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## **A tale of two trajectories: bottom-up social software adoption in differing organisational contexts**

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**Abstract:** The inherent bottom-up nature of social software diffusion differs markedly from the adoption trajectories to which most organisational IT strategies are accustomed. Through case studies in two organisations, this paper presents insights into how adoption of emergent social software platforms may take form, and discusses the implications of two radically different approaches to manage these processes. Our findings suggest that organisations may need to cede control over parts of the IT innovation adoption process to benefit from grassroots initiatives, and rather standardise successful innovations on an ongoing basis to avoid detrimental fragmentation of media usage across organisational boundaries.

**Keywords:** enterprise 2.0; IT innovation; technology adoption; social software; bottom-up processes; distributed organisations.

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## 1 Introduction

For organisations operating in the global knowledge economy, where technological innovations occur at a rapid pace, it is of ever greater importance to utilise Information and Communication Technologies (ICTs) to improve work processes, collaboration, knowledge sharing and innovative abilities. This is above all true in the geographically distributed settings of networked enterprises, facing challenges of coordination and collaboration across separate parts of the company and with outside partners. Presently, many researchers and practitioners accentuate the potential of emerging, social software to help overcome such challenges, by facilitating social interconnectedness both within and across organisational and geographical boundaries (DiMicco et al., 2009; Grudin, 2006; McAfee, 2007).

Due to the importance of ICTs in ever more aspects of organisational life, there is a great body of research investigating the factors that affect the success or failure of IT innovation adoption initiatives in organisations. Several influential theories have been developed to study the adoption of information systems, such as the Theory of Reasoned Action (Fishbein and Ajzen, 1975), Theory of Planned Behaviour (Ajzen, 1991), Social Cognitive Theory (Bandura, 1986), Innovation Diffusion Theory (Rogers, 1983), Innovation Diffusion Theory for Organisations (Rogers, 1995), Technology Acceptance Model (Davis, 1989), and the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003). These theories and models can be highly predictive in the right circumstances, and have identified numerous factors affecting the adoption process, both relating to the organisation (e.g., size and structure), its environment (e.g., competitive pressures), employee characteristics (e.g., computer experience) and the technology (e.g., compatibility with existing systems); see Jeyaraj et al. (2006) for a comprehensive review.

Even though there are a broad variety of theories in use, they share the commonality of considering the adoption process as a sequence of stages, in which decision-makers must first come to a conclusion about whether or not to implement a certain innovation, and then focus on gaining acceptance and assimilation within the organisation (Frambach and Schillewaert, 2002). As such, they aptly reflect the traditionally long and protracted process of technology adoption, involving multiple parties and several stages where different options are evaluated in systematic trials by IT departments and end-users. Such a paradigm, however, in which the adoption of IT innovations follows from a strategically based, centralised decision, is now being challenged by a tendency for social software adoption to occur 'under the radar' in organisations, as grassroots efforts led by front-line workers (Caya and Nielsen, 2009).

While prior research has provided insights into how groupware may be successfully adopted without managerial mandate, by gaining a critical mass of users who influence and maintain wider use within the organisation (Grudin and Palen, 1995), there is a distinct lack of empirically based knowledge as to how bottom-up IT innovation adoption takes form in the current socio-technical landscape. In order to realise the potential benefits afforded by new ICTs, new technologies must often be accompanied by complementary organisational changes (Castells, 1996; Orlikowski, 1993; Powell and Snellman, 2004), and the adoption of new ICTs may also lead to unexpected or undesirable side effects that do not become evident until organisational actors appropriate the new technologies into their work practices (Ciborra, 1996; DeSanctis and Monge, 1999; Orlikowski, 1996; Rolland, 2005). Thus, bottom-up social software adoption may entail different implications based on how such processes are (or are not) managed in different organisational contexts.

In this exploratory paper, we investigate how such processes take form in a comparative case study of two organisations, by examining similarities and diversity using qualitative methods (Ragin, 1994). Such an approach is appropriate, as understanding technology adoption requires careful examination of the interactions between technological features and the social context of use. More concretely, the purpose of this paper is to identify the implications of different ways of managing bottom-up social software adoption within organisations. The research is based on a grounded theory approach (Glaser and Strauss, 1967), where the present research question emerged from our empirical observations in an investigation of media usage and social capital. Yet while the findings from this study are particular to our field sites, it is possible to perform what Yin (2003) terms 'analytical generalisation' of theoretical concepts and patterns. Our aim, then, is to generalise these observed phenomena to specific implications in particular domains of action (Walsham, 1995), thus providing a description of generative mechanisms that may prove useful both to further research and to current practice.

The remainder of this paper is organised as follows. The next section sets the scene for our investigation, by presenting some relevant insights about the nature of social software and its adoption in organisations. Next, our research methodology and two research sites are presented. The subsequent sections provide an in-depth account of the bottom-up adoption processes observed in each case and the organisational backdrop in which they occurred. These narratives and central implications are then discussed, drawing upon insights from related research. The final section summarises the results and the contribution of our findings.

## **2 Adoption of social software in organisations**

Much of the former research within the IT innovation adoption field focuses on the factors that facilitate or inhibit the adoption and diffusion of emerging IT-based processes or products within a population of potential adopters. To this end, diverse theoretical approaches have been developed and utilised in a wide range of studies, using mostly quantitative, but also qualitative methods. Despite extensive variation, Fichman (2004) points out how the vast majority of this research has been conducted within a shared paradigm, where it is expected that organisations possessing certain characteristics or

operating in certain contexts will exhibit greater levels of innovation (in terms of frequency, earliness or extent of adoption). This line of research does, however, also entail several theoretical and methodological biases, such as a pro-innovation bias (“all adoption is good”), a rationality bias (“adopters make rational decisions”), a recall bias (unreliability of self-reports) and a pro-adopter bias in that non-adopters are understudied (Jeyaraj et al., 2006). Notably, there is overall a lack of integration and understanding of the linkages between individual and organisational adoption of IT innovations, as studies rarely examine how an organisational decision to adopt an innovation is actually implemented by individuals within the organisation (Jeyaraj et al., 2006).

Historically, it has often been the case that enterprises lag behind in adopting new technologies (Skeels and Grudin, 2009). E-mail and Instant Messaging (IM), for example, are generally considered mission critical systems today, yet researchers and industry analysts still argued about their appropriateness in the workplace years after they were first introduced. Presently social software is gaining a foothold in many enterprises, but, to a much larger extent than was the case for e-mail and IM, these emerging technologies spread amongst employees with extensive familiarity of using the internet for a wide range of purposes in the private sphere. As such, it is likely that prior experiences with social software shape expectations of how to get things done, and raise expectations for how to collaborate and communicate within the workplace (Caya and Nielsen, 2009).

While there exists no widely agreed-upon definition of social software, nor of which precise technologies are encompassed by the term, a shared foundation is that they are tools that support group communication and collaboration. Unlike the related term groupware, however, these do not only support groups with mutually dependent tasks, or that work towards explicit, shared goals, but also facilitate more emergent forms of collaboration and community. While much attention is currently directed towards the latest generations of tools emerging from the web 2.0 domain, such as blogs, wikis, social network sites, and new types of group filtering and recommendation systems, the authors of this paper maintain that traditional tools (e.g., discussion groups and mailing lists) sharing similar characteristics are equally deserving of the label social software as these more recent technologies.

Grudin (2006) points to four key characteristics of emerging technologies that have the potential of overcoming existing obstacles to knowledge management. By building on these points, we may pertinently describe the central characteristics of social software. First, social software is often relatively lightweight, i.e., with few steps required to get started, a low learning curve, and often accessible directly through a web browser. They are also often low cost solutions, or even open source, possibly hosted by external service providers. Secondly, social software makes information and activity highly visible – be it people’s relations, interests, plans, presence, opinions, writings or other outputs. Closely related to visibility, these technologies usually meet not only certain needs of the individual, but have additional value and benefits on a group level. Discussion forums, for example, may provide help for the individual seeking solutions to a problem, while also being available to anyone facing similar problems at a later time. Finally, social software enables groups to form and self-organise with a minimum of imposed structure. Unlike traditional groupware and organisation-wide collaboration tools, where employees are placed in organisationally or functionally defined groups top-down, social software facilitates self-organisation by allowing people to affiliate through personal choices and actions. As such, the true nature and potential of these

technologies only manifest when people incorporate them in their work routines. While the specific features provided by a tool may afford certain forms of usage to a larger extent than others, these systems can generally be appropriated by individuals and groups for a wide range of activities, both within and across organisational boundaries.

Prophets of the network society have long since asserted that technology would enable new network-based organisational structures, however, where hierarchical structures and geographical distance would become less influential (Castells, 1996). Still, the changes thus far have not been as fundamental and wide-ranging as some envisioned. Partly this can be attributed to political and cultural obstacles, that are likely to be relevant when considering social software in enterprise settings as well. Indeed, it is still quite common for organisations to disallow the use of social software, citing concerns about lack of security, content moderation and reduced employee productivity (Awareness, 2008). While such concerns may well be justified in some instances, these barriers may also relate to power issues and defensive routines inherent within the organisation. In their study of social network site adoption for internal communication in large organisations, Baltatzis et al. (2008) found a strong association between informants' hierarchical positions and negative perceptions of the value of changing workplace communication methods, proposing this to be considered a threat to existing power relations and work practices. Even while acknowledging the importance of adopting IT innovations in the organisation, decision-makers may not be comfortable with the practices associated with social software, which potentially reduce their ability of exerting unilateral control (McAfee, 2006). We may thus expect differences in the ability of organisations to adapt to this evolving technological landscape, and to draw advantage from the new opportunities afforded.

### **3 Research setting and methodology**

This study is part of a larger research project, in which interrelations between ICT use and social capital are examined across different organisational types and countries, using both qualitative and quantitative techniques. The current paper is based on interviews with project leaders and participants in two organisations.

#### *3.1 Case selection*

The selection of cases was based partly on convenience, in that existing relations were used to gain access to appropriate field sites, and partly strategic, wherein organisations were approached based on theoretical relevance. As such, both cases are primarily involved in knowledge-intensive work, relying more on intellectual capabilities and manipulation of information than on physical inputs or natural resources (Powell and Snellman, 2004). They also share the commonalities of being headquartered in Norway while operating internationally on a global market, being organised primarily around team – and project-work, and being dependent on ICT-based collaboration across geographical, organisational and cultural boundaries. However, and as presented below, the cases also differ in certain key dimensions that help us shed light upon our research questions. For reasons of confidentiality, the cases are given the pseudonyms of SIERRA and TANGO throughout the paper.

The groups of employees selected for interviews within each case were largely opportunity samples, as we had to adjust to the requirements of the participating organisations (e.g., no teams working on highly confidential projects or with upcoming deadlines). However we specified dimensions to which it would be interesting to gain some variation, including degree of distribution, international collaboration and demographic composition. Within each group we also requested a varied sample of informants in terms of age, gender, nationality, location, role in the team and length of time working in the company.

### *3.2 Case descriptions*

Our first case, dubbed SIERRA, is a research and development program in a large, Norwegian energy company. All in all, approximately 150 employees from the company's research department work in the program, which has been operational since the autumn of 2007. These are primarily located at three separate offices in different parts of Norway, plus a few participants from foreign offices. The typical employee in SIERRA is a 30–40 years old male with a PhD degree in one of several technical fields, although there is a moderate degree of variance in age, gender and education.

Overall, the company of which SIERRA is part can be described as a rather bureaucratic and hierarchic matrix organisation. The SIERRA program is organised in six long-lasting projects, further composed of several sub-projects of a more limited scope. While certain sub-projects were almost entirely co-located, many spanned across at least two offices. Employees sometimes work in more than one of these sub-projects, enjoying a reasonable degree of control over how they organise their own time and work. There was some degree of interdependence between the projects and sub-projects, as well as with other parts of the company.

Our second case, TANGO, comprises an engineering department of about 130 employees in a medium-sized, Norwegian software development company. The department is globally distributed across several countries, though mainly located in Scandinavia, Eastern Europe and South-East Asia. The predominately young men of TANGO have high levels of education in general, intermingled with a fair amount of autodidact programmers.

The company of which TANGO is part may be termed an adhocracy (Mintzberg, 1983), albeit with an increasing level of hierarchy, as the company has experienced significant growth over the last few years. While employees belong to quite stable teams closely connected to certain projects, they may easily be shuffled around to work on different projects for a short time as the need arises. There is generally a need for close and constant collaboration within the projects, which last from as short as a week to about a year in length. The projects are often oriented around a core of co-located team members, but as the company has grown it has increasingly relied on distributed collaboration with team members from different offices and countries.

### *3.3 Data collection and analysis*

A semi structured interview schedule was developed based on extant literature on social capital and work-related networks in organisations, while also covering the availability, usage and role of ICTs. A total of 46 in-depth semi-structured interviews were carried out, lasting between one and two hours. Of these, 30 interviews were conducted during

the autumn of 2008, with six project leaders, four sub-project leaders and a sample of project participants at all three sites in SIERRA. The remaining 16 interviews were conducted at TANGO during the spring of 2009, with one informant from human resources, two team leaders and 13 team members at three sites in different countries. All interviews were recorded and transcribed in full, and analysed with the help of the Atlas TI qualitative software package. The data analysis followed a grounded theory approach (Glaser and Strauss, 1967), in which the data was coded through a process of critical deconstruction and connected to higher level themes. The themes discussed in this paper emerged as important early on, allowing us to gain insight from several perspectives throughout the data collection effort. Where direct quotes are provided, these are *“italicised and in double quotation marks”*, and in some instances translated into ENGLISH by the author.

## 4 Results

In the following chapter, two illuminating narratives of bottom-up social software adoption are presented as they became apparent through the qualitative interviews.

### 4.1 SIERRA: introducing wikis in ‘hostile’ IT territory

One of our initial impressions in SIERRA was that of a discrepancy between the formal structure of projects and how work was actually performed. The level of collaboration across offices in the distributed projects was very limited, with the exception of a few individuals (often sub-project managers) acting as brokers (Burt, 1992) between separate sub-sets of co-workers. In terms of ICT usage, SIERRA had a very traditional media ecology, dominated by e-mail, telephone, videoconferencing, project sites and most preferably face-to-face meetings, as well as some use of IM.

There had been a few instances where high level managers had launched initiatives for moving beyond this practice, seeking to utilise technologies such as discussion forums or more extensive profile pages. However, these top-down initiatives slowly died out, largely because they lacked sufficient thrust to overcome employees’ resistance to changing their way of working. Consequently, there was a general lack of faith in the idea of successfully adopting any new ICT, unless this was done very vigilantly with effective sanctions ready at hand. After all, merely getting documents over from e-mail attachments to be shared at a project site entailed a major struggle, and was accomplished only after capping the size of all e-mail accounts.

Generally, however, there was a definite sense amongst managers that they ought to be better at taking advantage of new technologies, and then especially in terms of improving knowledge sharing within SIERRA. Unfortunately it was in no way clear whose responsibility it would be to initiate such a process, or moreover, to support the transition from having the technology available to actually using it purposefully. Furthermore, even project leaders, with quite high positions in the company hierarchy, did not feel confident that they could actually decide on their own to move beyond the standard ICT package in their projects. Notably, one project leader expressed the need for *“someone to just take charge and do something about it”*, a sentiment shared by others as well. However, while the improvement potential of adopting IT innovations was generally acknowledged, a lack of more than superficial knowledge of the nature of

emerging communication technologies led to a presupposition that almost anything social software related was outside the control of the company by default. Such security concerns were in line with the rather strict company policies on what software and services employees were allowed to install and use.

Amongst the project participants in SIERRA, there was a varying degree of discontentment over the existing ICT tools and policies, where two distinct perspectives could be identified. A majority of the informants seemed to accept the current IT environment, albeit grudgingly at times, as simply being a part of their working environment and outside their control. Not being able to connect with personal and professional contacts outside the company on IM could certainly be a bother, and the project sites were almost universally considered a suboptimal solution for supporting their work, but responses to this situation rarely went beyond resigned discontentment. A similar attitude was evident in relation to certain 'mandatory' ICT practices, such as the official guideline asserting that all project related e-mails were to be manually archived and categorised in the common project site – a tedious task in even the smallest of projects. As these policies were widely disregarded in the day to day operations, they rather contributed to a lack of respect for the IT regime as a whole. It should be noted, however, that a considerable number of informants were quite content with the current situation as well.

It soon became evident, however, that there existed a minority of employees who were more clearly discontent with the status quo, due largely to being aware of alternative and (in their opinion) superior technologies in support of their work. This group of employees, who, in reference to Von Hippel (1986), may be termed 'lead users', were persons with highly specialised needs that typically had a higher level of interest in ICTs than the 'general users', often extending to their lives outside work as well. Notably, their discontentment was not based merely on the perceived detriment to their personal productivity, but also considerations of the performance of the organisation as a whole. The knowledge that "*so many man-hours are wasted unnecessarily*", or that the company was paying an excessive cost for inferior software, would induce just as much frustration.

At one point, a few such lead users in SIERRA did in fact try to "just do something about it", after hearing word of a project in another part of the company where a few employees had set up a wiki and versioning control system to support their software development. These researchers did quite a bit of programming in their work, but felt very restricted by not having any other way to share their code than through e-mail or the project site (which was considered '*a nightmare*' due to the lack of a proper versioning system for anything except Microsoft documents). Thus, a similar open source wiki solution was set up on an internal server practically overnight, at an insignificant cost, and its use grew '*like wildfire*' through word-of-mouth. Soon it was used for many other purposes than software development, also amongst the 'general users', with several informants expressing genuine delight over having it available.

Accordingly, the response from the IT department to this development caused great dismay. More than once the system had been ordered shut down, without any attempts to communicate with the existing user base. The basic argument was twofold: such a solution was against current regulations, and the next version of the existing project sites would supposedly have similar functionality – although there was no indication of when that might be operational. Amongst several informants, this was understood as being a power issue, i.e., to mark authority by an unknowledgeable IT department

“*who might spend too much time travelling around listening to sales pitches by Microsoft, and too little time seeing what their users actually need*”. This antagonism was curiously reflected in their software platform of preference: while those officially in charge of the IT environment preferred standardised Microsoft solutions, the lead users were of an “open source mind-set” (which according to themselves is more guided by actual end user needs).

At one point, the IT department did indeed succeed in shutting down the wiki for a while. In order to avoid forfeiting their new and improved way of work, key actors of the bottom-up adoption movement employed several strategies. Most immediately, they appealed to various contacts upwards in the company hierarchy, using both formal and informal lines of communication, arguing that they were entirely dependent on the system for their work, and that the lack of any alternative resulted in a significant loss of productivity. This bought enough time to resume their ongoing missionary work, in which ‘evangelists’ would actively seek out other groups and persons in relevant positions to garner support and to spread the use of the system – the idea being that at a certain point, they would reach a critical mass (Markus, 1987) where any further attempts to shut it down would cause too much of an uproar to be possible. Such missionary work was at the same time altruistically motivated, however, in that they wanted their colleagues to enjoy the same benefits as themselves. An important aspect of this work was keeping it all ‘under the radar’, so that the IT department was not aware of the extent of this activity, and thus not able to react in time.

#### *4.2 TANGO: which right tool for the job?*

Our second case provides a very different story of social software adoption. One of the first things that became clear during the fieldwork in TANGO was a broadly based emphasis on openness. Employees were usually expected not only to provide help or information when asked directly, but to volunteer knowledge or relevant resources to the collective in shared ICT arenas. This culture was also evident in other aspects of their operations, such as a rather flat hierarchy, fluid organisational structure and a strategy of involving customers and end-users in the development work whenever possible.

There were no definite restrictions on what ICTs employees could use. In fact, management in TANGO actually encouraged employees to stay up-to-date and use new tools, both for internal and external communication and collaboration. Their ICT policy primarily concerned using technologies in a responsible manner, such as not to speak of upcoming release dates in public forums. Correspondingly, TANGO had a very complex media ecology. While there was extensive use of traditional media such as e-mail, mailing lists and IM, as well as much face-to-face interaction and regular meetings, there was also a wide spectrum of more novel ICTs in use. Wikis, (micro)blogs, chat, social network sites, discussion forums and various hybrid solutions were all represented to some degree or other. Beyond a core set of technologies that everyone was expected to use, each project in TANGO could decide independently on what software to use in support of their work processes. This freedom to select the tools perceived best for the task at hand was highly valued by the respondents. When discussing the role of the IT department in this matter, the general response was that they simply provided the server capacity and did not question the usage any further.

In this rather unregulated socio-technical landscape, innovations diffused along both formal and informal routes. People working at the same office would hear word of new

ICTs or practices from colleagues in different projects or from their personal networks outside the company, and follow up on this in their own work and projects. Some of these innovations would then ‘stick’, and spread within a given project. While this might sound all very well, a consequence of this freedom was the existence of several quite different media ecologies and use practices amongst the different offices. Most projects were, after all, still predominantly located at one office, where more frequent informal interactions seemed to have led to local ICT cultures over time. Challenges could arise, then, when teams expanded to include team members from other locations, or needed to collaborate with other teams in distant locations.

For collaboration spanning different teams and projects, negotiation had to be conducted in order to agree upon what tools to use. In some instances this would result in simply using basic tools, such as e-mail and telephone, even while acknowledging that this was suboptimal for the task at hand. As projects expanded to include distributed members, these would be required to adapt to the existing practices of the project – for instance by being available on Skype while at work, or keeping an eye on the IRC channel or mailing-lists for updates. Still, they also felt the need to use the tools used by colleagues at their local office, as informal interactions frequently took place in these arenas. Thus, they faced the dilemma of spending more time and attention on different channels than they would prefer, or to forfeit awareness either of what others were doing at the office, or of the ongoing status of geographically distributed projects.

“It’s overwhelming. Like there are so many communication channels, well it’s not a problem if you don’t have to follow them in real time, but many of them you have to be present and answer questions, so sometimes it’s distracting from the main job.”

Characterising the situation well is the adoption of a tool we dub ‘KIK’ in the following. This rather obscure hybrid of a discussion forum and chat system was initially adopted at a foreign office comprising just a handful of individuals, at a time prior to being acquired by the company of which TANGO is part. As the office has grown, new employees have adopted the system as the de facto digital arena for both formal and informal communications. While newer employees considered KIK to be quite different from what they would have chosen independently, it became an excellent tool for continuous awareness and quick questions and answers once you got used to it. Difficulties arose, however, as teams from this office expanded to include members from a new office in yet another country.

As local, informal interactions took place via other means in the new office, these new team members did not experience the same breadth of social pressure to participate in the KIK system. Still, they often felt obliged to at least be logged in, as team members from the originating office wished to have them available in the same manner as they were used to. Thus, the new members would use the system to the minimal extent required, but without experiencing the same advantages as those at the originating office. Indeed, one informant merely described it as ‘a black hole’, as you never knew if or when an answer would come, entirely contradictory to the perceptions at the originating office. For all interactions amongst the new team members, then, they would continue using their own channels, which thereby were not visible to the rest of their team. Even employees at the originating office acknowledged that the current situation was not optimal in terms of interoffice collaboration and knowledge sharing. However, KIK usage seemed to continue out of habit and because of the local benefits.

“For interoffice stuff it’s KIK, because they are heading the project they chose this form of communication, and we are newcomers to the project so we adapted.” (Team member at new office)

Interestingly, several informants (and notably all from the newest office) expressed that they would welcome a more centralised ICT strategy, in order to create a single, easily searchable, shared platform where everyone in the company could be reached. The advantage of being certain that everyone used the same solution was considered as great as to outweigh if it wasn’t perfect in all other regards. Lacking an official decision, however, there would always be groups of people dissatisfied with the current solution and seeking to move onto something else.

## **5 Discussion**

As has been described, our investigation revealed two markedly different approaches to IT innovation adoption. Where one organisation tried to control such processes by means of strict regulation, the other allowed them to transpire in an evolutionary fashion. Still, our findings show that bottom-up processes played an important role in both cases, albeit with wholly different implications.

One immediately evident implication relates to employee satisfaction. By seeking control and standardisation of the IT environment in SIERRA, many employees became discontent and those with needs and wants beyond the standard package even more so. As these knowledge workers generally have a high degree of autonomy in how they perform their work, constraints perceived to unnecessarily hinder their performance could lead to conflicts and antagonism. Conversely, by allowing employees the freedom to select the tools perceived best suited for the tasks at hand, TANGO was able to bring about a much appreciated sense of local control in the projects. This is in accordance with a long line of research on psychological empowerment, that has shown how control over work conditions and processes is an important factor for job satisfaction (Deci et al., 1989; Spector, 1986), which in turn is known to affect job performance, motivation, turnover and organisational commitment (Judge, 1993; Martin and Bennett, 1996; Williams and Anderson, 1991). However, while the overall level of satisfaction may have been greater in TANGO, there was also much greater variation across different parts of the company, to the detriment of those in less central positions. The apparently advantageous relation between increased freedom of choice and employee satisfaction may thus be moderated by the degree of geographical distribution and boundary spanning interdependence.

Another central implication relates to the extent to which social software is adopted and utilised. While the approach adopted in TANGO afforded a continuous exploration of new opportunities amongst the employees, the policy of centralised control in SIERRA was an unequivocal barrier to the adoption of IT innovations. The centralised IT department, managing a wide range of systems and users, did not seem to be up to date on the technological developments that were noticeable by employees intimately involved in the specialised work tasks that would benefit from such tools and services. Discussing user innovation in manufacturing, Von Hippel (2005, p.14) points out that when

“the information needed to innovate in important ways is widely distributed, the traditional pattern of concentrating innovation-support resources on a few individuals is hugely inefficient.”

In a very similar sense, the traditional IT innovation adoption process within organisations, where standardised solutions become available only after months of testing and piloting, seemed an unnecessarily protracted and inefficient process for employees with sufficient competence to know exactly what they needed and how to get it at a marginal cost. This should also be seen in relation to the central characteristics of social software, in that these were primarily light weight, easily available solutions, whose utility was magnified in unplanned ways as others adapted the technology to their own unique working conditions.

It is highly plausible, however, that some of the differences observed were not only related to policies, but also to employee characteristics in the two cases. While those who played important roles in the bottom-up process were termed lead users in SIERRA, TANGO was composed almost exclusively of such employees. As part of a global software development company, the diverse media ecology observed in TANGO should at least in part be attributed to the generally high interest in cutting edge technology amongst the employees. Similarly, the IT policy in TANGO should also be seen in relation to employee characteristics. Due to their extensive computer experience, TANGO employees were not only less likely to unknowingly pose security risks, but considering their general emphasis on openness and freedom of choice, it would be more challenging to attract highly skilled employees into a locked down environment if this were to be considered.

Yet, the strategy in TANGO went beyond merely providing employees with freedom of choice, to actually encouraging the adoption of IT innovations. This supporting attitude was based on an overall awareness of the nature and potential benefits of social software at all levels in TANGO. As such, it is reasonable to propose that their high level of IT innovation adoption was also a result of a general ‘predisposition to innovate’ (Morrison, 1996) in the organisation. In existing research on IT adoption, top management support has reliably been proven one of the best predictors of adoption both by organisations and individual employees (Jeyaraj et al., 2006), and the same seems to be true for these bottom-up processes.

However, while the approach in TANGO may entail a greater potential for adopting IT innovations, our findings show how the outcome of these processes need not necessarily be beneficial to the overall operations of the organisation. A lack of centralised control led to fragmented media usage across sub-units over time, which in turn entailed significant barriers to boundary spanning collaboration. So even if facilitating bottom-up processes entails a greater ability to adopt IT innovations at a faster pace, benefits may remain local rather than global, due to a prevalence of localised interactions and practices.

Furthermore, the need to be present at several different arenas was in some cases perceived as distracting from the work tasks at hand. As shifting ones attention from one focus to another demands a cognitive effort, in which the context of the current activity may be lost, a greater level of decentralised social software adoption may contribute to a sense of cognitive overload amongst employees (Kirsh, 2000). Amidst popular beliefs that allowing the use of social software will lead to wasted time on non-work-related communication, our findings suggest that a more pertinent concern may be reduced

employee productivity due to the efforts required to keep track of, and switch between, several different media. However, the relative importance of these concerns is likely related to features of the technologies in question and the domain in which they are used. Specifically, the findings presented in this paper all concerned tools that were deployed in support of internal communication and collaboration in the organisations, rather than in support of individual employee's external social networks and interactions.

It is noteworthy that the liabilities of an overly complex media ecology seemed to have emerged only after the company had reached a certain size and degree of distribution, as well as after a period of rapid growth. Apparently IT innovations had diffused, and convergent practices had emerged more easily when existing as a smaller organisation, in which there were also more frequent interactions between the employees. These findings are in accordance with what has been previously suggested about the importance of social norms and persuasion on individual acceptance of organisationally adopted innovations (Davis et al., 1989; Mirvis et al., 1991). The fact that many employees in the more peripheral office, having similar individual characteristics to those in TANGO on the whole, would actually prefer less freedom of choice is a very clear sign that a more liberal approach to IT innovation adoption is not a superior option per se. Rather, we can see the important role of centralised control in reducing complexity and uncertainty, and "levelling the playing field" (for better and worse), as all employees are on the same platform.

One final theme that deserves mentioning relates to the role of the IT department in these processes. It was evident that key actors in the SIERRA bottom-up adoption initiative considered other goals than satisfying user needs, or the overall welfare of company, to be the primary driver in the existing adoption strategy. These assertions resonate well with the findings of Baltatzis et al. (2008), in terms of social software characteristics being a potential threat to existing power relations. While these sentiments were not widely proposed, and we lack sufficient input from other perspectives on this matter, it is not difficult to see how IT innovations that are low cost or freely available, easily configured, maintained and supported, possibly even hosted outside the company, may be considered unaligned with interests such as increased budgets and influence within the organisation.

## **6 Conclusion**

The current technological landscape is in rapid and continuous development, where the combination of easily available, low-cost social software and an increasingly specialised and ICT competent workforce pose novel challenges to knowledge-intensive organisations. In these circumstances, there is an inherent tension between the imperative goal of utilising innovative ideas and technologies, and traditional aspirations of maintaining centralised control over IT innovation adoption processes. This paper has presented much needed empirical insights into how bottom-up social software adoption can take form in different organisational contexts, and discussed several implications of how such processes were managed.

Our findings from SIERRA demonstrate how relying exclusively on centrally controlled IT innovation adoption may reduce the potential for utilising innovative technologies, which in turn limits the opportunities for employees to find more efficient

ways of conducting their work. Moreover, as tenacious employees are prone to seek ways in which to improve their working conditions, employing a variety of resourceful strategies even in controlled environments, constraints perceived as repressive may both prove ineffective and lead to conflicts and reduced employee satisfaction. On the surface, then, it would seem that ceding some degree of control over the IT innovation adoption process would be beneficial, in order to nurture (rather than hinder) bottom-up initiatives.

Yet while allowing – or even encouraging – grassroots initiatives may contribute to the quantity of innovative technologies and work practices adopted, our investigation in TANGO highlights how the benefits of such an approach may remain local rather than global without centralised coordination, due to the emergence of a fragmented media ecology. As the organisation expanded, both in size and geographical distribution, the advantages of their decentralised approach became increasingly outweighed by liabilities. To some extent, then, the centralised IT innovation adoption approach in SIERRA is better aligned with the challenges arising from a large and complex organisation, in that the resulting standardisation reduces diversity and uncertainty.

However, the ever-increasing demands for organisations to be flexible and responsive require practices capable of dealing with continuous change. If traditional IT innovation adoption strategies do not adapt to the changing organisational and technological contexts in which work is being conducted, new technological opportunities, such as those provided by social software, may be under – or inappropriately utilised, leading to competitive disadvantage in the long run. As such, practitioners may have something to learn from both of the rather extreme positions described in this paper. Insofar as we can draw a general conclusion from this two-case study, a more promising strategy may be to systematically identify lead users, in order to co-manage emerging grassroots initiatives, and rather promote and standardise emergent ‘winners’ of this evolution on a more ongoing basis.

Certain limitations should be noted when considering these results. As the theme of IT innovation adoption was not primordial within the project, we may not have gained sufficient insight into the perspectives of management and representatives of the IT departments on these matters. As such, a broader sample of informants would certainly have been beneficial. Furthermore, the level of detail presented about the adoption processes from each case was necessarily somewhat less extensive than could be wanted, due to the comparative nature of this study. Lastly, a more thorough examination of how the characteristics of individuals, organisational contexts and situational factors affect these bottom-up processes is needed. Further research should thus be conducted in contexts differing in relevant characteristics, in order to establish a more general framework.

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