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Abstract

There is some evidence of the unabated proliferation of employee-autonomous, informal in an enterprise sense, collaborative information technologies (CITs) to perform collaborative activities despite huge investments in CIT enterprise systems. This article will introduce the metaphorical construct of "shadow CIT" (similar to "shadow IT" – Raden, 2005; Schaffner, 2007) to describe the strategic choice to use autonomous CITs instead of formal enterprise CITs. "Shadow IT" has been defined by Raden (2005) as a set of IT tools used "for performing IT functions but not part of the mainstream IT organization" (p.1). Similarly, "shadow CIT" solutions are employee-autonomous: they are not implemented as part of the organisational IT infrastructure, neither have they received any targeted organisational investment. Several research questions are explored in this paper. The existence of "shadow IT" has been argued to imply a failure on the part of enterprise IT to provide all of the services to meet their users' needs. Does the existence of "shadow CIT" imply a failure of enterprise CITs of a similar kind? If shadow CITs are found to be [capable of] filling gaps within enterprise CITs, what kind of gaps are these? Often, without being able to articulate why, users appear to shun solutions and good architecture within enterprise CITs in favour of the ability to get their work done through autonomous "shadow" solutions. What kind of motivation may be driving such decisions?

Keywords: collaboration information technology, CIT, group support system, GSS, computer supported collaborative work, CSCW, technology acceptance, technology diffusion, CIT use, CIT acquisition trends

1 Introduction

Since its inception, the field of computer supported collaborative work (CSCW) has been concerned with the development – and, by extension, the use – of collaboration support systems. The purpose of this paper is to analyse "formal" and "shadow" (autonomous) collaborative solutions, by differentiating between their usage patterns, and the motivational factors driving their adoption. The paper is structured as follows: 1) we give some background information, characterizing the field of CSCW, 2) we then present a description of the source data through briefly outlining two principal findings, 3) we assess the debate through a comparison between "shortcomings of proprietary CITs", and "advantages offered by shadow CITs" – organized around a four-issue framework, reflecting the critical concerns of compatibility, performance, personal satisfaction, and affordability, 4) we summarize and critically evaluate the observations through the lense of IS strategic planning theory. The following section gives some background information, characterising the field of CSCW.

2 Background

An ever-increasing number of systems have been developed recently, with the aim of supporting collaborative work. Along with the thousands of man-years, and millions of dollars, invested in the development of formal groupware solutions (usually proprietary and created by professionals), a new type of groupware has concurrently emerged: user-created and community-driven groupware, produced by non-paid volunteer contributors, and available for free usage. Consequently, contemporary groupware seems to be fighting a battle on two fronts – both of which appear likely to escalate significantly in the years ahead in our view. A clash between traditional (formal) and new (autonomous) collaborative platforms is well underway (see Figure 1-1).
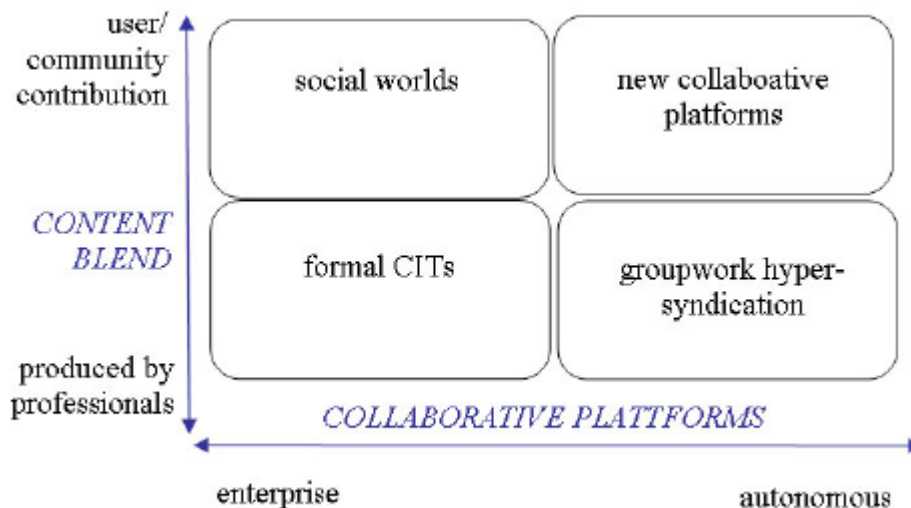
Figure 1-1: CIT developments[1]

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[1] Figure 1-1 is inspired by the 2007 Report of the IBM Institute for Business Value study (IBM 2007). Our diagram is by analogy — the Figure we draw from is Figure 5 on page 4. The authors describe an entirely different domain – the one of media distribution. We transfer the logic into the CSCW domain.

With formal CITs, content is most often produced by professionals, distributed through proprietary platforms, and utilised as part of the organisational IT infrastructure. In the world of new collaborative media, content is increasingly user-created, enhanced by community contribution, and accessed through open platforms. These polarized tendencies are probably destined to collide. The first symptom is the emergence of autonomous collaborative platforms and their growth into a threat for proprietary solutions. The synthesis of user-created and professionally-created content, together with the dissonance between enterprise and autonomous collaborative platforms, is causing disruptions and forcing new alliances (Figure 1-1).

Distributed organizations are a collection of heterogeneous *social worlds* with unique cultures and practices (cf. Schein, 1985). People belong to multiple social worlds. We agree with Mark and Poltrock (2004) who proposed that, in complex distributed organizations, social worlds make sense to view as the unit of adoption because team boundaries fluctuate as teams form and reconfigure. In contrast to most organizational theory, the units of analysis in Social World Theory (Strauss 1978, Clarke 1991) have fluid structure. They are connected through communication rather than by geographical location (Shibutani 1955). We deem other units of analysis like "communities of practice" (whose boundaries do not necessarily match those of the adoption units), "social networks" (focusing on a person's "ego network" which is more likely to be a collection of individuals as opposed to a distributed work group with unique properties), and "open systems" (accounting for influences from groups external to one's workplace but not for
their intersection) less suitable for studying CIT diffusion. In contrast, social worlds intersect with each other and have fluid boundaries.

New collaborative platforms are another important unit of analysis in our view (see Figure 1.1). The cheaply networked Web 2.0 technologies of the 90s created many new kinds of collaborative media – an unprecedented micromedia explosion. The incentives for "prosumers" to produce a huge plethora of forms of micromedia popped into existence; wikis, blogs, moodles, podcasts, vlogs, machinima, fan films, and cosplay are just a few examples (Shumarova and Swatman 2007). These tools are accessible through open, usually web-based, platforms. As reported in recent literature, open CIT platforms are enjoying excellent rates of implementation and usage (see 3/Finding 1 below). Quite contrary to them, *formal* CITs have only slowly been winning an uphill battle diffusing into organisations (see 3/Finding 2 below), and are increasingly being threatened to be – either partially or entirely – supplanted by informal solutions. The obvious benefits for team collaboration achieved through the use of formal CITs in experimental settings do not appear to be so obvious on an organizational scale. Globally over the last few decades, many millions of dollars have been spent, and many person-years of high-quality research invested in what we might, in the broadest terms describe as computer supported cooperative work (CSCW) research. Nonetheless, the impact of this research on organisations – commercial, governmental – has been disappointingly small. A cynic might go so far as to say: "once you have said MS Exchange and Lotus Notes, you have said all there is to say about serious enterprise CITs".

Proviing adequate technology to support modern collaborative work has proven to be a difficult task, and various complex factors are aggravating the problem. One factor is in our view underlying for most of the challenges, and this is g*roupwork hyper-syndication*. As organizations are becoming more diffuse – both through geographical distribution and through dynamic and flexible organisational structures – the adoption of collaborative information technology (CIT) to support collaborative work becomes more of a challenge (Mark and Poltrock 2003). In these organisational settings, people often are members of multiple collaborations, assuming different roles in each (e.g. engineer, manager, task force committee member) (Mark and Poltrock 2004). Therefore, group tasks often vary and vary significantly. There is no isolated, single workplace, rather there is a networked workspace where distributed functionality and ubiquitous information are bringing about higher levels of task fragmentation. Recent evidence from case studies suggests that multiple ITs are required to support collaborative efforts of virtual team members (see Lewis et al. 2004). Additionally aggravating in this respect are two recent developments: the transfer from "localized systems" to "global digital infrastructure" (technology landscape changes), and the transfer from simple value chain management to business componentization (business landscape changes) (Straeten 2007). On this background, we have explored recent CSCW literature, and performed a careful review of what has been studied, and discovered about collaborative technologies. The next section presents an overview of our research methodology.

3   Research Methodology

The present work is a continued discussion of some of the results of an extensive content analysis of CIT literature we have conducted in Shumarova and Swatman (2008)[2]. To locate studies, we performed a keyword-based search on the SCOPUS database, applying a keyword set of "adoption", "diffusion, "uptake", "use" etc., combined with different term-variations for CIT – i.e. computer supported collaborative work (CSCW), group support systems (GSS), groupware (GW), collaboration support software (CSS), group communication support systems (GCSS). The content analysis data comprised a corpus of 374 randomly downloaded research papers published in the field of collaboration information systems (i.e. CSCW) over the last decade, i.e. 1997 up to 2008. Some tentative findings emerged from the analysis, two of which claimed the following:

Finding 1: A previously under-researched collaboration system type, i.e. webbased *social* collaboration systems, seems to be growing into a central focus of reporting in literature. More than 16 % of all randomly downloaded studies, and 33 % of web-based system studies, dealt with web-based *social* collaboration systems (e.g. Bachnik, Szymczyk et al. 2005; Cooke 2006; Fichter 2005, 2003; Fine 2005; Gely and Bierman 2006; Haythornthwaite 2000; Madden 2005; Martin 2007; Powell 2007; Sgouropoulou, Koutoumanos et al. 2000; Laff 2007; Strupp 2005; Wilson 2006 etc.).

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[2] Shumarova and Swatman (2008) is submitted for publication at the International Conference on Information Systems, ICIS 2008 – December 14 to 17, Paris, France. All findings are presented in detail in Shumarova and Swatman (2008). Two of the findings are quoted here briefly in order to facilitate the following extended discussion.

The vast majority of the studies, devoted to web-based social collaboration systems, were advocating their enormous potential use for modern collaboration, and were proclaiming their growing popularity. A substantial part of the reporting stressed the point that – in enterprise settings – social software was being adopted *autonomously*. Thereby, the adoption process was self-initiated and self-directed by individual employees, often in conflict with the formal organisational IT infrastructure. Web-based social collaboration systems were reported to cover (include) the following applications: blogs (or weblogs) for storytelling (61.54% reporting within web-based social collaboration systems), the corresponding blogging server software and blogging platforms and aggregators necessary for internal blog aggregation (microblogging), wikis (15.38% reporting), forums, hypertext and unstructured search tools, collaborative planning software for peer-based project planning and management, ideas banks for ideation (idea generation), social networking tools, enterprise social bookmarking platforms for tagging and building organizational folksonomies, podcasts, web-based RSS (rich site summary) aggregators, RSS for signaling, mashups for visualization, newsgroups, group message boards, and prediction and forecasting platforms (so called prediction markets) (Shumarova and Swatman 2008).

Finding 2: A rich literature supports the view that numerable formal CITs have not reached mass uptake, high utilization levels, or critical mass, and have been slow to transition into the workplace (e.g. Agostini and De Michelis, 2000, p. 335; Agres, DeVreede, Briggs 2005, p. 267, p.268; Bajwa et. al. 2004, p.66; Bajwa et al. 2005, p.137; Bentley, Horstmann et al. 1997; Brézillon and Pomerol 1997, p.1; Briggs and Adkins et al. 1999, p.152; Chen and Lou 2002, p.1; Dennis and Reinicke, 2004; Lewis et al. 2007, p. 387; Munkvold and Anson 2001, p. 279; Whittaker and Schwarz, 1999). For example, Bajwa, Lewis et al. (2005)'s results indicated that email and audio teleconferencing were perhaps the only two CITs that have been widely adopted within the enterprise. As far as CIT utilization levels are concerned, their results indicated that except for email, none of the other formal CITs had high utilization levels (Bajwa, Lewis et al. 2005). Although no reliable generalisation on the state of current CIT diffusion can be inferred, a stochastic trend toward acknowledging a failure of formal CIT mass uptake is obvious (Shumarova and Swatman 2008).

The aforementioned remarks, as reflected in Findings 1 and 2 above, raise some penetrating questions: why are formal CITs not infusing massively in organisations? Why are social web-based tools enjoying growing user acceptance? Apparently, enhancing groupwork through [exclusively] traditional CIT is no mantra to ward off evil but rather a mixed blessing. It seems worthwhile to dig deeper into the most commonly quoted contrast: lack of user acceptance for formal collaborative tools, and fairly high user acceptance for social collaborative tools. Analysing this reported contrast is the purpose of the present work. The following section describes the structure of this essay, as well as the basic terminology used for its purposes.

3.1 Study nomenclature and structure

For the purpose of this study, we introduce the metaphorical construct of "shadow CIT" – similar to "shadow IT" (Raden 2005; Schaffner 2007) – to describe the strategic choice to use autonomous CITs (for example web-based social collaboration tools) instead of enterprise/formal CIT tools. "Shadow IT" has been defined by Raden (2005, p.1) as a set of IT tools used "for performing IT functions but not part of the mainstream IT organization". Similarly, "shadow CIT" solutions are employee-autonomous: they are not implemented as part of the organisational IT infrastructure, and have not received any targeted investment. Often, without being able to articulate why, users appear to shun enterprise CITs and "good" architecture in favour of the ability to get their work done through autonomous "shadow" solutions. In our attempt to shed some light on what kind of motivation may be driving such decisions, we shall be guided by the following research questions:

- Does the existence of "shadow CIT" imply a failure on the part of enterprise CIT to provide all of the services to meet their users' needs?
- If shadow CITs are found to be [capable of] filling gaps within enterprise CITs, what kind of gaps are these?

To understand the issue precisely, it is necessary to clearly differentiate between what we mean by "formal" and what we mean by "shadow" solutions. First of all, formal solutions are organisation-mandated, while shadow solutions are adopted by individual employees autonomously, through self-initiative, and they are selfselected. Formal solutions are an *intended* part of the organisational IT infrastructure, and the result of targeted investment. Shadow solutions are, by contrast, emergent, *defacto* collaboration systems. Formal solutions are organisational strategy-driven, while shadow solutions are social culture-driven. Formal solutions are usually created by professionals, while shadow solutions are created by the user community. Last but not least, in contrast to formal collaborative solutions, which impose structure *prior* to use, shadow solutions tend to encourage use prior to providing structure by offering more user participation and authenticity. The section below provides an issues summary of reported failures of formal CITs, as well as advantages of (i.e. gaps filled by) shadow CITs.

4 Issues Summary: shortcomings of formal channels and advantages offered by informal channels of collaboration

> *"The traditional enterprise lags very far behind the Internet and the consumer world. Unfortunately, traditional business applications require tons and tons of training, the best example being ERP. The other fundamental problem is: because of the scale of information, and the rapid exchange, these traditional collaboration systems really fail at the scale and pace that things are happening today".*
>
> *Matthew Glotzbach,*
> *Head of Enterprise Products, Google (Glotzbach 2006)*

To identify possible gaps that informal collaboration channels may be capable of filling, we have employed a methodology of comparison between "shortcomings of proprietary CITs", and "advantages offered by shadow CITs" – both located through our extensive content analysis of CSCW literature. The comparison is organized around a four-issue scheme, reflecting four critical concerns: "performance", "personal satisfaction", "compatibility", and "affordability". These four issues have been identified as critical based on their regularity of reporting in literature (see Table 4-1). The following shortcomings of proprietary CITs have been recognised and widely discussed in literature:

Issues of *"performance"*
• Proprietary CITs require training on the technology.
• Proprietary CITs are facilitator dependent.
• Their usage requires many sessions.

Issues of *"personal satisfaction"*
• Proprietary CIT usage is associated with loss of [human] affective reward.
• Lack of anonymity hinders freedom of expression.
• Leader domination hinders active participation.

Issues of *"compatibility"*
• Proprietary CITs have not reached critical mass.
• Transition to organizational CIT is complex and time-consuming.
• Lack of compatibility hinders cross-organisational use of CITs.

Issues of *"affordability"*
• Proprietary suites are costly.
• Economic causes make some CIT facilities self-extinguishing.
• Proprietary CIT equipment requires additional costs for facilitation.

Table 4-1 below reviews some seminal CSCW papers and indicates the presence of reporting in each of them on one or more of the above-mentioned issues.

Reported shortcomings of proprietary CITs												
Reference	performance			personal satisfaction			compatibility			affordability		
	Require training on the technology	Facilitator dependent	Usage requires many sessions	Loss of affective reward	Lack of anonymity hinders freedom of expression	Leader domination hinders active participation	Proprietary CITs have not reached critical mass	Transition to organizational CIT is complex and time-consuming	Lack of compatibility hinders cross-organisational use of CITs	Proprietary suites are costly	Economic causes make some CIT facilities self-extinguishing	Proprietary CIT equipment requires additional costs for facilitation
Lewis et al. 2007	x	x			x		x	x	x	x	x	x
Agres, De Vreede, Briggs 2005	x	x	x				x					x
Bajwa, Lewis et al. 2005							x					
Fichter 2005								x		x		
Briggs, De Vreede et al. 2003	x	x	x	x	x			x	x	x	x	x
Fjermestdad J. and Hiltz S.R. 2001	x	x	x		x	x						
Munkvold and Anson 2001	x	x					x	x				x
Briggs, Adkins et al. 1999	x	x	x	x			x	x				x
Brézillon and Pomerol 1997							x				x	
Nunamaker J. et al. 1997	x	x	x		x	x		x				x
Reinig, Briggs et al. 1997				x								

Table 4-1: Shortcomings of proprietary CITs as reported in literature

Table 4-2 presents an overview of the advantages offered by some informal channels of collaboration, identified to have been most widely discussed in literature. According to our content analysis results, most widely discussed are blogs, or weblogs (61.54% reporting within web-based social collaboration systems), wikis (15.38% reporting), and the generic type of *conversational* collaborative applications. The latter have been the object of a rich body of case and field studies (e.g. Anderson and McCarthy 2005; Carletta, Anderson et al. 2000; Fitzpatrick 1999; Fono and Baecker 2006; Kethers, Hargreaves et al. 2004; Mark and Poltrock 2003; Mark and Poltrock 2004; Ocker and Yaverbaum 1999; Müller, Raven et al. 2003; Reimer 2006; Van Dolen and De Ruyter 2002; Vincent 2000 etc.). Some examples of conversational collaborative applications include data-conferencing, instant messaging, chat, bi-directional chat-like facilities, webbased discussion moderation tools, common information spaces, etc. To ensure consistency of comparison between reported "shortcomings of proprietary CITs", and "advantages offered by shadow CITs", Table 4-2 is organised around the same four-issue scheme (as in Table 4-1), reflecting the critical concerns of "performance", "personal satisfaction", "compatibility", and "affordability".

		blogs	wikis	conversational tools
performance	speed	good	good	excellent
	easy content update and dissemination	excellent	excellent	excellent
	reliable archiving/ journaling capability/ easy traceability	excellent	very good	bad
		excellent	excellent	very good
personal satisfaction	freedom of expression	excellent	excellent	excellent
	discussion	excellent	satisfactory	satisfactory
	man-to-man communication/ affective reward	very good	satisfactory	satisfactory
	active involvement/ perceived behavioural control	excellent	excellent	very good
compatibility	transferability/ pervasiveness	excellent	excellent	excellent
	ability to seek advice outside the enterprise/ build communities of interests	excellent	excellent	excellent
affordability	quick return on investment	excellent	excellent	excellent

Table 4-2: Reported advantages and levels of fulfilment offered by informal CITs

"Performance expectancy" in the context of technology acceptance stems from Social Cognitive Theory, and has been defined as dealing with job-related outcomes (Compeau and Higgins 1995). The first requirement performance expectancy places on groupware – in the contemporary unstructured teamwork environment – is that of *speed.* Most conversational tools (e.g. instant messaging) offer immediate gratification by providing real-time, instantaneous communication. Minor matters can

be cleared up instantly (Fichter 2005). Blogs are also successful at spreading ideas quickly. With their RSS feeds notifying the users of new posts, blogs are very gratifying for *easy content update and dissemination*. The so called "tipping point" effect in maximizing impact on social networks can come into play which allows effective swapping of links, collaborative tagging, referencing etc. – leading to enhanced content, and turning some blogs into excellent knowledge-sharing repositories.

The first requirement performance expectancy places on groupware is that of easy traceability of information: the journaling capability allowing reliable archiving. Blogs are excellent archives for a couple of reasons. First, with their reversechronological order (the most recent posts come first) blogs combine the immediacy of up-to-the-minute posts, and latest first (Nardi, Schiano et al. 2004). Second, some blogs offer just one archiving choice, for example, by day, others offer a whole range of options: by entry, day, week, month or category (Fichter 2003). Third, each post is uniquely identified by an anchoring link, commonly referred to as a "permalink". The permalink is a persistent URL: it never changes over time, thus allowing reference to the post by anyone who wishes to hyperlink to it or cite it (Pomerantz and Stutzman 2006). Thus, bloggers link to one another's posts, which typically remain accessible indefinitely (Kirkpatrick and Roth 2005). This unique journaling capability can serve as corporate "memory" offering excellent levels of traceability. Perhaps to a lesser degree, corporate Wikis – with their permissions to access, write, or edit – as well as with their indexing or tagging for search, recovery and audit trails – are easily discoverable (Martin 2007, Fine 2005). Synchronous conversational media such as instant messaging or chat offer moderate journaling capability: with this type of media reference transactions have pacing similar to face-to-face conversations, but this may lead to the user feeling rushed to provide a response quickly rather than taking the time to conduct more research and formulate a better response (Kaske and Arnold, 2002).

"Personal satisfaction" (see Table 4-2) we view as a result of an outgrowth of internal influences, fuelled primarily by "secondary appraisal" (Coping Theory – Lazarus 1966, Beaudry and Pinsonneault 2005, p.493) – i.e., a user's assessment of his/her control over the situation in terms of benefits maximizing, benefits satisficing, disturbance handling, and self-preservation. In the case of blogs, wikis, and conversational tools, because the WWW is used as a medium, authors feel free to express their opinions and views on different subjects, without fear of censorship (Bachnik, Szymczyk et al. 2005). Blogs contain hot new thoughts, devoid of artifice and enriched with a heavy dose or irreverence (Finneran 2006). Blogs are more independent and democratic than many enterprise CITs. In addition to that, posting preliminary thoughts through blogging fosters *discussion*. What previous research termed "thinking with computers" (Mortensen and Walker 2002), is now being demonstrated by "thinking by writing" through blogs (Nardi, Schiano et al. 2004). With some formal channels, in contrast, collaborative efforts, such as brainstorming, marketing strategy, software development, and e-learning have been ill-served (Martin 2007).

Researchers in the field of group support systems (GSS) have discovered that users sometimes find themselves feeling emotionally unfulfilled while using GSS. Users report loss of the *affective reward* associated with a challenging meeting where they struggle and succeed. This lack of engagement has been shown to be a cause of user resistance to adopting GSS technology (Reinig, Briggs et al. 1997). Blogs – with their very personal nature – seem to be best able to compensate the lack of affective reward. This might be the reason why they have had far more resonance than more impersonal corporate media products (Gely and Bierman 2006). Blogs combine a strong sense of the author's personality, passions, and point of view (Nardi, Schiano et al. 2004). Even a mediocre Blog might be entertaining (Finneran 2006). Some researchers even view Blogs as "catharsis" (Nardi, Schiano et al. 2004, p.44), as an outlet for thoughts and feelings, giving people a place to "shout". Blogs – a medium where, simultaneously, everyone is a publisher and everyone is a critic (Kirkpatrick and Roth 2005) – can convey a sense of *active involvement* (Finneran 2006) and *perceived behavioural control*. Perceived behavioural control has been theorised as "perceptions of internal and external constraints on behaviour" (Taylor and Todd 1995, p.149), like selfefficacy (Venkatesh et al. 2003). This, blogs seem to be arenas for practicing collective control: a strategy for survival in the workplace. Collective control is an active strategy, encompassing aspects of social support and social solidarity (Johnson 1989).

With the WWW as a common platform, web-based social collaborative tools enjoy a great degree of platform neutrality and compatibility. Thus, they are successful at connecting loosely joined communities (Fichter 2005). For example, blogs make it possible for employees to seek advice *outside* the enterprise. This has often proven to be more rewarding and effective than seeking advice inside the enterprise: bloggers will have a recognizable point of view, but it will emerge from their knowledge rather than their attitude. They will be engaging writers, but they will win our attention with insights, not insults (Finneran 2006). Ultimately, blogs and wikis are cheap or free to produce, easy to use and require little or no training. Often, this can be critical for the choice between using a proprietary or an open-source collaboration solution. Proprietary suites can be powerful, but are often costly, with additional costs stemming from the need for training and facilitation. Portal suites are usually top-down endeavours, requiring heavy, upfront investment before it can be seen whether people will effectively use the collaboration areas (Fichter 2005). Standing alone, this may not seem earthshaking but it convincingly makes the case that costly and heavy enterprise collaboration endeavours may be "neglected" in favour of shadow CITs.

5 Discussion

"Enterprise applications do not deliver enough value to the end user. We have spent the last decade or so buying enterprise technology, building technology inside our companies, IT spent lots of time in blood, sweat and tears, and unfortunately lots of money, wiring it… Enterprise technologies are built by the experts for the experts. As enterprise technology has evolved historically, it has become less user friendly. And that is a big problem because another

evolution is happening at the same time, and that is the merging of the work life and the personal life. A "consumer"on the internet, and an "employee" at the enterprise is actually the same person. And so, the tools I use in my expectations about my work life start to be strongly influenced by the experiences I have in my personal life online. The challenge is how do we translate this crazy experience that our employees have on the internet, and now they have these expectations of 'I should have that experience as I am at work', how do we tell them that that is the wrong thing? My answer is: that is actually the right thing".

Matthew Glotzbach,
Head of Enterprise Products, Google (Glotzbach 2006)

As many leading thinkers have pointed out, technology has brought about the merging of the work life and the personal life. This has lead to the transfer of "consumer" experience on the internet into the expectations for "employee" experience at the enterprise. Thus, we have witnessed a process at which, initially shadow CITs, have entered the workspace somehow naturally. One example is the evolution of blogging. In 2006 blogs were the fastest growing media on the planet: with 70 million blogs existing and over 75,000 new ones being created each day, a new blog being created almost every second (Cooke 2006). Interestingly, employees started translating their personal blogging experience into their workplace. Lots of high-tech employees (for example hundreds of Sun Microsystems employees) started writing public blogs at work, about work, which violated every traditional percept of corporate communication (Roush 2006). Eventually, employee blogging "at work, about work" took myriad of forms. Employees blogged in order to obtain technical types of feedback about workrelated issues, and sought advice outside the enterprise. The focus of their blogging was generally *not* on their co-workers or their immediate environment (Gely and Bierman 2006). Bloggers of this type "clustered" in a variety of social worlds, such as law (__ 2008a), accounting (__ 2008b), medicine (__ 2008c), and construction (__ 2008d). Thus, blogs made a bottom-up, un-steered transition into the workspace, entering it initially as shadow CITs. Noticing these developments, business managers did not know if what was happening "might really be dangerous… and they did not know how to decide that" (Boyd 2007). Different companies reacted differently, but altogether, three types of reaction strategies seem to have been performed: 1) strategy of fear, rejection, and banning; 2) strategy of limitation and regulation; 3) strategy of acceptance.

Strategy of rejection and banning
The transition of self-selected solutions into the workplace was an expression of the freedom of choice of individual employees to decide how to get their work done. Some leading thinkers classified this choice as liberation of the workforce from the constraints of legacy communication and productivity tools (Enterprise 2.0 conference). Others, like Tom Malone, even went further, saying that "we are in the early stages of an increase in human freedom in business and that may be as important as the change to democracies has been for governments" (Malone 2005). Either over-estimated, or underestimated, *micro-management* became a fact, and it

was being exercised autonomously by individual employees who now had all the resources and information available to make their own decisions instead of following orders. Many organizations were not ready for a bottom-up approach in which individuals sought to affiliate with others of similar interests (with instant messaging, for example, they were creating their own groups, and organizing them to meet their personal and work goals) (Fichter 2005). Empowerment of this type was thought of as reducing management's ability to exert unilateral control, and some companies reacted by banning the usage of new-generation social collaboration tools at the workplace. Lynch (2008) summarised the motivational perspectives for banning consumer social networks (like Facebook) at work:

- One concern is that it can become a recreational time suck for employees draining productivity from an organization.
- Another concern is that employees post personal opinions which can be misconstrued as the public position of the company they work for, or leak other sensitive information inadvertently while collaborating with peers across different companies.

Even without being blamed for information leakage outside the company, social CITs have been classified as a "compliance and control nightmare" (Martin 2007, p.58) carrying the risk of [internally] losing essential data and precious information assets. The arduous task of storing and searching information through such repositories can be vexing (Martin 2007). Lynch (2008) noticed a tendency that many organizations just do not have the time to think about or get into such applications and so it is just easier to ban them.

Strategy of limitation and regulation

Other companies, like IBM, crafted and established corporate policies aimed at regulating their employees' participation in consumer social networks. Those policies were put in writing, in the same fashion that other personnel issues were traditionally regulated (Laff 2007) (see Table 5-1 below).

Guidelines for IBM [public] Bloggers:
1| IBMers are personally responsible for their posts. Be mindful that what you write will be public for a long time—protect your privacy.
2| Identify yourself—name and, when relevant, role at IBM—when you blog about IBM or IBM-related matters.
3| Use a disclaimer such as this: "The postings on this site are my own and don't necessarily represent IBM's positions, strategies, or opinions."
4| Respect copyright, fair use, and financial disclosure laws.
5| Don't provide IBM's or another's confidential or other proprietary information.
6| Don't cite or reference clients, partners, or suppliers without their approval.
7| Respect your audience. Don't use ethnic slurs, personal insults, obscenity, etc., and show proper consideration for others' privacy and for topics that may be considered objectionable or inflammatory—such as politics and religion.
8| Find out who else is blogging on the topic, and cite them.
9| Don't pick fights, be the first to correct your own mistakes, and don't alter previous posts without indicating that you have done so.

Table 5-1: Guidelines for IBM Bloggers. Source: Laff (2007).

Strategy of acceptance

Other companies saw a potential value in the "shadow" solutions, and embraced the idea that – instead of banning or limitation – their implementation as organisation-mandated tools may actually be beneficial. One example was the emergence of *organisational* blogging. Over the past three years, companies including BBC, Boeing, Disney, Ford, General Motors, Google, the Guardian, Hewlett Packard, IBM, GM, Microsoft, and Sun Microsystems have encouraged their employees to create and use organisational blogs (Gely and Bierman 2006, Fichter 2005, Fine 2005, Kirkpatrick and Roth 2005, Laff 2007, Larson 2005, Lunden 2005, Martin 2007, Roush 2006). Many large corporations started using wikis internally, including Adobe, Best Buy, Disney, Eastman Kodak, General Motors, IBM, Microsoft, Motorola, Nokia, Novell, SAP.

These companies acted as innovative early adopters, but they are still a minority, if we judge, for example, based on the percentage of the CEOs at major corporations in the United States who had established corporate blogs in 2005 – i.e. ten percent (CNN.com 2005). According to Boyd (2007) innovative companies are eager to explore how to adopt the best parts of Web 2.0, and apply them, and at the same time they want to retain the best of what they already have in Web 1.0 and pre-web technologies, but they do not know how far to go with applying the lessons from the non-enterprise consumer space. Clearly, early adopting enterprises have understood that: a) in a global working environment, access to the global wisdom of the world is needed (Glotzbach 2006) and therefore the global scale offered by Web 2.0 solutions; b) rather than being feared, transparency can be central to business success (Tapscott 2008); c) collective intelligence may be translated to competitive advantage (Enterprise 2.0 conference).

With the transition of Web 2.0 user community-produced CITs into the enterprise, i.e. their "metamorphoses" from autonomous solutions (shadow CITs) into enterprise-supported infrastructures, the social informatics community coined the term "enterprise social software" in the spring of 2006. In his article "Enterprise 2.0: The Dawn of Emergent Collaboration" McAfee (2006) introduced the term "Enterprise 2.0" to widespread use as a synonym of "enterprise social software"– illustrating a new wave of Web 2.0 business communication tools (Shumarova and Swatman 2008). A number of articles followed, offering insights on different characteristics of enterprise social software (e.g. Davenport 2008; Lakhani and McAfee 2007; Singh 2008), as well as organizational science analyses of the Enterprise 2.0 (e.g. Figure 5-1 below).

McAfee (2007) claimed that, in contrast to traditional collaboration software, which imposes *structure* prior to *use*, enterprise social software tends to encourage use prior to providing structure. Encouraging use prior to structure is a type of "creative destruction" (Schumpeter 1934, Young et al. 1996), which may be viewed as, in a sense, accidental. Clemons (1986) suggested that „…most of the successes [in IS application] have been accidents: they were in response to a real and pressing need of line management, but their strategic significance was not initially recognized".

Enterprise 1.0	Enterprise 2.0
Hierarchy	Flat Organization
Friction	Ease of Organization Flow
Bureaucracy	Agility
Inflexibility	Flexibility
IT–driven technology / Lack of user control	User–driven technology
Top down	Bottom up
Centralized	Distributed
Teams are in one building / one time zone	Teams are global
Silos and boundaries	Fuzzy boundaries, open borders
Need to know	Transparency
Information systems are structured and dictated	Information systems are emergent
Taxonomies	Folksonomies
Overly complex	Simple
Closed/ proprietary standards	Open
Scheduled	On Demand
Long time-to-market cycles	Short time-to-market cycles

Figure 5-1: Difference between Enterprise 1.0 and Enterprise 2.0. Source: Enterprise 2.0 conference 2008

Interestingly, quite in line with this thought, the diffusion pattern of contemporary CITs we have witnessed over the past few years, has been primarily accidental. Like most Web 2.0 collaborative tools, blogs for example, started in their incarnation in the late 1990s as teenager diaries of daily experiences, passions, and frustrations. They emerged as an exception (Roush 2006), and it was somehow accidentally when enterprises eventually realised that the benefits of their authorized usage may outweigh the risks.

Nonetheless, according to Normal Accident Theory (Heinrich 1950; Langewiesche 1998; Perrow 1984; Sagan 1993) accidents are inevitable and "normal", given that life in general is a complex and tightly coupled system, exhibiting complex interactions and sequences that result in many failed redundant pathways, and only one path to a successful outcome (i.e. the "normal accident"). Metaphorically speaking, thence, any normal accident may be viewed as the outcome of the absorption of tightly coupled coincidents. In this line of thought, the diffusion path of collaborative technologies has been a response to absorption – a kind of social osmosis – of pressing events in the consumer internet world, the strategic significance of which was not initially recognized in the enterprise world.

Undoubtedly, the transition of social software into the enterprise was not an intended strategy, but rather, an emergent "defacto" realised strategy which was un-steered, self-supporting and self-organizing. A sensible way to think about this development may be Minsberg's model of IS strategy types (see Figure 5-2). Mintzberg (1978) distinguished between *intended* and *realised* IS strategies, where he described *intended strategies* as subsequently realised deliberate strategies, distinguishing them from emergent strategies, i.e. those that were not planned or were modified during implementation. In this sense, Mintzberg distinguishes between conventional definitions of "strategy", which imply deliberative guidelines that determine decisions, and a broader definition, which simply sees "strategy" as "a pattern in a stream of decisions". Mintzberg also noted that the strategies resulting from a deliberate strategy formulation process may *not* be realised for several reasons

including unrealistic expectations, mistaken judgments about the environment, or changes during strategy implementation.
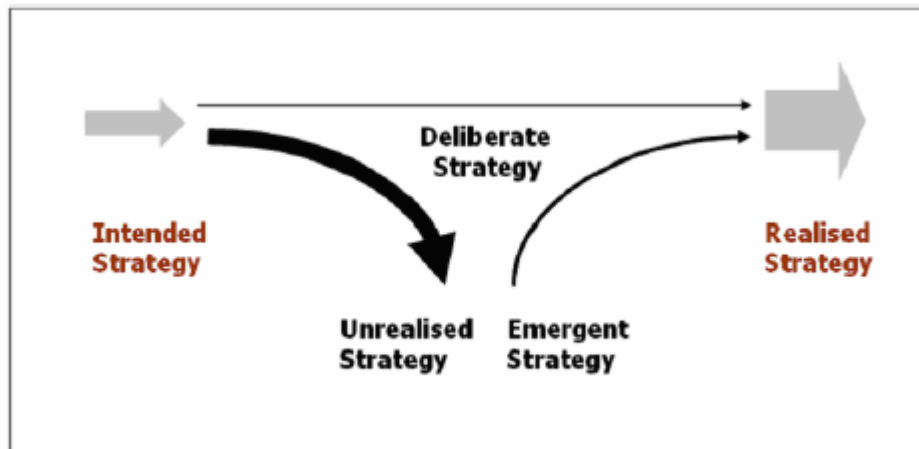
Figure 5-2: IS strategy types. Source: Mintzberg 1978, p. 945

In the case of collaborative technology, thousands of man-years, and millions of dollars have been invested in the development of formal CITs – the intended strategy was for the planned intervention of the research to yield considerable organisational impact. Nonetheless, numerable formal CITs did not reach mass uptake, high utilization levels, or critical mass, and were slow to transition into the workplace (See 3/Finding 2 above). The planned intervention did not generate largely diffused effective enterprise CITs. Instead, a different type of groupware concurrently emerged: user-created and community-driven groupware, produced by volunteer contributors, and offering more involvement, participation and global scale of experience for the user. Numerous individual decisions of individual humans – consumers and employees at the same time – to bring this innovation into their workspace, turned into a "strategy" in a broader sense. That strategy gradually evolved from emergent to realised, with the decision of some businesses to institutionalise the innovation.

"If we get the technology right, then cooperative working will follow" (Bannon and Schmidt, 1992) – the above statement may be classified as "most overemphasized" within the CSCW research community. Regrettably, nothing could be further from the truth. We argue for re-assessing the issue from an almost orthogonal viewpoint. We believe that the problem lies in the poor understanding of how teams collaborate linked to a disconnect between the empirically grounded theoretic understanding we do have and the design of CSCW tools. Obviously, the challenge is how to support unstructured teamwork.

6   Conclusion

This work extends our study into the "impact" of research in CSCW on organisations (Shumarova and Swatman 2008), which has shown that CSCW research has not generated largely diffused effective enterprise CITs. The focus of this paper is the process of "diffusion by absorbsion", demonstrated by socially absorbed self-selected

CITs that are now being adopted by individuals and groups in organisations. Distributed social collaboration – with its cultural implications – has brought about an "un-steered", self-supporting and self-organizing diffusion process. We have assessed the debate surrounding this issue through a comparison between "shortcomings of proprietary CITs", and "advantages offered by shadow CITs" – organized around a four-issue framework, reflecting the critical concerns of compatibility, performance, personal satisfaction, and affordability. In our attempt to explain what kind of motivations may be driving the usage of autonomous collaboration channels (instead of enterprise CITs), we have identified the main gaps, not filled by enterprise CITs, and the main advantages, offered by shadow solutions. We intend that the analysis, presented in this paper, stimulates the development of a broad research agenda, with the long–term objective of connecting our understanding of how distributed teams collaborate linked to the empirically grounded theoretic understanding we do have and the design of CSCW tools by means of which we hope to intervene in support of such teams.

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