Social Conceptualizations of Technology Structuring: A Comparative Analysis of Wikis at Two Global Organizations

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ABSTRACT

The widespread adoption and use of social media in almost every aspect of our daily lives may outpace existing empirical understandings. In organizations, social media are increasingly used by professional individuals and communities to support dynamic collaboration and knowledge sharing. While there is a growing amount of research on this subject, still little is known on how people use different kinds of social media in practice. That is, there is a need for an empirical understanding that addresses actual use practices of social media within the formal boundaries of organizations. To this end, we report on results from a qualitative comparative study of the use of wikis at two global organizations. Our aim is to develop an empirical understanding of the enactment of structures and the ways by which people structure and organize their wiki use practices by drawing on Orlikowski's (2000) practice lens. The findings from the authors analysis suggest a number of enacted structures that reflect diverse wiki use practices. The main contribution centers on developing three key mechanisms that provide means for understanding the structuring of the use of technology.

Keywords: Collaboration, Community, Organization, Practice, Structure, Wiki

INTRODUCTION

The use of social media in organizations is becoming increasingly common. Many scholars have suggested that the social media might reduce managerial control and flatten organizational hierarchies (Bibbo et al., 2010; Macnamara & Zerfass, 2012; Stenmark, 2008), transform and democratize knowledge exchange (Hasan & Pfaff, 2007; Aral et al., 2013; Bibbo et al., 2010), accelerate innovation and

product development (Zwass, 2010), and so on. Most interestingly for us, a dominant theme across these studies has been the suggestion that formal organizational structures might be altered by new social media, and notably that the hierarchical structures that determine authority relations, information flows, and mechanisms of control and coordination in organizations (Zammuto et al., 2007) might be transformed. But how social media may enable such transformation is not yet examined (Majchrzak et

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al., in press) and current literature offers limited insights into organizational use of social media (Jarrahi & Sawyer, 2013).

Other scholars have cautioned that the new social media and existing organizational structures are at least potentially incompatible. Hence, Grudin and Poole (2010) pointed to the tension that might exist in the interplay between wikis and organizations. They discussed the typical hierarchic character of large enterprises and suggested that it is naturally incompatible with the malleable character of a technology promoting open, flexible collaboration. Similar findings are offered by Yeo and Arazy (2012) and Macnamara & Zerfass (2012).

This caution is also evidenced by Huang et al. (2013) who suggested that organizations often tend to make adjustments to the use of social media so that it satisfies their governing principles. In the specific case of wikis, it has been suggested that they are often not used as initially intended (Martine et al., 2013). Holtzblatt et al. (2010) found that people are largely reluctant to use wikis for sharing information or editing content made by others because of dominant work practices and cultural sensitivities at the workplace. Other related perspectives refer to contradictory influences of social media (e.g., Hildebrand et al. 2013; Majchrzak et al., in press) implying that their use in organizations is ambivalent.

Nevertheless, it is still unclear how wikis are used in practice and how they may affect or transform organizations (Jarrahi & Sawyer, 2013; Majchrzak et al., in press; Martine et al., 2013; Saldanha & Krishnan, 2012; Stocker et al., 2009). Most social media studies have only focused on a few key themes related to categories of use (Kaplan & Haenlein, 2010) which for the most part are conceptual speculations (Jarrahi & Sawyer, 2013; Treem & Leonardi, 2012), potential of social media for innovation, creativity and democratization (Hasan & Pfaff, 2007; Shirky, 2008), and the potential to create and sustain social network ties (Ellison et al., 2011). We believe that what is largely missing is an understanding of wiki use practices inside formal, established organizations. That is to say, there is a need for an in-depth understanding

that primarily focuses on wiki use practices in order to examine how people structure and organize these practices in relation while using a wiki at the workplace.

Our aim in this paper is to provide that empirical understanding. So we seek an answer to the following questions: what kinds of structures are enacted when using a wiki in an organizational setting, and what enables the enactment of these structures? In order to achieve our aim and questions, we performed a qualitative comparative study of two global organizations that employ wikis at the workplace using Orlikowski's (2000) practice lens for studying technology use. We look specifically at the enactment of structures or, technologies-in-practice, that describe different ways of using technology. The main contribution of the paper is providing means to explain the variations in wiki use practices by describing a number of mechanisms that underlie the enactment of structure.

ORGANIZATIONAL USE OF WIKIS

A wiki is often described as a simple technology that allows for organic, incremental, open and collaborative development of content (Cunningham, 2004). It consists of a set of interrelated web pages that are continually and iteratively improved (Happel & Treitz, 2008; Wagner, 2004; Yates et al., 2010).

The functioning of a wiki centers on the idea of communities, that is, wikis are basically designed to promote and support collaboration by any community of individuals (Bibbo et al., 2010). One key affordance of wikis that make this possible is the collaborative publishing of content (Majchrzak et al., 2013). This allows many people to co-write and co-edit wiki content (Hasan & Pfaff, 2007) and also engage in knowledge shaping practices. Shaping is a distinctive affordance of wikis and describes the iterative, cumulative and organic nature of knowledge contributions, supporting the integration, organization and rewriting of content (Majchrzak et al., 2013; Yates et al., 2010).

In this respect, Wagner (2006) argued that wikis allow for conversational knowledge management practices in which teams engage in a ‘bazaar-style’ voluntary collaboration. Others suggested that wikis allow for transparency and facilitate informed audiences in organizations (Danis & Singer, 2008), support newly-established teams or short-term activities that have no established communication channels (Grudin & Poole, 2010), democratize knowledge contributions and enable community-based governance (Hasan & Pfaff, 2007; Majchrzak, 2009), and reduce control, flatten hierarchies, and leverage contributions from broader communities (Bibbo et al., 2010). Majchrzak et al. (2013) recently demonstrated other effects in relation to the mapping of organizational knowledge.

There are, however, a number of issues concerning the use of wikis in organizations. Holtzblatt et al. (2010) identified a number of factors impeding wiki use in enterprise settings such as reluctance to share (because of sensitive, open information), heavy reliance on tools other than wikis such as emails (because people are not accustomed to using the new wikis), and cultural sensitivities (e.g., sensitivities over editing rights). In a similar vein, Grudin and Poole (2010) discussed three key challenges for the sustainability of enterprise wikis including the alignment between manager and individual contributor expectations, content categorization and flexibility, and positioning a wiki in an existing information ecology and corporate culture. In addition, other scholars were specifically interested in issues related to content validity and accuracy in organizational wikis. Happel and Treitz (2008) discussed ‘wiki proliferation’ to describe problems in wiki content such as old, redundant, and unrelated content which are natural side effects of a growing number of wiki pages.

ANALYTICAL FRAMEWORK: A PRACTICE LENS FOR STUDYING TECHNOLOGY USE

The practice lens, which we use here as an analytical theoretical framework, was

proposed by Orlikowski (2000) to complement and challenge previous structuration models of technology use (e.g., DeSanctis & Poole, 1994; Orlikowski, 1992). Orlikowski (2000), drawing on Giddens (1984), seems to be arguing in her work that a view of technology as stable structure is problematic insofar as it delimits potential uses. Where this might have been a more or less reasonable way to think about technologies with a ‘self evident’ materiality, it becomes more problematic when we consider the materiality of the digital artifact. Existing structuration models of technology use may be less appropriate for addressing the increasing configurability and highly networked capabilities of new technologies (Orlikowski, 2000) including the new social media.

Orlikowski’s practice lens, then, distinguishes between use of technology and its artifactual character. A Technological artifact is some sort of a socially recognizable form such as a machine or a gadget with certain material and cultural properties. The use of technology, or technology-in-practice, “involves a repeatedly experienced, personally ordered and edited version of the technological artifact, being experienced differently by different individuals and differently by the same individuals depending on the time or circumstance.” (p. 408). In this view, Orlikowski treats technology-in-practice as some kind of structure that is routinely enacted as people recurrently engage with technology. See Figure 1.

Structure is understood here as a set of rules and resources that mediate human action through three modalities: *facilities*, *norms* and *interpretative schemes*. In their recurrent, situated use of technology people draw on facilities such as certain technological properties (e.g., editing), on social and cultural conventions (e.g., codes of conduct) associated with a particular organizational or institutional context, and on their knowledge, experiences, assumptions and beliefs. As people continue to engage with technology their use becomes structured by the various facilities available to them, existing norms, and evolving interpretations and assumptions. This kind of technology structuring, Orlikowski argues, enables the enactment of a

Figure 1. Enactment of technologies-in-practice (Orlikowski, 2000)

set of rules and resources that then serves to structure future use of technology. So, as long as people continue to use technology they are actually constituting and reconstituting structures of technology use. As such, the practice lens distinguishes itself from previous structuration models of technology by emphasizing the instantiation of structure or technologies-in-practice in recurrent social practice rather than treating structure as embodied and available for appropriation by the users of technology.

Furthermore, Orlikowski's practice lens has advantages insofar as it implicitly recommends an empirical stance. Orlikowski explained: "the practice lens more easily accommodates people's situated use of dynamic technologies because it makes no assumptions about the stability, predictability, or relative completeness of the technologies. Instead, the

focus is on what structures emerge as people interact recurrently with whatever properties of the technology are at hand." (p. 407). Hence the practice lens, we believe, provides a useful theoretical and analytical basis to understand and examine wiki use practices which are essentially dynamic, recursive and recurrent.

EMPIRICAL INVESTIGATION

Empirical Cases: CCC and IBM

The empirical data collection took place over a period of two years at two global organizations: CCC and IBM. We selected these organizations because of our interest in examining and comparing various wiki use practices in different contexts. As each organization adopts a different approach to using social media, investigating the

use of the wiki in CCC and IBM allowed us to develop an understanding of several dynamics underlying different uses and consequences.

CCC is a large multinational contracting organization founded in 1952, specializing in construction and engineering services. It has headquarters in Greece and offices spread around the globe with more than 170,000 employees spanning 60 nationalities. The company established a Knowledge Management (KM) department due to increasing complexity of communication among distributed project teams. This complexity was driven by the rising number of employees, which quintupled over the last decade. The initiative to establish the KM department aimed at providing a platform that helps the company *“build a knowledge rich culture”* in order to *“tap the expertise and embrace sharing, learning and innovation”* at the company. The KM department decided, after evaluating a number of options, to use a wiki as a collaborative platform for sharing and collaboration. This wiki, which is called Fanous, is centrally controlled by the KM department and access to the wiki requires permission. The wiki is used by several professional communities and each community has its own ‘wiki space’. There were 11 specialized communities at the time we started data collection in areas like hydrotesting and precommissioning, piping, mobilization, etc. The communities have a hierarchical structure comprising of community leaders, managers, and captains selected based on seniority and expert levels at the company. Their roles are mainly focused on ensuring that the content contributed into the wiki is reliable. Each community has regular meetings (e.g., every three months) where ‘key’ members meet and discuss various issues related to the progress of their wiki.

The second part of our investigation took place in IBM. IBM is a Fortune 500 company and with over 400,000 employees in 200 countries. The company has a department called Social Business and Collaboration Solutions that belongs to the software group within IBM. It specializes in providing enterprise collaboration solutions and integrating social software

facilities such as wikis, blogs, microblogs, and many others. One of the major tools produced by this department is IBM Connections, which was the tool studied in this paper. IBM Connections is a universal software that combines several social software facilities including wikis, blogs, microblogs, status updates, file sharing, etc. The wiki facility of Connections was our main focus. It can be used by anyone at IBM to create a wiki or a blog, communicate with others through microblogging facilities or status updates and share files publicly or privately. So wikis are freely configurable with no central control and both individuals and communities were allowed to setup their own wikis either publicly or privately for different purposes.

Research Method and Process

The research method used in this paper is qualitative. Fieldwork- a qualitative approach- is, in general, suited to the acquisition of an in-depth view of rationales for action and, moreover, allows for the study of the context or situation in which action takes place, which was important for us to illuminate in the two cases. It is commonplace as a method for examining case studies (see e.g. Denzin & Lincoln, 1994) in the social sciences and more specifically in IS research (see Walsham, 1993; Klein & Myers, 1999). It does not necessarily involve any specific method (observation; interviewing, ‘walk-through’ and so on) but an analytic commitment to ‘seeing from the point of view of the actor’. In that sense, it is typically predicated on an ‘interpretivist’ standpoint.

In the cases we recount, a combination of multiple qualitative data collection methods has been used. As such, the empirical data in this paper was obtained through interviews, field visits, observation and organizational documents. Semi-structured interviews and field visits were the primary vehicles of our investigations (cf. Walsham, 2006) and the basis for our analysis. The interview process in both organizations was guided by the practice lens presented above. The concepts of this framework were used to develop a set of questions to

guide our empirical investigation particularly in interviews. In the words of Walsham (2005) concepts were used as “sensitizing devices to generate some searching questions on the nature, purpose, and value of computer-based representations” (p. 12).

The total number of interviews at CCC was 10 of which three were face-to-face, three over the phone and four via Skype. The criteria for selecting the participants was based on seniority level, cultural background, wiki experience, and gender. This was done in order to obtain as diverse perspectives as possible. Several participants were geographically distributed across the globe and using the phone or an online medium was the only possible way to communicate with them. The average interviewing time was about 55 minutes and all interviews were audio recorded. It is important to note that all participants have given us their consent to record their interviews as well as reveal their identities in any published work.

We also had the opportunity to visit CCC twice and attend one of the community meetings. The first visit aimed at interviewing a number of participants and meeting with the management in person. The second visit was for attending a community meeting for observational purposes. The visit helped us to get insight into the discussions that take place among community managers and captains and understand the ways in which they used the wiki ‘in action’. General documents containing information about the wiki were also obtained from the KM department. During the first visit, we were also allowed to observe the wiki, which was only accessible through an internal secure CCC network, to understand its design and structure. Further, a number of screenshots of various wiki pages were taken in order to get some understanding of how people use the wiki to share content, make comments, and categorize topics. These included some log data such as number of viewers and editors for each article including their names, temporal data (e.g., addition and edit times), meta data such as tags describing content categories, and activity streams showing various addition,

commenting, editing activities. Other data was obtained from official KM documents such as number of active contributors which was 1000 and number of monthly contributions which was 200. This kind of data was important for us in terms of getting some practical sense of how the wiki is used and also supporting our analysis of the interview data.

At IMB, we spoke with a total of 10 employees from the software group of which 5 were face-to-face, 3 over the phone and 2 via Skype. The criteria to select participants from IBM involved cultural and professional background, gender, and wiki experience. The average interviewing time was about an hour and all interviews were audio recorded. The semi-structured interview was also the main vehicle of our discussions. However, we did not have the chance to examine any documents, attend meetings, or obtain log data at IBM like in CCC.

A Practice-Based Analysis of the Empirical Data

The empirical data analysis, as stated, was guided by a set of concepts drawn from the practice lens. Table 1 provides a summary of these concepts and how we used them in the analysis to draw out empirical observations.

Accordingly, we started the analysis with an iterative examination of each individual interview transcript to develop an understanding of practices and the reasons for them. In the first stage, data segments were organized according to their relevance to the theoretical concepts that guided our investigation and analysis. For instance, a data segment such as:

“...we have the ability to make certain (wiki) pages visible while not others and so we take a determination of what is going to be sensitive to our organization...” was assigned with the concept of ‘facilities’.

Then, we developed sub-categories that represent the meanings that underpin actions. The previous data segment, for instance, was assigned with the category of ‘self-control’

Table 1. Application of theoretical concepts in data analysis

Concepts	Sub-concepts	What to look at in the data	Empirical sources
Structure	Rules and resources	descriptions of organizational policies governing the use of technology (rules made by the organization), people's own practices (rules made by people), power dynamics among employees.	interviews, discussion with managers, meetings, documents.
Modalities of Structure	Facilities	descriptions of certain capabilities and technological resources that people use to achieve various purposes.	interviews, discussion with managers, meetings
	Norms	descriptions of certain work routines, traditions, procedures, and rituals at the workplace, descriptions of socially-accepted practices and behavior.	interviews, organization official presentations and public documents, discussions with managers, meetings
	Interpretive schemes	assumptions and beliefs, ideas, feelings, expectations and thoughts.	interviews, meetings

because it represents the practice of using certain characteristics in the wiki to make pages private or public.

Later, all categories available in each individual transcript were transferred into a table (cf. Miles & Huberman, 1994) and organized based on the three theoretical concepts: facilities, norms and interpretative schemes. This was done in order to combine relevant categories, spanning the theoretical concepts, for the purpose of developing general categories or representative themes. The next step was focused on determining dominant themes throughout the whole data in order to identify enacted structures (or technologies-in-practice). This whole analytical process was applied similarly in analyzing the two sets of data obtained from CCC and IBM.

The final analytical stage was “*another stage of interpretation*” as portrayed by Cole & Avison (2007). We were intrigued by some observations in the data of certain dynamics underlying the enactment of structure. So we sought further aspects of wiki use practices in CCC and IBM by looking at *how* structures are enacted. We therefore did a comparison of data centered on eliciting social practices involved in the enactment of structure in each

organization. Eventually, three key mechanisms describing certain social practices were discovered to be behind the enactment of structure. These mechanisms showed that structures were enacted in similar ways but resulted in different consequences.

FINDINGS: ENACTMENT OF STRUCTURES AT CCC AND IBM

In this section we report on the main findings from our analysis of the empirical data. The emphasis here is on identifying structures, or technologies-in-practice, that people enact while using the wiki. They essentially represent various ways of using the wiki in each organization.

Enacted Structures at CCC

Controlled wiki use: this was the most dominant enacted structure at CCC. There were multiple reasons behind the enactment of a controlled wiki use structure, which have been experienced differently by both senior and junior employees. One important reason for enacting this kind of structure was the perceived need for control and restriction of access to the wiki by

senior employees and managers. Emanuel who works as a group manager at CCC expressed this as follows:

... there are some projects in which access to Fanous is limited only to a very small number of people... there is no single policy, every project formulates and implements a policy towards using Fanous.

Many participants expressed similar concerns with selective participation and accessibility to the wiki. They also stressed that project managers tend to be against giving their employees free access to the wiki. The submission of requests form to get access to the wiki was indicative of this. Salma, a senior administrator, commented:

...you need to send a request and mostly they will approve it. But some people think that is limited for only specific people. And so maybe this perception influenced my opinion.

Noora, an estimation engineer, further added:

My problem with Fanous within CCC is that I am only allowed to see certain things...I am limited to mechanical estimation and piping references only...when I needed to do something out of my job, they gave me access for a week.

Interestingly, these concerns expressed by junior employees such as Noora and Salma were perceived differently by managers who believed that the wiki required some degree of control. Naim, a plant group manager with 30 years of experience, said:

It (the wiki) is not Facebook where it is completely open ... No. You only invite certain number of company employees to share their knowledge.

Hence, the enactment of a controlled wiki use technology-in-practice was driven by a set

of beliefs, assumptions, experiences and expectations by both senior and junior employees. The diversity of these beliefs, expectations and experiences reflects tensions among employees from different levels in the organizational hierarchy, and also drives structuring of the use of the wiki in terms of controlled accessibility and selective participation. While recurrently using the wiki this kind of structuring enabled the enactment of a set of rules and resources that led to a controlled use of the wiki. In addition, it is important to note that the enactment of this kind of structure can be seen as reinforcing dominant structural properties at CCC by preserving existing practices (cf. Orlikowski, 2000), which are rooted in the hierarchical structure of CCC.

Hierarchical collaboration: one of the main drivers for enacting this structure at CCC was the deployment of an approval and review system that allows senior and expert employees to review content contributed into the wiki by others. Abd, a mechanical manager, said:

We have four captains to approve the (work) procedures.

The captains in each community could examine and review shared content on the wiki and decide whether it should be published or not. The assignment of these captains to approve shared content was one way, suggested by the KM department and okayed by the communities, to ensure that content is reviewed by senior people for quality, relevance, and accuracy.

During our analysis we observed a tendency at CCC to value the knowledge of senior and 'expert' employees more highly. Participants who work at CCC in higher managerial positions emphasized that experience should be valued when contributing into the wiki and validating shared content. They therefore saw themselves to be in charge of this task given their long experiences in their respective fields. For instance, Abd, as a senior employee, explained how sharing his own experience was important to junior employees:

...you know it is now part of our thinking, part of our behavior that we have to contribute so that the new generation can benefit from our experience and they can build on that, not start from the beginning.

Also while visiting CCC and during the discussions we had with KM managers a similar view concerning the use of the wiki and evaluation of content was expressed. That is, hierarchical structures already present in the company created policies over wiki use that re-enforced rather than challenged hierarchy. The introduction of a review system privileged the assumptions of managers via their status as 'captains' who were also gatekeepers of content. This line of thinking was also prevalent, to some extent, among more junior employees. Watheq, for instance, who works at CCC as a civil engineer said:

...honestly making any changes, especially from a subordinate to his supervisor; will not look in his eyes or in some other peers' eyes positively.

In the same vein Nabeel, a human resources specialist, explained another dimension of hierarchical wiki collaboration:

You wouldn't be flexible enough to put anything you want onto the wiki so that everybody could see. And again you don't want to put something that your boss would not accept.

These views also recognize the hierarchal nature of knowledge structures, but imply different reasons for acceptance. For senior employees, experience equates to expert knowledge whereas for more junior employees, the value of experience is expressed less often than the importance of status or rank. The hierarchical collaboration structure was thus another manifestation of assumptions and beliefs about hierarchic divisions, attitudes towards expertise and knowledge, and norms and rules of control.

Motivation-to-use: in much the same way, we found that motivations for using, or

not using, the wiki were quite varied, and again correlated with organizational position. In some circumstances, there were strong motives for not using the technology. This technology-in-practice can be discussed at two levels. For seniors, the use of the wiki was an opportunity to make their knowledge and expertise accessible to other people in the company. Abd, for instance, explained this in respect of utilizing the openness of the wiki:

This can encourage us to contribute more...you know once you have contributed, you have also commitment. Once you make commitment you have to contribute.

As for junior employees, their personal beliefs and attitudes towards the level of their knowledge and expertise were fundamental in shaping their use of the wiki. We observed a less tendency by junior employees to share knowledge and participate rather less. Noora said:

...remember that my experience is limited. I've been here for a year and a bit and I only knew Fanous for about a year. If I have been here maybe for longer of course it would be more worthwhile to contribute for them and for myself.

For Noora sharing and contributing into the wiki is determined by her level of expertise and this was the case for most of the junior employees who spoke with us about their experiences in using the wiki. However, while the level of expertise was a kind of limitation to Noora and other junior employees, we found other issues that enabled the enactment of the motivation-to-use structure. Nisreen, an office engineer, has given an example that describes other personal values and attitudes for not using the wiki:

I like to read, I am really reading a lot..., but I don't have this personality to talk, to participate or to write... I think it is something in my character. I am not sure why.

Further, we observed an overlap between the structures of hierarchical collaboration and motivation-to-use while talking to junior employees. The dynamics of hierarchical and professional relations were central to shaping the use of the wiki by junior employees. Watheq replied when we asked him about his willingness to edit or comment on a public contribution made by his manager on the wiki as follows:

It is not the public nature (of the wiki). Because ... the importance of the issue is the person himself not the audience. The person that might get offended especially given the relationship of a supervisor and a subordinate. That might be critical.

Salma had a different view about relationship dynamics and her motivation for using the wiki:

maybe you can write a comment and your supervisor might not fully agree with it but you will write it because at that moment ... it doesn't have the formal feeling that you are posting something on lets say the bulletin or something more formal.

While CCC culture is dominated by hierarchical divisions, junior employees sometimes saw the opportunity to use the wiki to express and share their own opinions. Finally, in their recurrent use of the wiki, senior and junior employees drew on their own experiences and knowledge, CCC's hierarchical environment, wiki facilities, and professional relationships among them to structure and shape their use of the wiki.

Enacted Structures at IBM

Collaborative culture: the most dominant and representative structure at IBM was the collaborative culture. It was observed that the enactment of a collaborative culture was shaped by diverse factors spanning professional and cultural factors, technological facilities, behavioral

practices, and organization structuring. One major aspect that users of the wiki drew on to enact this structure is the availability of diverse collaborative tools at the workplace. Our IBM participants explained during interviews that they are accustomed to using multiple tools that support them in collaborating and sharing with each other at work. Bo who works at IBM as a technical sales professional commented on this:

...many of our internal tools are built like that, many of the tools we use encourage us to do these kinds of exchanges.

Mark, a learning intelligence leader, explained IBM's attitude towards collaboration:

We have a lot of information sharing tools and we have been proponents for things like wikis and other ways of informal sharing in a structured and unstructured manner for a large number of years now.

Further, the practice of using the wiki was shaped by this attitude in terms of allowing people to manage and control the wiki by themselves. So the wiki was self-controlled, either by individuals or communities, and anyone can freely use it for whatever purposes. Mona, a client technical professional, said:

our system contains different capabilities and all of them kind of make you as a person more visible, you can be seen...And the good part you can really control it on your own.

Luis who works as IBM worldwide business evangelist explained how the company reaches out to its employees. He said:

The fact that we do idea jams where we ask everybody for opinions on things and we value their ideas equally, that's part of the IBM culture ... if we look at IBM, what we stand by, the individual is an important person and the individual is to be respected.

Another intriguing aspect of individual behavior and attitude was related to how people really used wikis for collaboration. We asked our IBM participants about using one challenging facility of wikis- editing content. While some were conservative about editing as “changing content”, the majority were receptive to the idea of collaborative editing because they believed that getting different perspectives can contribute into enhancing content. Anna who is an information developer replied when we asked her about editing contributions by other colleagues:

I never had a situation where I edited content from another information developer and got a negative experience. So it's been a good experience because you're improving the content, you're making improvement and I think they always appreciate that.

We found that wiki users negotiated their agreements and disagreements to streamline collaboration through informal agreements such as suggesting a form of organization or agreeing on a set of guidelines to structure collaboration. Keith, a user experience specialist and Morten, a software developer, gave us two examples describing how their teams structured the use of the wiki:

the whole wiki is open for everybody but we just have an agreement okay here is the master writer for this and Sally is the master writer for this one and Bob is the master writer for this one and everybody else just comments.-Keith

we created a wiki where we agreed about the guideline and then we just worked from there and everybody who have some knowledge about some particular topic could enter that information. -Morten

People drew on the facilities available to them in the wiki, the collaborative atmosphere at the workplace and the self-organization of contributions to enact a set of rules and resources,

which resulted in a collaboration culture that structured the use of the wiki.

Job specialization: job specialization was found to be one important aspect of structuring the use of the wiki at IBM. It was important in terms of shaping the kinds of contributions that wiki users can make as well as motivating them to contribute. Depending on their specializations at work, users might be only making comments or editing content or doing both. In some other cases they found themselves reluctant to contribute because they saw that people with specific backgrounds were the only ones contributing into the wiki and therefore they tended to read passively. In fact, our participants from IBM had a tendency to check who the contributor was before they made any contribution. Participants often checked the previous contributions of their colleagues, the types of content they contributed and so on. Bo said:

I start by looking, do they know anything in this area, have they made any contributions, do they have a job where I expect them to know something about it.

Anna gave an example about how the role and specialization of the contributor may affect her own contribution:

...when I am collaborating with a software developer I tend to comment. But when I am collaborating with other information developers I tend to edit.

Further, we have also observed that wiki users tended to care more about the specialization and background knowledge of a contributor more than his or her position in the organizational hierarchy. Mona commented on this:

I don't check whether or not the guy who has written the wiki is higher in the hierarchy than I am. I would rather check I mean if he has the right level of knowledge. If he is a boss or not a boss I wouldn't care to that.

Hence IBM wiki users drew on their own job specializations and background knowledge of others to shape and structure their contributions into the wiki.

THEORETICAL ELABORATION: SOCIAL CONCEPTUALIZATIONS OF TECHNOLOGY STRUCTURING

This section extends our understanding of structuring the use of the wiki and aims to shed light on how structures associated with technology use are constituted. Our comparative analysis suggests three key mechanisms that enable technology structuring: (1) policy-making procedures, (2) exploiting professional roles and social relationships, and (3) maintaining collaborative culture and behavior. These mechanisms reflect aspects of shared social practices or processes which enable the structuring of wiki use.

Policy-Making Procedures

Policy-making was observed to be one of the most important mechanisms that enables and influences the structuring of technology use. Our empirical analysis of data from IBM and CCC suggests that in each context there are various forms of policy-making, which eventually had different consequences for structuring the use of the wiki. Since people draw on organizational rules, cultural conventions, norms, and so on (Orlikowski, 2000; Walsham, 2002), which essentially reflect policies governing social practice, we found that the way these are developed had an impact on structuring the use of technology in both organizations. In other words, how these rules, conventions and norms are instantiated influences how people routinely experience them.

At CCC, norms and rules were often developed through either explicit imposition or implicit influence by people higher in rank in the organizational hierarchy. The decision to deploy a review system to verify content shared on the wiki is just one example that shows a

top-down tendency to introduce policies at CCC. In their recurrent use of the wiki junior employees unsurprisingly recognized that they were accountable to these managerial decisions and hence accountable for their actions in respect of them. These, then, were constituted as rules and norms which structured their use of the wiki as well as shaped their perceptions of the meaning and purpose of the wiki itself.

Similarly the way policies were made at IBM also affected the structuring of wiki use but with different consequences. As shown in the findings above, people at IBM tended to informally negotiate policies governing the use of the wiki through social agreements and guidelines. These informal policy-making procedures affected the structuring of wiki use by enabling the development of rules and norms that wiki users drew on to enact specific types of structure such as collaborative culture.

Policy-making is thus seen here as a mechanism that is rooted in the local context of the organization, as it reflects unique contextual practices through which rules and norms are developed, and which in turn shape the structuring of technology use.

Exploiting Professional Roles and Social Relationships

Professional roles and social relationships provide facilities and resources through which people structured their use of the wiki. The importance of professional roles and social relationships was salient in both IBM and CCC. In both contexts, the use of the wiki involved collaborative practices, such as co-writing articles, editing content and commenting, that required multiple wiki users to get engaged in recurrent collaborative practices. These users tended to define their interactions and exchanges through their professional roles.

Nevertheless, we observed distinctive understandings of professional roles in the context of using the wiki at our organizations. That is, the influence of professional roles on shaping power relations and use of resources (e.g., editing wiki content) was interpreted

differently in IBM and CCC. While CCC wiki users tended to place much emphasis on the professional roles of contributors especially in relation to their positions (power) in the organizational hierarchy, wiki users at IBM were less concerned about the hierarchical roles of contributors. In IBM, wiki users were more concerned with interpreting and deconstructing professional roles through a variety of means including prior knowledge, digital traces (e.g., previous contributions via the social media) and current behaviors as indicators of adequate knowledge and expertise.

These understandings of professional roles also shaped how wiki users in each organization approached the use of the resources available in the wiki such as editing and commenting. In CCC, junior employees tended to avoid editing content contributed by senior employees and chose to make comments instead. In IBM, employees used various resources including editing and commenting without any major concerns about hierarchical divisions. Their main concern was only limited to knowing whether a contributor has proper knowledge or not in his or her position.

Further, informal social relationships were also central to the enactment of wiki use structures. This influence was exhibited by another feature of the communicative process, and one which is seldom remarked upon when digital facilities are discussed, and that is that people use more than one channel to communicate and their choice of channel may depend on what it is that they wish to communicate and with whom. Because of the sensitivity of social relations at the workplace, some people often emailed or even phoned content contributors to inquire about changes they made or discuss possible changes to be made. Others tended to leave comments after editing the content in order to explain themselves. This kind of behavior was aimed at maintaining social relationships among content contributors in order to preserve polite professional relationships, avoid conflicts and streamline collaboration and sharing. Willingness to use the wiki, we think, is mediated by assumptions about, or habitual

use of, other channels of communication (e.g., emails, telephone calls, face-to-face interaction) which seemed to carry different implications in relation to informal/formal contact.

To sum up, this mechanism describes distinctive patterns of orientation to unique professional roles and social relations, which in turn, shaped power relations, use of resources and social interactions. In this manner, exploiting professional roles and social relations enabled the development of a set of norms, rules, experiences and attitudes that people drew on to structure their use of the wiki in terms of their professional roles and relationships to each other.

Configuring Collaborative Culture and Behavior

The use of a malleable technology like a wiki for recurrent practices (e.g., co-editing content) is influenced by the configuration of the collaborative culture in its different patterns and artifacts. We observed that distinctive cultural patterns and artifacts in both CCC and IBM affected the way people perceived rules and norms and experienced the use of resources associated with using a wiki for collaboration and knowledge sharing.

One important observation from IBM, for instance, was the use of multiple collaborative tools. The wiki was only one of the many tools (e.g., blogs, micro blogs, instant messaging, etc.) which enable and support collaboration. All of our participants referred to the diversity of these collaborative resources to emphasize the culture of collaboration at the workplace. In other words, the established culture of collaboration in their daily work practices presupposed some kind of readiness to use new collaborative technologies such as a wiki.

Interestingly, this cultural readiness affected how people understand the rules that govern the use of the wiki. So, for instance, creating and using wikis is open to everyone inside of the company. Also, there is no central control of the use of wikis and people can in fact setup wikis for multiple purposes such as personal,

project, and community wikis. In respect of norms, IBM employs many evangelists, who have been described by some of our participants as ‘heroes’, whose jobs is to encourage and promote the use of wikis and other kinds of social media tools at the company. We observed that these evangelists affected the way people perceived collaboration through, for instance, presentations outlining the potential benefits of using social media, and thus shaped their values and attitudes towards sharing, collaboration and participation using wikis.

In CCC, the configuration of the collaborative culture was different. People were accustomed to using emails to share information with each other. There was only one single wiki facility that was divided into spaces used by different communities. Many of our participants from CCC referred to the wiki as a library or information repository rather than a platform for dynamic collaboration and sharing. They also tended to compare it with email by stressing its advantage in storing and accessing information. This strengthened the view of a wiki as a “static” library by a number of senior and junior employees. Further, behavioral norms related to the use of the wiki were rooted in dominant cultural conventions at the workplace. Senior employees, for instance, enjoyed more freedom in using the wiki in terms of accessibility and contribution compared to junior ones.

CONCLUDING DISCUSSION

The main aim of this paper was to understand the enactment of structures and how professional communities structure and organize their wiki use practices at the workplace. In order to do so, an empirical analysis of these practices was performed in two different organizations. This analysis resulted in a number of enacted structures, or technologies-in-practice, that reflects a myriad of uses and consequences of the wiki in each organization. Each of these structures represents different ways by which people use the wiki for different purposes. Most importantly, three key mechanisms were discovered

that show how people variously enact these structures as well as point to different uses and consequences in organizations.

Despite the fact that the use and impact of the wiki in CCC and IBM were different, they can be understood along the mechanisms we have discovered. Each of the three mechanisms provides a means to understand how these differences may occur by describing certain social processes and practices through which people develop meanings, assumptions, beliefs and expectations that enable the development of a set of rules and resources that structures their use of the wiki (cf. Orlikowski, 2000). These mechanisms are enacted in routine and recurrent practice, and their enactment is a negotiated outcome among wiki users. As people use the wiki, they continue to enact various mechanisms to structure and organize their use practices. So the current mechanisms may only be illustrative, rather than exhaustive, aiming at conceptualizing key ways for structuring the use of technology.

In practice, people do not use wikis in a vacuum. Once these technologies are available at the workplace people tend to develop various understandings that influence and shape the ways by which they use them. It could be argued that the general understanding of social media as a new class of technologies (Treem & Leonardi, 2012) makes people, especially in a professional environment, more concerned about the purpose of using these technologies and their implications for dominant work practices, professional roles and relationships and other organizational and cultural factors. While wikis and other social media may have the potential to offer new behaviors and affordances in organizations (Aral et al., 2013; Treem & Leonardi, 2012), as can be seen in IBM, we argue that realizing this potential depends on how people structure their wiki use practices.

While the three mechanisms are drawn from both organizations, the ways by which wiki users employ them are different, resulting in distinct uses and consequences in each organization. People in each organization possess different meanings, beliefs, values, experiences,

assumptions and skills that shape the enactment of structures along the three mechanisms we outline. Policy-making procedures represent how people in each organization enact policies to structure their wiki use practices. This implies some kind of structuring the use of the wiki in terms of developing governing principles, rules or regulations that influence the use of the wiki as well as the exploitation of the resources or facilities available in it. In CCC, governing policies or rules were imposed by the KM department and senior managers and enabled the enactment of control and hierarchical structures. In contrast, no such structures exist in IBM. Policies governing the use of the wiki were enacted by people in IBM through informal negotiations and agreements that enabled some kind of 'community governance' and the enactment of a collaborative culture.

The second mechanism, that is, exploiting professional roles and social relationships mechanism also represents different ways of structuring the use of the wiki. People use the wiki relative to their own professional roles, roles of other colleagues and their relationships to each other. In doing so, they develop certain expectations, assumptions and beliefs about these roles and relationships that influence the structuring of wiki use. Similar to the previous mechanism, this is different in the two organizations. In CCC, people were very concerned about their relationships with their managers and other senior colleagues. Their cautious behavior then led them to structure their use of the wiki in ways that limit their abilities to exploit the wiki. In IBM, people were less concerned about hierarchical divisions and more concerned about levels of knowledge and expertise. So this mechanism shows how people in each organization structured and organized their use practices in terms of different attitudes to roles and relationships. Professional roles and relationships clearly play a fundamental role in governing any potential for dynamic knowledge exchanges between individuals and communities resulting in contradictory influences that might be both enabling or hindering (Holtzblatt et al., 2010; Majchrzak et al., in press).

The third mechanism relates to culture. This demonstrates how the configuration of a collaborative culture and behavior in the organization results in different consequences for structuring the use of the wiki. Each organization exhibits distinctive cultural patterns that had a significant influence on employees' beliefs, assumptions and expectations of using the wiki. For instance, the availability of multiple social collaboration tools as well as social media evangelists who promote their use inside the company was central in shaping how people structured their use of the wiki. In contrast, CCC has a culture that embraces 'bureaucracy' and control which shaped structuring the use of the wiki in different ways.

The mechanisms we describe in this paper explain the distinctive ways in which people structure and organize the use of wikis and make adjustments (Huang et al., 2013) to their 'social, dynamic, and interactive potential' (Saldanha & Krishnan, 2012). We suggest that these mechanisms provide a framework for understanding not only the impact of wikis but also for highlighting how wikis may not be used as intended and may not necessarily bring about fundamental changes. Therefore we would recommend further studies that examine unintended uses and consequences of social media especially with emphasis on the dynamic interplay between existing organizational forms and new, potential forms of organizing enabled by the use of new social media. Such studies may address the limitations of our current study by adopting a different 'fresh' theoretical perspective as well examining other kinds of social media technologies.

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