Opportunity and risk in social computing environments

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Contents

1. Abstract

This report discusses the main findings of a pilot study that set out to establish the main risks and opportunities of the adoption of social computing tools within organizations for collaborative work purposes as perceived by information and knowledge management professionals. The output of the research project reveals that the business environment is in a period of evolution with regards to information infrastructures and, as a consequence, levels of adoption of social computing tools vary from organization to organization. Although not all participants in the study currently have access to these tools in the workplace, they are largely enthusiastic about their potential, particularly with regards to how they may improve knowledge and information sharing in support of collaborative work. Of the available tools, wikis are regarded as the most important. The greatest organizational risks associated with these tools, as perceived by study participants, relate to how they are integrated into the business. Partial/non-adoption or poor implementation raise most fears. Means of maintaining easy access to information resources and information governance issues are also a concern. A number of training needs have been identified, ranging from the requirement for individuals to become familiar with social computing tools at a basic introductory level, to provision that will allow knowledge and information professionals to influence how implementations are managed.

2. Acknowledgements

3. Introduction to the report

This report concerns the output of a research project on social computing tools in work environments conducted jointly by TFPL and Napier University June to August 2008. The main aim of the research was to establish the main risks and opportunities of the adoption of such tools within organizations for collaborative work purposes as perceived by information and knowledge management professionals. As well as being of general interest to TFPL's client-base, it was anticipated that the output of the project would inform future developments of TFPL's training and consultancy portfolio. In addition, it was expected that the study would serve as a pilot to identify key areas for future investigation and the feasibility of undertaking a larger, externally-funded piece of joint research conducted by the Napier-TFPL partnership.

In this work the term "social computing tools" refers two categories of technology applications. The first encompasses formal collaborative work platforms such as SharePoint (Microsoft), Lotus Notes and Quickplace (IBM) and eRooms (Documentum) implemented and controlled the organization. As well as these licensed systems, general employee use of freely-available consumer applications such as "mature" social software applications (for example instant messaging, blogs and wikis) and newer Web 2.0 applications (for example, social networking and microblogging) were also considered within the scope of the research project.

The main content of the project report starts with a summary of the desk research conducted prior to the design of data collection tools for the field-work. After this there follows a statement on the research methods deployed. The project findings, drawn primarily from the output of a web-based survey and illustrated with detail collected from focus groups and interviews, are then presented. These are organised according to the broad themes of opportunity and risk, with discussion of the implications of the findings. The report ends with discussion and conclusions on the main findings of the study.

4. Opportunity and risk in social computing environments: background

Recent mainstream media attention in social computing tools has raised awareness of major applications such as blogging. In some cases this is to the extent that particular brand names are more commonly understood and than the generic label for the tool. For example, "Facebook" has entered everyday vocabulary more easily than the term "social networking". Published journalistic comment tends to keep a narrow focus on freely-available social software for personal use, with much of the "news" content concerned with risk of tool adoption amongst vulnerable groups such as children. In contrast, the organizational impact of these tools - including licensed systems - in the business environment is rarely considered in the press.

Of the limited academic and practitioner literature on the deployment of social computing there are more studies available on the longer-established social software tools such as blogs, wikis, and instant messaging than there are on the newer Web 2.0 applications such as social networking. Much of this concentrates on educational environments. Of the research accounts on corporate use of social computing tools, most material is available on blogging and wikis with the focus tending towards discussion of the role of the technology with reference to external relationships, such the effectiveness of blogging for the purposes of public relations (PR). To date, opportunity and risk of social computing in collaborative work practice within organizational environments has not been examined in detail. Nor has this theme been considered from the perspective of information and knowledge professionals. Taking these factors together indicates that there is an opportunity for this project to make a contribution to the debate on the value of social computing tools in business environments.

As preparation for the main data collection exercise literature on the research themes was identified and reviewed. The output of this, as summarised in below, informed the design of the web-based survey. The output of the desk research also influenced the preparation of the focus group activities and the schedules for the telephone interviews.

Table 1: Identification of data requirements from literature review findings

Key research question	Literature review states	Questions to address in the design of the web-based survey
What are the main *opportunities* of the adoption of social computing tools in online collaborative work environments?	*Collaboration* is enhanced through improvements in knowledge and information sharing, more tightly-networked employees, widened communication channels.	What have been the *anticipated* benefits of tool adoption – in general, by tool? What have been the *actual* benefits of tool adoption – in general, by tool?
	Information management practice is enhanced through improved access to a set of larger, shared resources.	
	Productivity is enhanced through reduced reliance on e-mail, new approaches to targeted sales, marketing and PR activities.	
	Organizational culture is enhanced through the promotion of an open environment of shared ownership of organisational resources.	
What are the main *risks* of the adoption of social computing tools in online collaborative work environments?	*Information management* practice is put at risk due to difficulties in archiving and accessing information from social computing exchanges.	What have been the *anticipated* risks of tool adoption – in general, by tool? Which of these risks have *actually materialised* – in general, by tool? Do the participant organizations regulate/police use of these tools, for example review all blog postings prior to publication, monitor staff use of external social networking sites? Have the participant organizations issued published guidelines on the use of tools?
	Security risks include possible legal infringement, corporate disrepute, leakage of confidential information, identity theft.	
	Productivity risk, particularly when staff are permitted to access external social networking sites.	
	Risk of *anti-social behaviour* such as bullying, harassment and exclusion, or vandalism/sabotage of sources.	

Key research question	Literature review states	Questions to address in the design of the web-based survey
Which themes related to social computing would merit further investigation following the completion of the pilot study?	There is a lack of published research literature on the newer Web 2.0 tools, such as social networking.	Which under-explored themes are of particular interest to the participant organizations?
	There is a lack of published research literature on social computing as deployed by business organizations in general.	
	There is a lack of published literature on social computing for internal organizational purposes in particular.	
What is the extent of social computing tool deployment, and is it possible to make comparisons by sector?	(Not applicable: this research question was required to gather data for the framing of the research results.)	To what extent have participant organizations adopted social computing tools? What is the level of uptake of each tool? What is the main function of each tool? In which sector do respondents operate?

A full account of the research methods deployed for the study follows in section 5 below.

5. Project research methodology

5.1 Project stages

The project was undertaken in four main stages: (1) desk research; (2) field-work; (3) data analysis and (4) writing up. The completion of the desk research and formulation of the findings in the form of a literature review (as summarised in 4 above) was achieved in project weeks 1-2. The output of the literature review informed the design of the web-based survey in project weeks 3 and 4. Following piloting of the survey and modification of questions in response to suggestions, the main web-based survey went live in week 5. Two further data sets were assembled from the capture of discussions at two focus groups, and fourteen follow-up telephone interviews with volunteers who had also completed the web-based survey. The stages are summarised in Table 2.

Table 2: Project stages

Project stage	Activity	Weeks
Desk research	Literature search and review	1-2
Field work	Design of web-based survey Sample selection	3-4
	Data collection from web-based survey	5-7
	Focus groups	7-8
	Interviews	8
Data analysis	Quantitative data analysis	8-9
	Qualitative data analysis	10-12
Writing up	Completion of project report	10-12

5.2 Data collection and analysis

The four main data collection exercises are summarised in Table 3.

Table 3: Data sets

Data set	Data derived from	Focus of questioning and recording of data	Date	Participation
1	Web-based survey	Questions posed on: uptake of social computing tools within the respondents' organizations; governance of tools implemented; individual attitudes to risks and opportunities of social computing; identification of the main challenges of social computing tools; demographic data. Quantitative data was processed using Excel; qualitative data was coded up and analysed manually.	Survey "open" in weeks beginning 7th and 14th July 2008	57 usable survey returns
2	Focus group London	Participants were informed of the preliminary results from the web-based survey and then invited to discuss and report back on the main risks, challenges and opportunities posed by social computing tools. The output of the focus group discussions was recorded by the project team in Word files for later qualitative data analysis, and edited versions of these were posted to the public TFPL blog. Aspects of the discussions have been integrated into this project report under the main themes as derived from the analysis of web-based survey data.	Wednesday 23rd July 2008	13 individuals
3	Focus group Glasgow		Thursday 31st July 2008	12 individuals
4	Follow-up telephone interviews	Those working in organizations that had already implemented social computing tools were asked to relate their experience, e.g. why the decision was made for implementation, the anticipated and realised outcomes of the implementation. Those in organizations where implementation had not taken place were asked to discuss reasons why. In cases where implementation was imminent plans for implementation were discussed with reference to the themes of risk and opportunity. Individual interviewers made interview notes in Word files for later qualitative data analysis. Where appropriate findings from the interviews form part of this report according to the main themes as derived from the analysis of web-based survey data.	Week beginning 28th July 2008	14 individuals

It should be noted that it was possible for individuals to make more than one contribution to the research. For example, all interviewees completed the survey. In total approximately 80 individuals provided input to the project. They were all UK contacts of TFPL, either directly or through association with the Scottish Information Network

(SIN). With the exception of the Scottish contacts, those invited to contribute to the project were known to have an interest in social computing tools, for example as demonstrated by recent involvement in a TFPL SharePoint summit.

The demographic data collected from the web-based survey revealed that the majority (59%[1]) of respondents work for public sector organizations. 33% are based in private companies, with 7% from the voluntary sector and 3% from professional associations. The membership composition of the focus groups also showed a large participation rate from public sector workers (17 of the 25 participants), with the remainder coming from private companies (7) and the voluntary sector (1). Only amongst the interviewees was there greater input from the private sector. Eight of the fourteen interviewees are from the private sector, with four public sector participants and one representative each for the voluntary sector and professional associations. It should be borne in mind therefore that the findings related in this report may be biased towards perceptions and practice of information and knowledge managers from UK public sector organizations. In addition, the survey data revealed that the median number of staff where social computing tools have been implemented is 725. Thus, the findings are based, in the main, on data collected from information and knowledge professionals from large organizations.

As well as providing an opportunity for TFPL contacts to supply data on established social computing tool applications in their workplace, the survey was open to those working in organizations that do not (yet) have such an implementation. In practice over one third of survey respondents (35%) have had no experience of the use of social computing tools in their current workplace. Similarly, not all focus group participants have access to social computing tools at work. It should be recognized that some findings presented in this report are based on attitudes towards social computing gleaned from outside the work environment, rather than from within it.

Also of note in the report of this study is the survey response rate. This was low at 11% (57 returns from 525 invitations to participate). This may be accounted for by the timing of the call to participate in the study. The call went live at a time when a high proportion of contacts were away on holiday, and the survey remained open for a limited period only. Despite the disappointing return rate, however, the care that was taken in the design of the web–based survey has repaid in the provision of high quality submissions and - together with the data collected from the other three exercises – has provided a solid base from which the project findings were derived. However, one drawback of the low return rate is that, in most instances for data analysis, the numbers are not large enough to make strong comparisons across sectors. Where it is appropriate to make inferences of this nature, these are given in the report, but this has not been possible across the range of themes examined in this work.

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[1] For ease of interpretation percentages are used throughout the report to present the findings from the analysis of quantitative data from the web-based survey. In some cases percentages do not add up to exactly 100. This is due to rounding of the figures.

6. Main project findings

6.1 Nature of uptake of social computing tools within project participant organizations

When reviewing the project findings it is important to bear in mind that uptake of social computing tools is not universal in the workplace of all the study participants. In addition, comments on the web-based survey returns expressed by individuals where implementations have already been made reveal that these are still immature. Almost two thirds of the survey respondents who opted to provide additional information in the free-text comment box at the end of the survey took this as an opportunity to explain that although their organizations have an interest in social computing tools and have made initial steps towards implementation, the impacts of these initiatives are yet to be felt. Similarly, the number of survey respondents who opted for "neutral" and "don't know" responses when giving their opinion on statements that invited them to show levels of agreement[2] was higher than was anticipated at the research design stage of the project. The interviewees were also often cautious in drawing firm conclusions on the nature of uptake of social computing tools within their organizations, arguing that it is perhaps too early to make a judgment. For example, one private sector interviewee suggested that it would be more worthwhile to make an assessment eighteen months hence (i.e. early 2010). It can thus be concluded that organizations are experiencing a period of change in the management of technical infrastructures that support their business activities. This finding is indicative of the timeliness of this investigation as a pilot study.

Of survey respondents who have had practical experience of social computing tools in the workplace, the majority operate in an environment where freely-available consumer applications are deployed alongside formal licensed tools (57.7%). In 31.7% of the organizations there is just a formal online collaborative work platform, and in the remaining 11.5% the only social computing tools in use are consumer applications. In just over half the organizations surveyed (55%) the information and knowledge management staff have been involved in the decision-making processes related to the implementation of social computing tools.

In terms of *access* to these tools, in the majority of organizations covered by this study most staff are permitted to use them: 77.5% of respondents reported access levels above 75%, with apparent greater levels in public and voluntary sector organizations (80% and 100% respectively). Equally, restricting individual access to the tools, for example according to staff grade or expertise, appears be practice in a limited number of cases (24%). Where this applies, restrictions are made according to a varied range of criteria from those related to actual policy decisions (for example grade of staff, level of computing expertise, and the nature of work undertaken) to practical considerations such as whether or not the staff in question have Internet access from wherever they are working. In 40% of the organizations represented by the survey sample activity on social computing tools is known to be formally regulated or policed.

Of those who expressed an opinion, just over a quarter (26.5%) survey respondents considered encouragement to adopt the social computing tools made available within their organizations to be high. A further 32.4% identified it as "moderate". The majority of respondents (41.2%), however, noted that it was low. When the data collected on this theme is examined in detail, it appears that private sector organizations are less enthusiastic than their public sector counterparts: 50% of private sector respondents noted that encouragement was "low" as contrasted with 35% of public sector respondents. These general low levels of encouragement may account for the uptake of particular tools, identified by the majority as "low" for wikis, instant messaging, blogging and microblogging. Only in the case of social networking applications did the majority consider their uptake to be "moderate" or "high".

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[2] For example, question 3.1.8 "The deployment of social computing tools cuts down organizational reliance on e-mail".

The relative penetration and usage of each tool is also of interest here. Analysis of the survey data on the *availability* of each tool ranks them as:

1. wikis (87.8%)

2. blogging (80%)

3. social networking (73.4%)

4. instant messaging (61.8%)

5. microblogging (17%)

Reconsideration of data in answer to the same set of survey questions in terms of *degree of usage*, with the exception of microblogging[3], the rankings switch:

1. social networking: 68% moderate or high usage

2. instant messaging: 47.6% moderate or high usage

3. wikis: 42.9% moderate or high usage

4. blogging: 35.7 moderate or high usage

5. microblogging: 29.4% moderate usage (no references high usage).

From the analysis of two of the open survey questions[4] it is also possible to relate the *relative value* of each of the top four rated applications as related to the *support and hindrance of collaboration*. When asked from a "positive" point of view ("support collaboration best") wikis were most frequently identified (15 respondents), then blogs (7), instant messaging (6) and social networking (3). The position of wikis was maintained when the same question was posed from the opposite perspective ("support collaboration least"). However, in this case most complaints (5) referred to blogging. This was on the grounds that blogs are being used for purposes other than collaborative working, for example, for individuals to express personal opinion and/or trivia, or for external communications. Instant messaging and social networking applications attracted the same number of comments (3 each). The main issue with social networking is its highly social nature and the temptation for employees to deploy it solely for chatter that is irrelevant to work. The main drawback of instant messaging is that it may discourage employees from speaking to people in person - for example face-to-face, or by telephone – and thus lower opportunities for collaborative work. It should be noted, however, that two of the allusions to instant messaging concern the way that it has been implemented rather than the tool per se: in one organization it is simply regarded as another e-mail channel, and in another it has limited use due to firewall restrictions necessary in a highly fragmented public sector organization. For this reason it is regarded more highly than social networking as a tool for supporting collaborative work in the analysis of the responses to the request for survey participants to identify tools that "support collaboration least".

A number of conclusions can be drawn from these findings, as summarised in Table 4 below.

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[3] The survey responses indicate that not all respondents to the survey were familiar with the concept of microblogging: 37% who answered the question on its uptake in their organization selected the "don't know" or "not applicable" option.

[4] Question 1.7: "Of the tools deployed, which do you consider to support collaboration <u>best</u> in your organization?" and question 1.8: "Of the tools deployed, which do you consider to support collaboration <u>least</u> in your organization?"

Table 4: Comparative ranking of the "top four" social computing tools

Rank	Availability	Usage	Value as support of collaborative working – question posed positively ("supports collaboration best")	Value as support of collaborative working – question posed positively ("supports collaboration least")
1	Wikis	Social networking	Wikis	Wikis
2	Blogging	Instant messaging	Blogging	Instant messaging
3	Social networking	Wikis	Instant messaging	Social networking
4	Instant messaging	Blogging	Social networking	Blogging

First, ready availability of a technology does not necessarily lead to its popularity. This can be seen when a comparison is made in the position of wikis and blogging in the second and third columns. Furthermore, in this study the most valuable tools (wikis, as noted in the fourth and fifth columns) are currently under-exploited, and this is in spite of their ubiquity in the workplace (column two). A third observation is related to the relative value of the tools. Wikis are clearly regarded by the survey respondents as the most valuable social computing application for collaborative work, and instant messaging is valued above social networking. However, it is difficult to be definitive about the positioning of blogging given the inconsistencies in the responses to survey questions. Exploring the reasons for the mismatches outlined here were not within the remit of this study, but there are indications that how the tools are introduced into the workplace is significant. (This theme is considered at the broad level of implementation – as opposed to individual tool - in 6.3.5 below.) As one survey respondent suggested "[All of the tools] support [collaboration] in different ways and are limited mainly because of uptake rather than limitations of the tool itself". This was echoed in another comment made in response to the request for survey participants to identify the main challenges faced by organizations that have adopted, or plan to adopt, social computing tools:

> Like most things it's about cultural change. A tool (however clever) can be used well/badly. Therefore usual considerations apply around what purpose does it serve, selling it to the business, understanding business benefits/risks, giving staff skills to use properly, providing standards and guidance around use, encouraging good practice.

An extension to this study could explore these issues related to availability, usage and value, particularly in the context of organizational interest in returns on technology investment.

When a *sectoral* analysis is made of the data on (1) the relative levels of access to tools, (2) encouragement in their use, and (3) their actual uptake further inconsistencies become apparent. It has been noted above that survey responses from the public sector indicated greater levels of access to social computing tools and stronger encouragement of the deployment than those from individuals employed in the private sector. With the exception of microblogging, however, it is in private sector organizations where there is most activity centred on social computing tools, despite these lower levels of access and encouragement. This is shown in Table 5.

Table 5: Relative uptake of social computing tools in the private and public sectors

Tool	Private sector	Public sector	Difference
	Percentage of respondents who reported high or moderate uptake of tools in their workplace		Private sector percentage minus public sector percentage
Social networking	67%	36.9%	+30.1%
Blogging	38.4%	21.1%	+17.3%
Instant messaging	42%	26.3%	+15.7%
Wikis	41.3%	37.9%	+3.4%
Microblogging	20%	21.4%	-1.4%

It may be concluded that for a lower investment in the actual technology, and in its promotion, private sector organizations are achieving a higher return in terms of usage. Again, the reasons for this are beyond the scope of this pilot study, but this may be something worth investigating in the future, perhaps with reference to factors that motivate technology engagement such as adequate training in their deployment.

6.2 Opportunity in social computing environments

The desk research identified four main opportunities offered by social computing tools. The analysis of primary data collected for this study reveals the significance of these. In order of importance, they are (1) increased collaboration; (2) enhanced information management practice; (3) improved productivity; and (4) positive culture change and widened employee choice. Each of these is discussed below.

6.2.1 Increased collaboration

According to the results of the survey, the greatest opportunities that social computing tools offer to organizations lie in the support of collaborative working. Respondents made reference to this theme in general, as well in the context of three underpinning activities. In order of frequency of mention, these are: (1) facilitating knowledge and information sharing; (2) connecting individuals and groups; (3) widening communication channels.

To date there appears to have been mixed success in taking advantage of the potential of social computing tools to encourage collaborative work efforts. Of the respondents who noted improved collaboration as an anticipated benefit of the implementation of social computing tools in their organizations, the majority stated that they are beginning to see some evidence of this, but that success is localised and very dependent on uptake of the tools

in question. Respondents to survey question 1.7[5] provided examples of which tools support collaboration most effectively: wikis, social networking applications, and social tagging[6].

An overwhelming 84% of survey respondents agreed that the adoption of social computing tools leads to improved organizational **knowledge and information sharing**[7]. Of the remainder, not one disagreed with this assertion: 7% answered "neutral" and 9% "don't know". The responses to the open-ended survey questions showed that the main advantages here are found in improved access to expertise and reuse of existing information and knowledge where "all the people [are] in the loop all the time – unlike e-mail where people can fall off the address line", especially those working remote from one another. Of all the social computing tools wikis feature as the most useful for information and knowledge sharing, with blogs and social networking applications also cited. It is worth noting here that a large proportion of those who made comments on knowledge and information sharing when completing the survey were more interested in *information* rather than *knowledge* sharing. This is apparent in references to the extent to which social computing tools make artefacts such as "documents" and "project notes" accessible to end-users. Had they been more concerned about knowledge sharing more obvious reference would have been made to tools that connect individuals and groups to expertise, i.e. people to people, with social networking applications featuring more prominently in the research findings. In practice, success in using social computing tools for knowledge and information sharing is only achieved under specific conditions, where there is critical mass in tool adoption, as noted by focus group and survey respondents alike, one of whom said: "whether [organizations] potentially experience large improvements in information/knowledge sharing practice depends very much on whether adoption and regular use is widespread or not within the organization". Respondents pointed to desirable conditions for ensuring that an implementation success. These focused on the management of a *planned* implementation that takes into account a range of factors from information architecture design and user training to organizational buy-in. (These factors are also explored with reference to uptake in general in 6.3.5 below.)

Eleven survey respondents reported that one of the expected benefits of the implementation of social computing tools in their organizations was that this would **connect individuals and groups** with others beyond their immediate colleagues, with the implication that the forging of these links would underpin future collaborative work. Currently this aim is being met in some quarters, but not in all. The experience of one organization reflects the dominant pattern across the entire sample that completed the survey for this study: "some very active, others redundant". Local enthusiasm for and trust of the tools, training, support, and a willingness to share contact information are the determining factors here. Blogs were most frequently associated with facilitating links for their strengths in: (1) uniting physically separated team members; (2) providing an outlet for the promotion of on-going work to a wide audience; (3) opening up conversations; and (4) inviting and obtaining feedback on activities. Instant messaging was also cited as giving members of distributed work team a means of demonstrating a form of presence.

Social computing tools have also been implemented with the expectation that they will **widen communication channels** in general - both internally and externally – and will thus support collaboration. In terms of internal communication amongst the sample of survey respondents in this study there has been considerable success, with the blog identified as the tool best suited to this purpose. Further examples were presented by the interviewees and focus group participants: one of the interviewees explained how blogs are used in a large multinational to encourage staff awareness of company activities; another interviewee discussed how wikis provide a platform for debate of policy issues amongst members of a professional body; a Glasgow focus group

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[5] Question 1.7: "Of the tools deployed, which do you consider to support collaboration best in your organization and why?"

[6] This was the only instance in the survey results where social tagging merited a mention. Similarly few of the focus group and interview discussions considered this theme.

[7] Statement 3.1.5: "Organizations that adopt social computing tools experience improvements in information/knowledge sharing".

member reported that the deployment of social computing tools in his firm had opened internal communication channels so well that some training needs had been identified for a set of staff that that had previously never been considered a target audience for such attention. Although reports of experiments with the deployment of social computing tools with external contacts were less enthusiastic[8], it is clear that progress is being made towards maintaining more interactive contact and encouraging greater engagement between organizations and their stakeholders. As well as this being evident in the survey responses, there was a strong message from both focus groups that blogs provide a flexible medium with which to communicate with external contacts. For example, the Glasgow focus group participants also discussed social networking tools and their part in establishing and maintaining relationships with potential new employees and organizational alumni. One of the interviewees was also keen to promote customer-facing blogs and wikis as a means to engage the community served by his local government employer.

Since use of social computing tools with contacts external to the organization is associated with business development, it is also worth considering here the responses to three questions[9] related to perceptions of the deployment of social computing tools for organizational opportunities in sales, marketing and public relations (PR). In terms of marketing and PR activities the majority of respondents (59.5% and 54.4% respectively) agreed that social computing tools offered a means of improving practice. However, with regards to sales, the number of people who agreed (38.6%) was only slightly higher than those who admitted that they did not know whether or not social computing tools had any impact (36.8%). It should also be noted that there was a reasonable number of "don't know" replies in the instances of marketing (24.6%) and PR (22.8%). One explanation for these figures could lie in the demographics of the survey sample: information and knowledge professional often do not fulfil sales, marketing and PR roles and are not in the position to judge these assertions.

The results of this study show that social computing tools have strong potential to support collaboration. Blogs and wikis are particularly important in this respect. Whether or not organizations are able to realise this potential is dependent on local conditions, as illustrated by the mixed reports of success outlined above.

6.2.2 Enhanced information management practice

The output of survey question 1.10[10] generated thirteen comments related to improved information management practice. The most important benefit is improved information retrieval (7 comments) due to more obvious and better organization of quality resources, greater consolidation of material, reduction in the number of organizational information silos, and 24-hour access. Wikis, mentioned by nine individuals, have an important role here. This was illustrated by one of the telephone interviewees who explained how some content that was previously held on the organization's intranet has now been repackaged for a wiki. The new format has opened up opportunities for improved interaction with content that was previously under-used as a largely static resource. Of equal importance (3 or 4 comments on each) is how these tools can enhance organizational information resources (for example, by encouraging end-user contributions to use the platform for publishing and ensuring that available information is up to date), and address problems of information overload, particularly that caused by overuse of e-mail attachments. One interviewee made specific reference to the value of the tools in capturing the knowledge of an aging workforce prior to a number of retirements. The London focus group participants also highlighted how the mechanics of blogging improve individual information management practice, not least in teaching people what is acceptable (or not) to say in online environments. This is achieved

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[8] The data from this research project indicate that this is because of security risks, as discussed in 6.3.2.

[9] Statements 3.1.10, 3.1.11 and 3.1.12: "The deployment of social computing tools improves organizational opportunities for sales/marketing/PR activities".

[10] Here respondents were asked to write about the anticipated advantage of social tool adoption and whether or not these have come to fruition.

in a number of ways. For example, the degree of care taken in composing blog posts can be translated into practice when sending e-mails.

The extent to which the anticipated benefits related to information management have been realised varies from organization to organization. The most positive responses related to information management were improvements in information access and retrieval, with two respondents stating that their expectations have been met fully. On the whole others remarked that expectations have been met to a certain extent, but in many cases the implementation of tools is not yet mature enough to make a full assessment. On a more positive note, one of the London focus group participants noted how the social computing champion at his/her place of work had argued that the cost saving to be made in terms of information storage would merit the adoption of social computing tools in the organization.

6.2.3 Improved productivity

Perceptions of the extent to which productivity in general may be increased through the adoption of social computing tools was assessed through the analysis of levels of agreement with the survey statement "Employees who are permitted to use social computing tools in the workplace are more productive than those who are not" (statement 3.1.1). A much larger proportion agreed with this statement (44.5%) than did not (5.4%). However, it should be noted that the remainder of survey responses were split between the options of "neutral" (34%) and "don't know" (10.7%). Equally, a number of comments associated with these responses expressed the view that although there is *potential* for social computing tools to increase productivity, it may be too early to make such a judgement. Stronger messages on increased productivity came through in the telephone interviews. An interviewee working in the public sector reported that the implementation of social computing tools across the organisations with which he worked has been very successful, and he is currently working with an external agency on the development of a bench mark for measuring benefit. Another interviewee explained how her company has made a comparison of recent projects where social computing tools have been used with others which have operated without them. In the analysis it was discovered that those teams that used social computing tools were more successful. (In the context of productivity in general reference was also made by survey respondents to the illegitimate deployment of tools in the workplace and the potential for time-wasting. This is an issue that is explored in further detail in 6.3.3 below.)

More specifically, time-saving and reduced reliance on e-mail merited the attention of survey respondents. The former emerged as a theme in the responses to question 1.7: "Of the tools deployed, which do you consider support collaboration best in your organization?" The respondents were optimistic on this topic. For example, one explained "Our wiki adds productivity because it means teams are working together". Similarly, the focus group participants were keen to share their positive experiences of wikis for improved organizational productivity, particularly where there is functionality to provide audit trails of contributions and version control (with the opportunity to "roll back" content if required). The potential for social computing tools to reduce the e-mail burden was also well-recognised: 67% of respondents agreed with the statement that "the deployment of social computing tools cuts down organizational reliance on e-mail" (statement 3.1.8), whereas only 16% disagreed. An example of this was presented at the London focus group meeting where a participant described how an organizational e-mail burden had been reduced through the use of wiki posts in place of mass mailings. One of The interviewees made similar observations based on experiences within their own organisations and, in one case, interactions with a range of clients.

Here, again, there are indications that organizations are in a transitional phase, with the potential benefits of social computing tool adoption recognised, but not yet universally achieved. One comment illustrates a characteristic of the transition with respect to information overload: "People still send e-mail, and they even send e-mail to tell people they've done something on a social computing tool!"

6.2.4 Positive culture change and widened employee choice

In answer to open-ended survey questions just two people referred to the role of social computing tools in making a positive contribution to organizational culture. In both cases they believed that the implementations in their organizations were beginning to take the desired effect, and that their organizations were "getting there". The first was reaching its goal to build a more participative culture, and the other was making progress in establishing a "small company feel" (despite its status as a large multinational). When prompted to comment on the two survey statements on culture[11] there was strong agreement that:

- in organizations where employees are connected through social computing tools they enjoy a more positive organizational culture than those where this is not the case: 61.5% agreed or strongly agreed.
- the introduction of social computing tools such as blogs and wikis promotes a sense of shared ownership, and this subsequently improves employee relationships and morale: 61.4% agreed or strongly agreed.
- organizations that restrict employee engagement with social computing tools stifle potential for creativity and innovation**: 71.4% agreed or strongly agreed.

Further evidence on the impact that access to social computing tools can have on morale was provided in response to a question on productivity[12]. Here a respondent said:

> I've found morale is better in organizations that don't block access to these tools. It's good to accept that employees have a life outside work and provided these tools are used in moderation they shouldn't be a problem.

Participants at the London focus group also spoke of how social computing can give employees a sense of satisfaction and empowerment as they make their contributions, and this may instil a sense of shared corporate identity.

A further set of opportunities offered in work environments where social tools are deployed relate to individual employee choice, which in itself has an impact on perceptions of organizational culture. Four survey respondents remarked that these tools offer flexibility of working, as did members of the two focus groups[13]. Evidence was presented that this is the case in some organizations, with wikis identified as the most obvious tool for this kind of work because they are "easy to use and accessible from anywhere". Two respondents also considered how these facilities could be used to keep or attract staff to the organization, each of them raising a point also identified by the London focus group participants. In the first case it was explained that "the organization has been unwilling to allow to implement controls [on social tools usage] fearing that younger staff, who expect to be able to use these tools, will leave and move to competitors who do allow use of these tools". The second suggested that an expected benefit of offering social computing tools in the workplace would be to become an "employer of choice". In both these case, however, the respondents admitted that, as yet, there has been no evidence to demonstrate that these advantages have been realised. One interviewee provided an example of how a private sector organization that does not encourage social networking internally has realised the tool's

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[11] Question 3.1.13: "In organizations where employees contribute to blogs and/or wikis, a sense of shared ownership over the resources contained within them is created. This shared ownership subsequently improves employee relationships and morale and question", question 3.1.20: "Organizations where employees are connected through social computing tools enjoy a more positive organizational culture than those where this is not the case", and question 3.1.22: "Organizations that restrict employee engagement with social computing tools stifle potential for creativity and innovation".

[12] Question 3.1.18: "Allowing employees to engage with social computing tools lowers their productivity".

[13] London focus group members also debated whether the flexibility to work away from the office was actually a benefit, with the concern that it may increase pressure on employees to work at home.

value in attracting new talent to the firm. In this case it has a presence on Facebook which allows the incoming set of graduate recruits to mix online with the current trainees.

These findings show enthusiasm for social computing tools as agents of culture change (as well as being part of culture change itself). There is a strong indication that in the future organizations that have not gone down the social computing route may be forced to do so in order both to attract and retain talent.

6.3 Risk in social computing environments

Data collected for this study covered themes related to risk as identified in the desk research: risks related to information management, to security, and to productivity. Although there was adequate opportunity for study participants to discuss anti-social behaviour, this did not emerge as a major concern. Of greatest importance however, was the risk of a failed implementation. Each of these themes is discussed in the sections that follow below.

6.3.1 Information management risk

With the exception of risks associated with unsuccessful implementations of social computing tools (see 6.3.5 below), risks associated with information management represent the biggest concern of the survey sample. This is perhaps unsurprising given that the study participants are individuals whose work responsibilities include information management.

Findings from this study indicate that the "free" nature of social computing tools leads to a lack of control of information resources. Of those survey respondents who indicated "lack of control" as a risk in response to question 1.11, there was evidence to suggest that they are currently experiencing the problems that this brings, for example in SharePoint implementations that lack a consistent structure. Established means of handling information resources is of relevance here, as highlighted by a survey respondent who remarked that organizations should avoid "undermining existing good information management practice, [understand the role] of social computing versus other tools and [use] them appropriately". Information management planning, from the broad perspective of information architecture design to more specific efforts such as to reduce classification overheads through the automatic collection of metadata, were identified as challenges relevant to the general issue of control. As well as this, three particular risks directly related to the issue of control emerged from the analysis of the survey data as significant. These are (1) restricted access to information resources due to poor archiving, (2) the proliferation of information sources and systems, and (3) information overload. Information quality was also considered worthy of attention. Each of these is discussed in turn below.

Restricted access to information resources due to poor archiving was a major concern. Over half the survey respondents agreed that important organizational information may be lost due to the failure to archive (and thus make accessible in the future) information exchanges between staff in social computing environments[14] (42% agreed; 10.5% strongly agreed). Specific reference was made to the special nature of social computing exchanges. It was hinted that their value is greater than formal records, such as minutes of meetings, and they thus merit archiving effort:

> The informal discussion of issues on social networks are often much more revealing of the dynamics of a business than the formal records and have come to replace some of more traditional forms of staff communication.

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[14] 3.1.7 "In social computing tools important organizational information may be lost due to the failure to archive (and thus make accessible in the future) information exchanges between staff."

Comments revealed that archiving risk is currently being addressed by organizations through policy development and guidelines on issues such as the backing-up of blogs and wikis, and the need to save important instant messenger conversations. However, one respondent pointed to the difficulty of imposing rules in a social computing environment on the grounds that this is counter-intuitive, working against the "free" nature of the tools themselves. Others questioned the extent to which it is feasible to maintain high archiving standards given the cost and time investment required. Two respondents who did not believe that important information is being lost in social computing tools made the point that important exchanges are currently "misplaced" elsewhere in individual e-mail in-boxes. Equally, Glasgow focus group participants who complained about the lack of enthusiasm to archive instant messenger conversations also noted that face-to-face and telephone conversations are rarely formally recorded. These observations suggest that the social computing environment (where exchanges are more "public") may actually provide a *better* opportunity for archiving of material and improved future information access and retrieval.

Even if material is archived, it is still at risk of being rendered redundant if it cannot be found amongst a proliferation of information systems and sources. Indications from this research show that this is already an established organizational problem: the majority of respondents who identified **proliferation of information sources and systems** as a risk in response to question 1.11[15] stated that their awareness came from practice in their own organizations. This issue was also important to focus group participants who discussed the difficulties that arise from the sprawl of information sources from the adoption of social computing media. There are two major issues here (1) how employees know where to find the information that they need and (2) once found, the means of knowing whether or not the version of information discovered is the one to be trusted. One survey respondent pointed to a further risk associated with a lack of faith that the organizational system will deliver the information required. In this kind of environment a proliferation of systems and sources can self-generate because "[A] lack of formal taxonomy [to help with information retrieval] confuses people and tends to encourage even more private knowledge sharing".

Given the extent to which the two major risks of archiving of material and the proliferation of information sources and systems were identified by survey respondents, it is surprising that **information overload** was not as frequently highlighted as a concern. Of the respondents who identified information overload as a risk[16], none felt that this has been realised to any real extent. Furthermore, responses to the statement "The adoption of tools for online collaborative working adds to organizational problems of information overload" showed a majority that disagreed (40% disagree; 12% strongly disagree). The message here is to use the tools sensibly, taking advantage of the features that the offer for tailored information delivery. As one respondent explained: "If used properly, and training/guidance may be required, these tools can make it easier to find the information you want, e.g. using RSS to read the blogs relevant to you." Good management of the implementation is an issue here, particularly with reference to tool proliferation, as already discussed above.

As well as version control (as noted above) survey respondents drew attention to other **information quality** issues that can be viewed as information management risks when social computing tools are deployed. Survey respondents mentioned risks to quality in general, for example one wrote about possible "garbage in, garbage out" scenarios, and illustrated this with an organizational example where "sites are currently managed by enthusiastic amateurs [but] information governance procedures have not been implemented". Currency of information appears to be a particular problem with reports of "patchy" updating of resources and failure to remove out of date information. The examples of this provided by the survey respondents all applied to wikis. The deliberate vandalism of information held in social computing environments (for example, wiki pages) – although raised by survey respondents and at the London focus group meeting - is not, however, an issue: only

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[15] 1.11 "Please indicate the main anticipated risks of their [social computing tools] adoption."

[16] 1.11 "Please indicate the main anticipated risks of their [social computing tools] adoption."

8.75% of survey respondents showed any agreement with the statement "Allowing any employee the freedom to edit documents online (e.g. through the use of wikis) encourages vandalism of resources". This does not mean that it would not be possible for such activity to take place. As one respondent put it: "It allows vandalism but does not encourage it. But it's like saying that painting your house white encourages graffiti" (and indeed the accidental alteration or destruction of wiki material was seen as a drawback to the use of a wiki as a tool for collaboration). Others mentioned guards against such behaviour such as protocols, workflow permissions and established audit trails. Added to this, one respondent used the comments box for this question to refer to strategies to encourage people to make contributions: "I see the opposite problem - a cultural nervousness about editing someone else's work (and hence implying that it wasn't good enough)."

This analysis shows that the main information management risks relate to reduction in levels of accessibility to, and proliferation of, sources. Information overload and degradation of information quality are minor concerns.

6.3.2   Risk of compromised security

It was anticipated from the findings of the literature review that compromised security would be recognised as an important risk in social computing environments, and it was indeed the case that the survey generated data on this theme. As well as security risk in general, participants in this study identified four main areas of concern. In order of frequency of mention, these are risks related to (1) legal infringement; (2) disrepute; (3) leakage of confidential data; and (4) identity theft. The data from the web-based survey analysed here derives from the two open questions where participants were asked to identify risks of adoption of social computing tools and challenges to their adoption. In addition, this analysis includes consideration of levels agreement with a number of statements related to the themes of security risk.

Some survey respondents noted security in general either as a risk or a challenge to the adoption of social computing tools. However, the number was not large: just nine individuals made unsolicited allusion to security in answer to question 1.11[17] or 4.1[18]. Equally, levels of agreement with the statement that "individuals who engage with social computing tools risk compromising their organization's IT security" were low: of those that expressed an opinion as to whether they agreed or disagreed with the statement just 36% were in agreement. It would also appear that this risk, although theoretically valid, has rarely been realised in practice. Only a couple of examples of security breach were offered by the survey respondents under this theme. These were the posting of careless comments on blog entries, and viruses entering organizational systems through third party applications available from social networking sites. The indication from this study is that information and knowledge managers are aware of the belief that there are security risks associated with social computing tools. However, their own experience is that organizations are too risk averse and this can work against the effective introduction of social computing tools into the workplace. To some this is a hindrance to their work, especially where there is ambition to deploy a wide range of tools: often these are incompatible with the security requirements of the organization. As one participant explained in disagreement with the statement "individuals who engage with social computing tools risk compromising their organization's IT security": "No, their *organization's IT* compromises their ability to use social computing tools".

The pattern of response applicable to security in general is reflected in the analysis of data related to the theme **legal infringement** in particular, as derived from open-ended survey questions. Again, a few survey respondents (five) identified some relevant risks or challenges. These referred to records retention requirements, copyright, data protection and freedom of information. These issues were also raised at the focus groups and amongst the telephone interviewees. However, nobody offered evidence to suggest that their organizations are

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[17] Question 1.11: "Please indicate the risk of their adoption".

[18] Question 4.1 "What do you consider to be the main challenges faced by organizations that have adopted, or plan to adopt, social computing tools?"

currently struggling with legal infringement in the context of social tools adoption. In contrast with the statement on security risk in general, the level of agreement amongst those who gave an agree or strongly agree answer to the statement "Increasing employee opportunity to publish on work matters in the wider environment raises the risk of legal infringement" was high at 70%. Consideration of this figure with those on uptake of social computing tools as discussed in 6.1 above may suggest that there is the potential for legal infringement to become a bigger issue as more organizations move to social tools adoption. This may also account for the couple of associated comments on the need for controls to be put in place to guard against legal infringement (see also 6.3.5 below for a discussion of governance in the context of tool adoption).

The number of respondents who wrote about **disrepute** in the open-ended questions on risks and challenges was also five. Here the theoretical risk was applied to blogging, but again nobody provided evidence from their own experience of instances where organizational reputation had been compromised. There was evidence here that this may be because these respondents are working in environments where there are strict controls. One respondent, for example, acknowledged that the risk of disrepute has not been realised in the organization because there are "very tight controls on outward-facing sites... certain basic tools are not seen as safe to deploy". Opinion on this issue was also explored in the analysis of the level of agreement with two statements. The first was "Organizations that sanction unregulated employee engagement with social computing tools (for example to blog about their work) unnecessarily put at risk their established good external reputation". Of those who expressed an opinion to agree or disagree, the split was 73% agree and 27% disagree. Some of the comments that accompanied the selection of level of agreement for this statement were strongly worded. For example, one person who had noted "strongly agree" wrote:

> A disgruntled employee for what ever reason could cause havoc in this situation. I personally would never put a good reputation on the line by having unregulated blogs sanctioned or not. Reputations can take years of hard work to forge and can be lost in days.....it is just not worth it.

In contrast someone who disagreed strongly with the statement expressed the view:

> If staff are trusted enough to be employed they should be trusted to blog responsibly about their work. This is always a tricky area but I never understand why managers think employees who are professional in the workplace will suddenly say something crazy if they're given an external blog!

A third of the comments referred to attention to issues of governance as a means of guarding against this risk. The second statement relevant to the theme of disrepute was "Some employees will deliberately use social computing tools as a platform to present a false picture of their organization's activities". In this case the opinion of those who selected an agree or disagree option fell firmly on the side of disagreement. When this result is taken into consideration with that for the statement on damage to external reputation described above, there is some indication that organizations are more concerned about possible accidental breaches than deliberate inappropriate use of tools. These views were also reflected in the discussions of the focus groups.

Of the four main areas of concern of relevance to security the **leakage of confidential information** appears to be the most prevalent in practice. Five survey respondents provided data on this theme in answer to open-ended questions, and of these four mentioned breaches. These included: the storing of confidential material in shared areas on the system; documents shared without any audit trail or authority to release the information that they contain; and inappropriate disclosure of information online, for example in a wiki. One of the interviewees was particularly concerned with such risks, especially in the context of intellectual property and, at the time of the interview, was actively making a case for his organisation to prohibit the use of publicly available social computing tools. Although his colleagues are subject to a security policy and code of practice which aims to guard against threats associated with the leakage of confidential information, the interviewee was not convinced that they were fully aware of the responsibilities that these restrictions imply. The issue of confidentiality was explored a little further with reference to the accidental communication of confidential information beyond the organization. In responses to a statement on this theme the percentage of respondents who showed agreement

or disagreement with the view that "The chance that confidential information may be accidentally communicated outside the organization due to the uptake of social computing tools is no greater than it was before these tools existed" was split: 53% agree, 47% disagree. The content of the comments reflected this split with slightly more people highlighting an increased possibility of information leakage, for example through accidental uploading of a blog entry to an external, rather than internal site. A second statement tested opinion as to whether the deployment of social computing tools increases vulnerability to corporate espionage. Again the opinion was split, but the percentage difference between those who agreed and those who disagreed was low: 43% agreed; 57% disagreed. Again the issue of governance and communication of clear policies to staff was raised as a precaution against this kind of security breach.

The final security-related theme to emerge from the analysis of the survey data was the **risk of identity theft**. This was mentioned by just two people in response to open-ended survey questions, but no instances or examples of breaches were recorded. All respondents had the opportunity to give their opinions on the theme when considering the statement "Engagement with social computing tools in the workplace increases an individual's risk of identity theft". That so few respondents referred to identity theft in the responses to open-ended questions, and that a large majority (85%) of those expressing an agree or disagree opinion did not believe that engagement with social computing tools at work raises this risk, indicates that this is a low security risk. Again, the statement on this issue encouraged respondents to make comments on the need for employees to be trained how to recognise where this risk may lie and how to take precautions against it.

It can be seen from this analysis that security risk in general, though recognised as an area of debate, is not a major preoccupation of information and knowledge managers when they consider social computing tools. Indeed, in the comments on each of the four main themes discussed here, at least one person made a remark typified by the following:

> There are always risks with these things. Risk is increased but the benefits are worth it.

For example, on disrepute:

> [This] was a risk before social computing tools. Disaffected employees would find ways to publish their views.

It is also interesting to note that few respondents admitted to security breaches in their own organizations. This could indicate that the level of risk has been exaggerated in reports of social computing applications, for example in the press. However, it may actually be the case that the apparent low level of instances of security breach in this study is related to low levels of social tools adoption, and/or strict access policies already in place where tools have already been implemented. In short, it is not possible for breaches to take place because either (a) the implementation is not mature enough or (b) there is adequate governance in place.

6.3.3 Productivity risk

The link between organizational availability of social computing tools and the general issue of staff productivity was raised in the free-text answers to survey question 4.1, where participants were asked to identify the main challenges faced by organizations that have implemented, or plan to implement such tools. Respondents questioned whether investment in social computing tools can provide returns in terms of increased revenue, or improvements to products and services. One respondent articulated this challenge as "Delivering an environment that enables a wide degree of social computing that is compatible with the productivity... requirements of the organization". Another raised the issue of being able to measure the return, with specific reference to social networks and the level of support that they require. This is regarded as a barrier to adoption, as articulated by one respondent:

[Managers] also thrive on cost-benefit analyses and it's often hard to pinpoint benefits from the tools in a spreadsheet. If you can't show how much time/money they will save managers won't invest, even when most tools are simple and cheap to adopt.

Two specific topics related to productivity emerged from the survey data, both of which relate to time wastage: (1) due to "legitimate" user activity such as difficulties navigating systems or efforts to be more creative in work approaches and (2) due to inappropriate use such as online socialising. However, it should be noted that respondents' perception of actual productivity loss in their own organizations is low. Where this applies, there have only been isolated cases. For example, two respondents explained that productivity has been lessened due to the inability of certain staff to make sense of the systems implemented. Another noted the tension engendered in making efforts to allow people time to be creative with the tools without compromising their output. In terms of non-sanctioned use of social computing tools just one noted an instance of misuse that required intervention: "Certain individuals have been 'caught' spending huge amounts of time on social sites rather than business focused areas". Others pointed to minimal misuse where, for example colleagues may make "some light-hearted comments, but [are] otherwise very professional". Similarly, the focus group members could envisage time-wasting scenarios, but real serious instances were not cited.

These findings align with the analysis of responses to the statement "Allowing employees to engage with social computing tools at work lowers their productivity" in survey question 3.1.18. Here the majority disagreed with this statement (35% disagreed, 26.3% strongly disagreed). Frequent allusion was made to the fact that it is not the tools that cause productivity loss, but individuals with a propensity to waste time. A typical comment here was: "If employees are going to waste time, they don't need social computing tools to do it."

On the basis of this data then, lessened productivity per se – although identified as a risk – does not concern information and knowledge managers. Of particular importance here is that they have not witnessed wholesale drops in productivity following the introduction of social computing tools. A greater challenge, perhaps, is the *perception* of managers that productivity loss may be a big issue. This is discussed in greater detail with reference to uptake in 6.3.5 below.

6.3.4   Risk of anti-social behaviour

The theme of anti-social behaviour was incorporated into the research project since this has received much attention with regards to social computing tools in non-work environments. In this study, however, this was not considered to be a threat. Anti-social behaviour did not merit a mention in either of the open-ended questions where respondents were encouraged to write about risks (question 1.11) and challenges (question 4.1), and only 12.5% agreed with the statement "The 'social' nature of social software in the workplace can encourage anti-social behaviour such as harassment and bullying." As was the case when asked about vandalism discussed above, some remarked that this kind of abuse would be possible in online collaborative work environments, but that it would be unlikely to take place, not least because governance checks and corporate culture would militate against it. One person also pointed out that this type of behaviour may be less evident online because comments are shared within the community and are thus subject to scrutiny[19]. Although it is not possible to provide a firm explanation for this, it is clear that anti-social behaviour is not a primary concern of knowledge and information professionals in the context of this study.

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[19] This would apply to some tools such as wikis and blogs, but not necessarily to others such as instant messaging and social networking.

6.3.5 Risk of implementation failure

As well as the specific risks related to information management, organizational productivity and compromised security, the survey respondents identified the broad theme of implementation failure as potentially damaging to organizations. Indeed, aspects of partial or non-adoption of social computing tools for collaborative work featured most frequently in survey responses to the invitation to list the main challenges faced by organizations that have adopted, or plan to adopt, social computing tools (question 4.1), and was a key theme of the two focus group meetings. Added to this, the survey responses suggest that the way in which an implementation is managed determines the future challenges that an organization will face in seeking a return on its investment in social computing tools. One survey respondent explained: "[The main challenge] depends on the nature of the tools and how they are implemented". This opinion was also illustrated by London focus group participants who referred to the issue of information overload: whether or not this increases or decreases with the deployment of social computing tools is contingent on how the implementation is made.

Of the survey respondents who noted partial or non-adoption of social computing tool implementation as a risk to the creation of an effective online collaborative work environment all provided evidence of this being the case in their own organization. An example of this is the under-exploitation of blogs in a voluntary body: although entries are published, they are not widely read. The impact of this is not catastrophic. However, in the words of one of the survey respondents, "non-participation of some parts of the organization minimises value [of the tools]". Similarly the Glasgow focus group participants discussed a scenario where the potential of a tool, such as a wiki, is limited if it is operated in isolation from other internal systems.

The desire of information and knowledge managers surveyed for this study is for colleagues to actively embrace social computing tools with the expectation that they will quickly move through the stages of non-participant, to lurker, to contributor. An analysis of the responses to survey question 4.1, where participants were invited to identify challenges of social tool implementation, suggests that to address the risk of partial or non-adoption effort needs to be channelled into persuading staff of the benefits of a new way of working. Harking back to previous efforts in encouraging technology take-up, one respondent noted that:

> [A main challenge is getting people to appreciate] how these things get used. Just putting a set of tools on the desktop and telling people to use them does not work. We've tried this several times!

Making the transition is not easy when staff are accustomed to working within the boundaries of their immediate department in highly structured and facilitated information and knowledge environments, especially if they find change difficult, are not highly experienced with IT, do not understand the concepts and/or language of social computing, and feel that there is no time available to learn about the tools. One survey respondent also highlighted the important point that for an implementation to be successful it needs critical mass:

> If just one person of a group refuses, or cannot use the tool, collaboration can become impossible, as the rest of the group has to go back to email and phone to pass information around.

The role of senior staff is key in this context. A significant challenge mentioned by several survey respondents is to persuade senior (and often older) colleagues that these tools can bring serious, long-term business benefit. Often they are distracted by the technology, especially if it is over-hyped without reference to the degree of leadership required to ensure successful introduction of the tools. This point is illustrated in complaints expressed in the survey responses:

> Managers see [social computing tools] as a flash in the pan. Very few realise the benefits they can bring to an organization. So the main challenge I've seen is in organizations where (often younger, junior) staff "get" the tools but can't persuade their managers to allow them to use them internally or externally.

> [A challenge is] getting the luddites to understand :-) [They need] an understanding as to the potential of social media/computing within business. For most it still seems to be something that young people do in their spare time to socially network with friends, [and] not conduct business and collaborate with partners

or colleagues. Awareness of what can be achieved by adopting social computing/media methods and styles within work practices [is required].

> Very few senior managers actually use or understand these tools themselves but they either don't realise what they're missing or don't want to fess up! There seems to be a terrible gulf of misunderstanding between senior managers (and sometimes IT folk who are vital for adoption) and the organization's users who are merrily playing around on all these sites.

More specifically, non or partial adoption will remain as risk as long as management is fearful of the publicised risks of social computing, most notably that the tools "may be a waste of time and reduce time spent on actual work" (one respondent noted that the label "social" does not help here) and that their usage puts organizational security at risk. Participants at the London focus group discussed the recommendation that popular terminology should be avoided when making a business case for the adoption of social computing tools. For example, it was suggested that promoting the functionality of a wiki without reference to the term would be more likely to result in management interest than starting a conversation using the vocabulary of social computing.

The question of senior management support came through strongly in the interviews conducted for this study. In the more "successful" implementations there is senior management buy-in, and this is often complemented with the appointment of social computing champions or facilitators throughout the business. This was well illustrated by a public sector interviewee working in local government: endorsement of social computing by the chief executive wore down resistance from other quarters in the senior management team. In contrast, information and knowledge professionals who work in organizations where there is no senior management interest in social computing tools other than to resist their adoption will struggle to see an implementation, let alone one that is successful. One of the public sector employees regretted the approach of her employer that has prohibited the use of Facebook at the office, and is currently questioning the use of unsanctioned, although work-related, wikis in an environment where there is inadequate IT infrastructure, lack of knowledge of and expertise in social computing tools, and no clear information strategy.

A further aspect of implementation failure is the risk that although tools may be adopted, their potential for supporting collaborative work is not realised. This is because either they are not deployed to their full potential, or because they are abused in the workplace. With reference to the former, a survey respondent noted that the social computing platform in a private sector organization is being treated simply as a document repository. Others mentioned blogs being used simply as dissemination tools (for example, for marketing) and instant messaging merely fulfilling a function of e-mail[20]. Another noted that a potential challenge to the adoption of social computing tools for work purposes is that their introduction is treated as a management gimmick, and so they are not well integrated into business processes. More was said in the survey responses on the issue of abuse, with particular forms assigned to each tool: for example blogs used for disseminating personal opinion; microblogs for generating trivia; and social networking for socialising.

The analysis of the survey data on risks and challenges shows where information and knowledge management professionals believe that management attention should be focused in efforts to implement social computing tools. There is a requirement to identify right tools for the organization in question from the large choice available, ensuring that those selected will fit with established information and knowledge sharing behaviours whilst adding value to the organization's business. In order to achieve this time needs to be allocated to make the right choices supported by firm leadership from the top of the organization. The risk of not achieving this is that an inappropriate implementation may be made, with the eventual negative impact of low employee buy-in. For example, one survey respondent made reference to internal "technical unreliability leading to dissatisfied

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[20] One of the interviewees explained that instant messaging is used as a form of desk-to-desk SMS, with its primary function being to check if colleagues are free for a telephone conversation.

users [who are now] unwilling to try [the tools] again". One of the interviewees told a similar tale with reference to the need to ensure that sufficient content is made available in social computing environments to make it worthwhile for others to start making contributions and return to the resource. Both the survey data and output of the focus group discussions emphasise that, once in place, it is important that adequate support is available to users, including provision of adequate training. Required levels of support are likely to vary across different staff groups, for example, by grade or age. A number of survey respondents expressed views that indicate that at the same time that investment is made at the level of the implementation, investment also has to be made in organizational change. This is to ensure the development of a cultural climate conducive to collaborative working using social computing tools where, in one survey respondent's words "employees feel safe to, and keen to, contribute to social computing platforms, in order that their benefits are maximised". Cultural change is recognised as a real challenge by several survey participants, not least in large, hierarchical organizations comprised of discrete business units where information and knowledge sharing across departments amongst people has not been the norm, and incentives for doing so are not in place. The focus group participants also highlighted the difficulties of managing an implementation across units of an organization which, at the outset, do not share a common level of enthusiasm for the new environment[21]. Adequate consideration needs to be made for this in any roll-out. In an attempt to address the complexities of cultural shift one of the interviewees explained that her company took the decision to avoid a "Big Bang" approach, but instead created conditions for the use of the tools to spread virally with the support of appointed social computing champions.

The issue of governance emerged as a strong theme in the analysis of comments from survey respondents on challenges to the adoption of social computing tools in the workplace, and was also discussed by focus group participants. In addition it featured as a theme in responses to questions of security risk, as discussed in 6.3.2 above. Governance is seen as fundamental to the adoption of good practice, both in terms of how to use the tools and acceptable usage and, as such, plays a role in the degree to which an implementation will be adopted within an organization. Information and knowledge managers identified in their survey responses that senior managers should recognise that clear guidance on tool deployment should be communicated to staff. This should be devised in a way that sets out what is and is not acceptable "without imposing too many rules and regulations" so that "managers come to trust and encourage their staff to collaborate and self-organise" – a sentiment shared by focus group participants who were wary of over-regulation frustrating and/or stifling the endeavours of creative teams. Interviewees gave examples of the damaging effect of management interference in "grass roots" initiatives: in one case efforts to formalise wiki and blog activity into the organizational information infrastructure was extremely unpopular. Nonetheless, if successful, sensible efforts in governance can help meet the challenge of creating "a corporate culture where a shared set of values results in the self-discipline of the staff providing the best protection against misuse of... applications". Currently, however, answers to the survey question on whether or not their organizations had issued guidelines on the ethical and moral use of social computing tools[22] shows that this is not universal practice: 40% of respondents said that guidelines have been issued in their organizations; 43% said that they have not; and 17% do not know whether or not this is the case. This is likely a symptom of the rapid adoption of tools: there is therefore bound to be a time-lag in the creation of organizational policies for their deployment and management. Equally, this low figure may represent both limited senior management interest in, and a risk to full exploitation of, social computing tools in support of business objectives. As members of the Glasgow focus group noted, depending on the implementation, controlling social computing tools can take considerable time and effort. It is likely that organizations have not yet prioritized this as an area for investment. Indeed, it may be argued that it is simpler

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[21] Polarized positive and negative views "traditionally" associated with age or management position were felt to be less of a problem than professional background. Concerns were also expressed at the lack of familiarity with social computing tools amongst information and knowledge management professionals.

[22] Question 2.1 "Has your organization issued guidelines on the ethical and moral use of social computing tools? "

for an organization to delay adoption – or even ban tools – than it is to devote time and effort to creating guidelines and ensuring that they are followed.

7. Discussion and conclusions

The main aim of the research was to establish the main risks and opportunities of the adoption of social computing tools within organizations for collaborative work purposes as perceived by information and knowledge management professionals. This has been achieved, as summarised in Table 6 and Table 7 below.

Table 6: Summary of research findings on opportunity in social computing environments.

Opportunity	Aspect	Importance assigned by study participants	Success in capitalising on the opportunity	Notes
Increased collaboration	Knowledge and information sharing	High	Some success, but this depends on local conditions within units of the organization.	Wikis identified as the most important tool. Focus of discussion biased towards information rather than knowledge sharing.
	Connecting individuals and groups	Moderate	Some success, but this depends on local conditions within units of the organization.	Blogs identified as the most important tool.
	Widening communication channels	Moderate	High levels of success, particularly internal to the organization.	Blogs identified as the most important tool.
Enhanced information management practice		Moderate	Largely successful, but varies from organization to organization and depends on maturity of implementation.	Wikis identified as the most important tool.
Improved productivity		Moderate	Mixed experience to date and difficult to demonstrate.	Wikis identified as the most important tool.
Positive cultural change and widened employee choice		Moderate	Experience to date is positive.	Efforts to recruit and retain talent may force organizations to adopt social networking tools.

Table 7: Summary of research findings on risks of social computing environments

Risk	Aspect	Level of risk as perceived by study participants	Instances of risk in practice	Notes
Information management risk	Restricted access to information resources	High	Currently a major issue.	The issue of "control" is counter-intuitive in a social computing environment.
	Proliferation of information sources and systems	High	Currently a major issue.	Main issues are access and version control.
	Information overload	Low	Not a major problem.	Social computing tools, properly deployed, lower information overload.
	Decreased information quality	Low	Accuracy of information on wikis is a concern.	Need for clear guidelines on governance identified.
Compromised security	Legal infringement	High	None cited.	This is a theoretical rather than actual risk and/or lack of evidence of breaches may be related to high levels of control or low levels of uptake.
	Disrepute	Moderate	None cited.	Blogs seen as a potential problem.
	Leakage of confidential data	Moderate	Several examples provided.	Lack of care with blogs, wikis and social networking raises issues.
	Identity theft	Low	None cited.	

Risk	Aspect	Level of risk as perceived by study participants	Instances of risk in practice	Notes
Productivity risk		Low	No serious cases cited.	The main risk here is that lowered productivity is perceived to be a risk since this inhibits tool adoption.
Risk of anti-social behaviour		Low	None cited.	
Risk of implementation failure	Partial or non-implementation	High	Much evidence.	This is the biggest risk.
	Tools adopted but not in support of collaborative work	High	Much evidence.	

The research also sought to identify the relative value of each of the major social computing tools within the context of the opportunities and risks that they pose. Drawing on the summary data from Table 6 and Table 7 above the "top" tools are wikis, blogs and social networking applications, as shown in Table 8 below. It should be noted that this analysis does not align exactly with that presented Table 4 on page 15: in common with the earlier analysis wikis are regarded most highly, and the ranking of tools matches their availability within organizations. However, as far as usage and value of tools for collaborative work in general in concerned, the rankings are inconsistent, with social networking being favoured over blogging, and instant messaging featuring more highly in the context of nature of uptake of social computing in general.

Table 8: "Top" social computing tools in the context of opportunity and risk factors

Rank	Tool	Opportunities for	Risks posed
1	Wikis	Improvements in organizational knowledge and information sharing, information management practice, productivity.	Information quality in terms of accuracy of material held on wikis, leakage of confidential data.
2	Blogs	Connecting individuals and groups, widening communication channels.	Disrepute, leakage of confidential data.
3	Social networking	Encouraging positive cultural change and widened employee choice.	Leakage of confidential data.

The overview of research results as presented above demonstrates that knowledge and information professionals have a largely positive view of the value of social computing tools, with many having already seen

their benefit in the workplace. Knowledge and information professionals are also aware of the risks that such tools present. However, on the whole, few have witnessed the full range of possible negative outcomes that the adoption of social computing tools may pose in the organizational context. The lack of concrete information on the majority of identified risks indicates that these may be more prominent in theory than in reality.

It is worth noting that three of the risk factors that *are* of concern to knowledge and information professionals[23] (in that they are perceived as significant, and there is evidence to show that there are already associated problems) are closely aligned with key information management roles: providing access to resources and information governance. It is therefore perhaps not surprising that the study participants have readily identified these factors and illustrated their impact at work. This may also account for the higher value assigned to wikis (as open tools for the capture of explicit knowledge in the form of information) in contrast with social networking applications (where the output of collaborative work is less "visible"). Had the study participants been drawn from a wider mix of professions, or from a different set of employees, it is possible that risk may have been perceived differently. For example, given the nature of their role in disciplinary actions it is possible that human resources staff may see greater evidence of inappropriate use of social computing tools than their colleagues in information and knowledge management functions. It thus follows that the findings of this research merit interpretation within the context of the professional group on which it focuses.

Perhaps the most significant finding of the work is that the biggest concern related to social computing tools, as perceived by knowledge and information professionals, is that organizations will fail to capitalise on the opportunities offered by social computing environments. This may come about for one of two main reasons: either management takes the decision not to adopt social computing tools at all, or social computing tools are introduced in such a way that they are not deployed to their best advantage. Indications are that caution amongst decision-makers based on unwarranted fears lie behind reluctance to adopt. In cases where adoption has taken place, the risks of failure are largely familiar to anyone involved in a major technology implementation in the past three decades (see 6.3.5 above) such as early work on intranet development, or the roll-out of desk-top services: it is not the tools that determine the level of risk, but how they are introduced, deployed and governed. This is evident in the findings on the opportunities offered by social computing environments, most notably with reference to the potential for collaboration. The mixed accounts of success are largely dependent on local practice, and not on a particular technology choice such as, for example, the decision to favour blogs over wikis for project management. The inconclusive findings on the relative value of particular tools discussed above also support the argument that *how* an implementation is made is highly significant. The lack of a consistent message on tool availability, usage and value also raise questions on return on technology investment, and the related issue of how to assess and demonstrate it.

The main concerns of organizations that have adopted, or are planning to adopt social computing tools point to a range of training needs amongst knowledge and information professionals. These include content that covers how knowledge and information professionals may:

- "Sell" social computing tools as valuable additions to organizational information infrastructure

- Play an active role in the implementation of social computing tools within organizations, including influencing broad decisions on tool choice, the management of the roll-out of services, and the design of governance guidelines

- Develop high-profile roles as mediators within social computing environments

As has been noted elsewhere in the report of this pilot study, organizational information infrastructures are experiencing a time rapid change as the social computing landscape evolves, and there is an indication from

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[23] Access to information resources, proliferation of information sources and systems, and leakage of confidential data.

some of the survey returns and discussions in the focus groups that there is a lack of familiarity amongst knowledge and information professionals with social computing tools. This applies both in general as well as to the business environment[24]. This would indicate a need for the provision of some basic introductory training on social computing tools with a focus on organizational use in support of information and knowledge management functions.

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[24] This is not surprising given that a number of participants work in organizations that have not embraced social computing tools.