful to get projects started (Beer & Nohria, 2000), whereas community building is seen as ultimately having a more significant long term beneficial effect (Constant et al., 1994; Janssen, 2000, p. 287; Snowden, c2000; Wasko & Faraj, 2000, p. 162).

The conditions for sharing need to be managed. For example, ease of access to resources - a determinant of creation mass - is important to participants who expect to trade their own input for that of others. When career progression and reputation building are seen as potential rewards for sharing, online systems such as intranets need to make obvious resource ownership, protection and management in terms of the control, location and branding of content. This is because exchanges, like gifts, are subject to scrutiny (Mauss, 1990 translation, p. xiv) and systems of incentives need to be seen to be fair (Dyer & Nobeoka, 2000, p. 348; Miles et al., 1998, p. 286; O'Dell & Jackson Grayson, 1998, p. 164; Von Krogh, 1998, p.142; Wasko & Faraj, 2000).

The incentives need to be presented not only to encourage people to share information, but also to share *valuable* information. The danger is that individuals may appear to be contributing *something*, but what is not being contributed is more significant. This may be unintentional on the part of individuals, perhaps due to the environment in which they are situated (Von Krogh, 1998, p. 143) or deliberate (Dyer & Nobeoka, 2000, p. 348). According to the literature reviewed this would appear to be more significant when reward systems are in operation (Leonard & Sensiper, 1998, p. 123; Von Krogh, 1998, p.142). It is also important that the incentives for knowledge sharing match the spirit of what is to be achieved (Sawyer et al., 2000, p.184). This is illustrated in case studies where employees are encouraged to buy into the idea of a culture of knowledge sharing even though this is at odds with the practice of rewarding individuals for their personal knowledge (for example, Newell et al., 1999, section 2.5; Orlikowski, 1996).

It is proposed that incentives for knowledge sharing, as described in this paper, might be considered as currencies of social exchange. Further development of this work will be to devise a methodology to research individual actors, and groups of actors, in a large multinational organisation to examine how such currencies are handled. It is hoped that conclusions on the applicability of social exchange theory to KM and the domain of information science might result from the investigation, thus addressing some of the emerging perspectives identified in section 2.2.1 of this paper.

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