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Developing a Method for Measuring "Working Out Loud"

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DEVELOPING A METHOD FOR MEASURING
"WORKING OUT LOUD"

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Business and Economics
at the University of Kentucky

By

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ABSTRACT OF DISSERTATION

DEVELOPING A METHOD FOR MEASURING
"WORKING OUT LOUD"

Enterprise social network software platforms (ESNs) are increasingly being deployed in firms across almost every industry as a means of fostering employee collaboration. Although benefits in increased productivity, innovation, and employee engagement are highly touted, there is a high failure rate of these deployments. This often occurs because (1) there is a misapplied focus on technology adoption rather than adoption of the employee behaviors that are ultimately required to obtain those benefits, and (2) it is unclear what those behaviors are and how to measure them.

"Working Out Loud" is one possible framework for understanding and measuring the behaviors necessary to fulfill the promise that ESN vendors advertise. It is loosely described as doing work in a way that makes it visible to others, and is often associated with the use of social business tools. As these tools proliferate within organizations, the Working Out Loud concept is becoming increasingly popular as an organizational and individual goal and mantra among social software vendors, their customers, and leading pundits and consultants in this space.

Many benefits have been associated with Working Out Loud; however the concept is still somewhat amorphous. No attempts have been made to quantify it and little research has been done on whether the benefits attributed to it really exist. The common industry definition of Working Out Loud identifies two separate behaviors: narrating one's work in the form of blog posts, status updates, etc. (typically individual behavior), and performing work in a transparent and observable way through the use of an enterprise social platform (typically group or team behavior).

This research hypothesizes that these two behaviors do exist and are related but distinct, and thus scales can be developed to measure each. A survey was given to employees of Lexmark International, Inc. (the author's employer). Exploratory and confirmatory factor analyses performed on the data confirmed the hypothesis and resulted in scales for individual and group Working Out Loud that are designed to be minimally intrusive so as

to enable both researchers and practitioners to track an organization's Working Out Loud behavior on an ongoing basis.

KEYWORDS: Working Out Loud, Social Business, Enterprise 2.0, Collaboration, Enterprise Social Network

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Chapter 1:   The History of Social Business

 The use of "social" collaboration software as a field of study has a long history but in

recent years has become extremely dynamic and chaotic as organizations find themselves

trying to figure out how to best utilize these new technologies that can directly impact

their cultures, hierarchies, and business processes. It is important to provide a brief

history of social technologies so as to situate Working Out Loud within the broader study

of social software and social business, as well as to frame the present issues both for

practitioners and researchers. Others (Allen, 2004; Cook, 2008; Zhang, 2010) have done

an excellent job of tracing this history all the way back to Vannevar Bush's "memex" in

the 1940s (Bush, 1945). This dissertation will not rehash that work, but instead focus on

two intersecting trajectories that might be labeled the groupware trajectory and the social

media trajectory.

The groupware trajectory originated out of the office automation efforts of the 1970s. As

part of that research, the National Science Foundation funded the development of the first

collaborative software tool, the Electronic Information Exchange System (EIES), which

in 1978 prompted Peter and Trudy Johnson-Lenz to coin the term 'groupware' and define

it as "intentional group processes plus software to support them" (Johnson-Lenz &

Johnson-Lenz, 1994). As the demand grew for software that could support autonomous

groups of knowledge workers, software vendors began to provide groupware tools such

as WordPerfect Office (1987), Lotus Notes (1989), and Microsoft Exchange (1993).

These tools typically included features such as email, calendaring and scheduling, instant

messaging, document sharing, and discussion forums. As the market grew, an academic

discipline sprang up called computer-supported cooperative work (CSCW) to study the

use of these tools (Whitaker, 1996). Given that these tools were developed prior to the

widespread use of internet browsers, they were client-server based and targeted toward

workgroup productivity.

Through the 1990s, at the same time that businesses and academics were exploring the

uses and benefits of groupware, consumers were beginning to explore the internet as a

means of collaborating. As personal computers became available in the late 1970s,

throughout the 1980s many of their owners began to set up local electronic bulletin

boards that could be accessed using a dial-up modem over a phone line. This electronic

collaboration capability accelerated as web browsers were developed in the early 1990s.

The first blog was created in 1994, instant messaging became available in 1996, the

Google search engine appeared in 1998, Napster peer-to-peer file sharing in 1999, and

the first true social networking site (Friendster) was launched in 2002 (Bennett, 2013).

For the most part through the late 20th century and into the mid 2000s, the groupware and

social media trajectories for development of collaborative software remained independent

of each other. But the widespread success of Facebook and Twitter in just a few years

after their launch (2004 and 2006 respectively) caused these two trajectories to intersect

as employees who were very familiar with the personal use of these tools began to

explore their application for work. Traditional groupware vendors moved to web-based

platforms and began adding features such as blogs and wikis, while new vendors such as Jive, Yammer, and Socialcast arose to provide organizations with "Facebook for the Enterprise."

Chapter 2: Practitioner and Researcher Challenges

This recent, rapid merger of traditional groupware and consumer-oriented social software has created several challenges for both researchers and practitioners. There have been many calls for more research in this area (Kane, Alavi, Labianca, & Borgatti, 2014; Leonardi, Huysman, & Steinfield, 2013; Parameswaren & Whinston, 2007a). Some recognize that the focus of research so far has been on the use of external systems (e.g., Facebook, Twitter, Linkedin) while very little has been done to examine social tools used in an internal corporate context (A. Richter & Reimer, 2009; Seebach, 2012), and that practitioner reports tend to increase hype rather than providing methodologically sound assertions (Lehmkuhl, Baumol, & Jung, 2013). Others argue that past studies have focused too much on the individual level at the expense of group and multi-level research (Keskin & Taskin, 2013; van Osch & Coursaris, 2013), in fact arguing that many of the individual-level studies done specifically on e-collaboration are flawed because they were conducted at the wrong level (De Guinea, 2011; Gallivan & Benjamin-Finch, 2005). The study of internal corporate social tools is especially problematic because they are by definition behind a firewall and used for a wide variety of purposes. There is at present no easy way to measure usage, adoption, and benefits consistently across multiple organizations. Following are some specific challenges for both researchers and practitioners in evaluating the effects of these tools.

Nomenclature

One challenge for researchers attempting to study this field is a basic lack of common nomenclature for the phenomenon. The terms *CSCW* and *groupware* still tend to relate to traditional pre-internet collaborative tools and processes. In the business world, the term *Web 2.0* had come into prominence during a 2004 conference (O'Reilly, 2005) as a way to describe the trends being seen on the internet leading to the "network as a platform:" providing users with the ability to interact with the Web by easily creating their own content, both individually and collaboratively, as well as by rating, "liking," and commenting on the content of others. As firms began to explore the business advantages of these enterprise social tools, Andrew McAfee noted this movement and coined the term Enterprise 2.0 (McAfee, 2006) as analogous to the larger Web 2.0 movement but within the firewall.

A competing term "social business" was initially not very well received for two reasons. First, that phrase had already been coined by Nobel Prize winning economist Muhammed Yunus to describe a business created to solve a specific social problem (Yunus, 2008) and many people felt that using the term to describe the social software phenomenon would create confusion (Kiron, 2013). Second, the word "social" caused many business executives to associate it with what they considered the frivolous personal activities of teenagers on Facebook and Twitter. But as firms such as McKinsey, IBM, and Deloitte began to tout the benefits of these tools, "social" began to be seen in a more positive light and firms started describing themselves as social businesses as an indication of their

forward-looking strategic thinking. Now the phrase *social business* is replacing

Enterprise 2.0 as the primary descriptor for firms making use of social collaboration

platforms. One reason as described in a debate on Quora.com called "What are the

distinctions between social business and Enterprise 2.0?" (Quora.com, 2010-2011) is that

Enterprise 2.0 tends to emphasize the technology, while *social business* implies not only

certain technologies but also organizational changes in processes and behavior.

While the business world is slowly coming to agreement on what to call this combination

of technology and business model, there is so far no such trend in the academic world.   A

limited scan of the literature found the following terms used when describing this

research area: *social media, social computing, Web 2.0, social software* (Zhang, 2010),

Enterprise 2.0 (McAfee, 2006), *social networking sites (SNS)* (A. Richter & Reimer,

2009), *SoMe* (abbreviation for social media) (Lehmkuhl et al., 2013), *collaborative*

information technology (CIT) (Karsten, 1999; Keskin & Taskin, 2013), *enterprise*

microblogging (EMB) and *electronic networks of practice (ENoP)* (Seebach, 2012),

groupware and *computer-supported cooperative work (CSCW)* (Whitaker, 1996),

organizational social media (OSM) (van Osch & Coursaris, 2013), *Enterprise Social*

Software Platforms (ESSP) (Kugler & Smolnik, 2013), *Social Networking 2.0* (van Zyl,

2009), and *enterprise social networks (ESN)* (Riemer & Tavakoli, 2013).

For simplicity and consistency, this dissertation will use the terms most common in the

industry:

- *Enterprise Social Network* (ESN) – the instance of a social software collaboration platform deployed internally within an organization

- *Social Business* – an organization that uses an Enterprise Social Network

Definition of Features

The various enterprise social software tools of the present day have several features in common. They are web-based rather than client-server. They are platforms rather than channels (such as email) and increasingly they are situated on cloud platforms with mobile as well as PC access. However, their capabilities constantly change and blur as vendors compete in what has now become a dynamic marketplace. Thus, the amorphous nature of these products presents a challenge for the researchers who are trying to study them. One problem is that new capabilities often first appear as individual products on the internet and, after proving their popularity in the marketplace, are co-opted as features of an ESN software suite. Parameswaren and Whinston (2007b) highlight blogs, wikis, social bookmarking, and photo and video sharing as examples of social computing on the web. All of these are now standard components of ESN software provided by the major vendors.

One of the earliest to try to characterize the capabilities of ESN platforms was McAfee, who coined the SLATES acronym (McAfee, 2009):

- *Search* – the ability to find content, communities, or people without having to navigate through a series of web pages or rely on someone else's categorization of that content

- *Links* – connecting related content within the context of the currently viewed content

- *Authoring* – easy ways for users to contribute their own content

- *Tags* – allowing for the emergent collective categorization of content (folksonomies)

- *Extensions* – providing the ability for users to "like," rate, and comment on content, then using that information to help direct those users to relevant content and discussions they might not have been aware of

- *Signals* – allowing users to follow and subscribe, then notifying them of changes through email, feeds, activity streams, etc.

In an attempt to synthesize at least 50 characteristics identified by McAfee, Parameswaren et al. and others, Ali-Hassan and Nevo (2009) suggest these high-level attributes:

- *Content* – user generated, transparent, shared, linked

- *Sources* – individuals and communities, unbound by organizational structure

- *Governance* – bottom-up, decentralized, informal

- *Technology* – flexible structure, decentralized, portable, lightweight

- *Purpose* – to communicate, collaborate and socialize across boundaries, form communities, tap the wisdom of the crowd

This broad and ever-changing collection of capabilities and purposes makes it very difficult for practitioners to define adoption and measure success, and for researchers to study these systems in the context of existing adoption models. Given this, it makes more sense when trying to measure adoption of an ESN to treat it as an integrated platform that users interact with rather than as a collection of individual collaboration tools (Leonardi et al., 2013).

Validation of Purported Benefits

As the world becomes more interconnected and scientific disciplines become more complex, teams are rapidly displacing individuals as the primary producers of new knowledge (Wuchty, Jones, & Uzzi, 2007). Therefore, in both the business and academic worlds the performance of teams will become increasingly important. While the study of team performance has a long history, there is relatively little research as to the impact of social business tools on them (A. Richter & Reimer, 2009). Research, where it does exist, tends to focus on improvements in behavioral characteristics such as swift trust and shared understanding rather than direct business benefits (Bittner & Leimeister, 2013; Murthy, Rodriguez, & Lewis, 2013). Most research also tends to focus on the direct impact of tool usage on participants and not on the larger implications of teams working openly and transparently on a platform visible to others in the organization not directly

involved in their work. Additionally, it may be that some currently accepted research in this area will need to be revised as social tools become more prevalent. For example, Malone and colleagues found that teams can exhibit a collective intelligence (Woolley, Chabris, Pentland, Hashmi, & Malone, 2010) but that it drops off when they get more than 10 members. However, he speculates that the use of social tools may allow collective intelligence to continue to grow as membership grows into the hundreds or thousands (Kleiner, 2014).

Because of the difficulty of collecting data across multiple organizations, most existing academic research of social business tools falls into three categories:

- Measuring the benefits that accrue to a narrow set of individuals such as a virtual team (Murthy, 2012; Murthy et al., 2013)
- Measuring the benefits of a narrow feature of social business on a broad set of people, such as the impact of status messages (Thom, Helsley, Matthews, Daly, & Mullen, 2011) or social bookmarking (Gray, Parise, & Iyer, 2011)
- Conceptual papers that propose various frameworks and maturity models (Bittner & Leimeister, 2013; Fulk & Yuan, 2013; Lehmkuhl et al., 2013; Turban, Liang, & Wu, 2011)

This necessarily limits their ability to identify patterns and generalize benefits at an organizational level. However, this has not stopped social software vendors from making sweeping claims along these lines. At the same time, as the appeal of social business

increases, a market has been created for post-purchase consulting services to aid companies in increasing the adoption of their new technology, and many of the large management and IT consulting firms have taken advantage of this opportunity. As a result, most of the research to date on the broad organizational benefits of ESNs has been done by large consulting companies or by individual consultants who specialize in social business transformation (Cardon & Marshall, 2014). This research is typically in the form of individual case studies, surveys of executives, or simply reports that aggregate the consultant's experience. For example:

- Gartner reports that its clients claim reductions in duplicated work, higher employee engagement, faster response times, better team effectiveness, and increased innovation (Rozwell & Sussin, 2014)

- Deloitte surveyed managers worldwide across 24 industries, not on actual benefits but on what *expected* benefits would be. These included improved innovation, knowledge sharing, and employee engagement (Kiron, Palmer, Phillips, & Kruschwitz, 2012). They did a similar survey of executives and found benefits in innovation, identifying internal talent, and improving visibility into operations (Kiron, Palmer, Phillips, & Beckman, 2013).

- In a survey of over 1,700 CEOs, IBM found that collaboration is the number one trait they look for in their employees, with a strong belief that it is necessary to improve innovation (IBM, 2012b). They also found that becoming a social business can increase agility, deepen customer relationships, drive operational efficiencies, and optimize the workforce (IBM, 2011).

- Frost & Sullivan surveyed managers and "decision makers" and found that collaboration correlated with improved profitability and customer satisfaction, faster product development, and more successful sales and recruitment efforts (Frost & Sullivan, 2006, 2009).

- McKinsey's surveys of several thousand executives indicate that the use of social tools increases productivity by as much as 25%, as well as improving innovation and employee satisfaction while reducing costs for travel and communication (Bughin, Byers, & Chui, 2011; Bughin & Chui, 2010, 2013; Bughin, Chui, & Manyika, 2012).

While these surveys provide a useful snapshot of where the marketplace is headed with respect to the purchase and deployment of ESN software by organizations, they share one major deficiency in that their surveys rely on responses from executive management, many who may not use the tools themselves. Since ESNs can be used in so many different ways, reports of benefits from executives may arise from second-hand perceptions and anecdotes, not from actual usage.

Definition of Adoption

Becoming a true social business is complicated and not easily accomplished, because it is affected not only by technology but also by culture, leadership, number of employees, and geographic distribution of those employees. Because of the impact of so many

factors, many early adopters found little of the success they were expecting (Forrester Consulting, 2012). Gartner predicts that despite the desire of so many companies to obtain the benefits described above, 80% of social business efforts deployed over the next two years will fail due to inadequate leadership and overemphasis on technology (Mann, Austin, Drakos, Rozwell, & Walls, 2012).

At the root of much of this failure is the very definition of "adoption" when it comes to using an ESN. Most traditional IT systems have a particular clearly defined use, and so most of the well-established adoption models such as the Technology Acceptance Model (Davis, 1989) simply assume that adoption equals sustained use. However, many social software tools are designed to provide a "Swiss Army Knife" collection of features that can be used for a variety of purposes. For example, Jive's software platform allows for uploading files, creating collaborative documents and wiki pages, posting status updates, tagging and liking content, project management, following activity streams, "sharing" by sending notifications, commenting and having threaded discussions. Does adoption of such a platform require only that a user log in and view content, or that one or more of the above features be used? If so, how many features must be used to constitute "adoption"? And since many companies allow their employees to use their ESNs for non-business conversations, is adoption limited to only business use or open to any use at all?

Figure 2.1 contains actual data from Lexmark International, Inc.'s adoption of an ESN. It

demonstrates why this definition of adoption makes such a difference in the success of an

ESN.

Figure 2.1 ESN Adoption at Lexmark
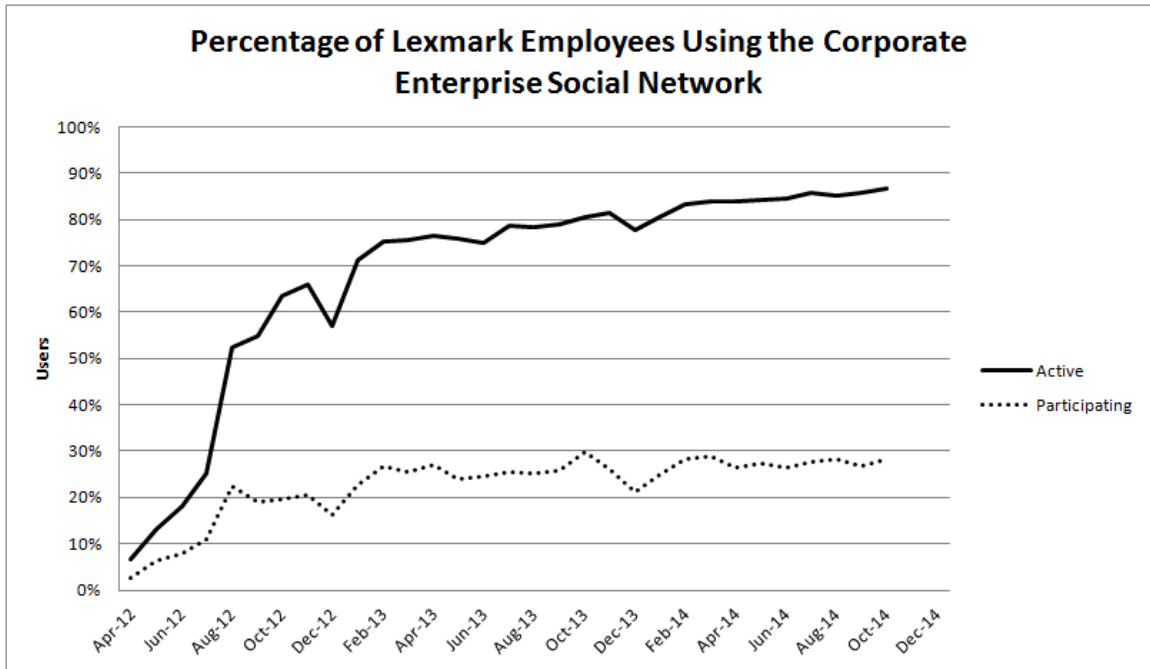
Based on the software's reporting tools, an active user is defined as one who logs onto

the ESN platform for any reason, even if just to search for information. A participating

user can be thought of as one who leaves a mark – uploads a file, makes a comment, likes

or rates a piece of content, posts a status update, etc. The chart illustrates that one could

easily make the claim that after two years the ESN has almost 90% adoption or equally

that it has less than 30% adoption, depending on how one wishes to define adoption.

Again citing Lexmark as an example, the Lexmark ESN contains the following types of communities:

- Formal spaces owned by business units such as HR and IT that contain the latest official policies and procedures

- Spaces devoted to specific projects related to new product development

- Spaces supporting communities of practice essential to the development of new technologies (sensors, paper handling, power supplies, gears, connectors, etc.)

- Volunteer groups dedicated to skill development (programming, public speaking, creating presentations)

- Diversity employee networks (young people, Hispanics, LGBT, women, etc.)

- Social clubs (motorcycles, photography, basketball, guitar, skiing, etc.)

- Buy/Sell/Trade spaces where employees can post want ads or for-sale notices

- A "Water Cooler" where employees are free to start a discussion on any topic they like

Given this wide spectrum of use cases, what does it mean for an ESN to have been "adopted" by an organization? This fuzziness in the definition of adoption is a primary reason why many of the surveys listed above often uncover conflicting results – large numbers of firms rushing to deploy social software packages but then struggling to make use of them. For example, over 70% of executives claim social business to be important to their business today, yet over half consider their implementations to be unsuccessful so far, citing lack of overall strategy, proven business case, and strong value proposition as

primary barriers. In addition, over 20% do not measure success in any way, while for the

remainder the most common metrics are platform-based traffic data and anecdotal

success stories (Briggs et al., 2014; Kiron, Palmer, Phillips, & Beckman, 2013).

ESNs also present problems for existing adoption models in the research literature, in part

because of their blended nature due to the intersection of the groupware and social media

trajectories discussed earlier. Attempts have been made to apply many different theories

and models to explain social business adoption: Technology Acceptance Model (TAM),

Task-Technology Fit Theory (TTF) and Adaptive Structuration Theory (AST) (Zhang,

2010); Diffusion of Innovations (Cardon & Marshall, 2014); Technology-Organization-

Environment Theory (TOE) (Saldanha & Krishnan, 2012); Hedonic Theory (Holsapple &

Wu, 2007); Representation Theory (Burton-Jones & Grange, 2013); Social Presence

Theory, Channel Expansion Theory, and Unified Theory of Acceptance and Use of

Technology (UTAUT) (S. A. Brown, Dennis, & Venkatesh, 2010); Transactive Memory

Theory (Keskin & Taskin, 2013).

Because of this blended history, ESNs do not fit neatly into most of the more traditional

models and frameworks because they have elements of adoption that are related to both

business use and social activity. The groupware trajectory has behind it a long history of

the study of traditional IT systems, where the Technology Acceptance Model (Davis,

1989) has a strong hold. TAM argues that perceived usefulness and perceived ease of use

are the primary driving forces for the adoption of new technology. Although well

established, TAM is derived from the study of IT systems that were designed for a specific purpose. In most of these systems there is little flexibility in how they are used, and the purpose is often one that is necessary for some particular business process. In these cases, "adoption" is simply a matter of use or non-use. However, ESNs are often voluntary in the sense that business processes can be done without them. An employee or team might choose to use email, phone calls, or face-to-face meetings to collaborate, rather than the social platform. And as illustrated above, those employees who do use ESNs might choose to use them in a variety of ways, at different frequencies, and for a variety of purposes, some of which may not be directly business-related. As a counter to TAM, hedonic theory arising from research on social platforms such as Facebook and Twitter suggests that adoption is dependent on enjoyment and perceived critical mass (Harden, 2012; Sledgianowski & Kulviwat, 2009; van der Heijden, 2004). It is not difficult to imagine that perceived usefulness and enjoyment might *both* play key roles in the adoption of an ESN. Therefore, there are some important questions that should be asked in order to better understand the adoption process.

What exactly is being adopted?

A scan of the research literature on enterprise social networks reveals two underlying assumptions in many studies which may lead to confusion when trying to understand social business adoption. First, ESN platforms can be considered "socio-technical systems," systems in which acceptance of the technology is shaped not only by the interaction of users with the system but also by interactions among themselves (Hiltz &

Johnson, 1990), and where even the same group of users may respond differently to a

technology in different settings (Marcus, 2007). Thus, these kinds of systems can often

be used in ways and for purposes other than those for which they were originally

intended, and it is possible for ESN platforms to be used in ways other than those

advancing social business. In fact, evidence such as the Lexmark data provided above

illustrates that it is possible to adopt social business platforms for other uses (such as a

document repository) without necessarily adopting the features that lead to becoming a

social business. Yet there is an implicit assumption in much of the research literature that

because the tools have the capabilities for collaboration, networking, increasing social

capital, etc. that deployment and use of those tools will naturally lead to organizations

gaining the benefits of those capabilities. Another complication is that most research

cites the openness of these platforms as one of their primary benefits, yet almost all of

these enterprise-level ESN products provide the ability to manage access at a granular

level, in other words not just access to the overall platform but access to specific places

and content within the platform. Ironically, it is possible and not all that uncommon for

organizations with a secretive, protective culture to create "collaboration silos" within

their ESNs that negate many of the benefits they had hoped to obtain (Alvarez, 2013).

Second, most existing adoption research, even socio-technical research that takes into

account this interdependency of technology and social behavior as it relates to adoption,

tends to focus on the technology as the object of study (Venkatesh, 2006). But the

benefits most firms seek from becoming a social business come from changes in

employee behavior, with adoption of the ESN platform included as a means to that end,

not an end in itself. The capabilities that social business technologies provide are

necessary for becoming a social business, so to that extent the adoption of those

technologies is an essential part of that transformation. But technology adoption is not

sufficient for becoming a social business. And because the two are so intertwined, it is

easy for both practitioners and researchers to fall into the trap of focusing on technology

adoption as the key, under the false assumption that social business behavior will

naturally follow, perhaps because technology adoption is more concrete and easier to

measure.   This means that many of the adoption models cited above such as TAM,

hedonic theory, and Task-Technology Fit (Goodhue, 1995; Goodhue & Thompson, 1995)

do not align with what most firms really mean by adoption because those models focus

on technology as the object of adoption. But Gartner points out that their high failure rate

prediction for social business initiatives in coming years is largely due to too much focus

on technology at the expense of leadership and relationships (Mann et al., 2012).

What is needed for both researchers and practitioners is a good description of the kind of

behavior businesses expect to see when deploying these technologies that will lead to the

benefits they anticipate, and a way to measure the level of that behavior. Scheepers et al.

have proposed a construct called "sense of community," comprising the four behavioral

sub-constructs of information seeking, hedonic activities, sustaining strong ties, and

extending weak ties, to be used as a dependent variable when studying social media use

(Scheepers, Stockdale, Scheepers, & Nurdin, 2014). However, their construct is intended

for use in research of use of external social media on the web. There does not appear to

be a similar construct for use when studying internal social media use, i.e. use of ESNs.

What level of the organization is doing the adopting?

Most technology adoption research has been done at the individual level of analysis (Saldanha & Krishnan, 2012; Venkatesh, 2006). This is especially true of research attempting to align social business adoption with TAM, which tends to downplay the impact of cultural and social forces (Bagozzi, 2007), forces that have been shown to have a significant effect on social technology adoption (Olschewski, Renken, Bullinger, & Moslin, 2013). But many ESN deployments are justified financially based on an expectation of benefits at the organizational level, and research has shown that increases in group social capital lead to increases in group effectiveness (Oh, Labianca, & Chung, 2006). So, it is important to understand ESN adoption from a multi-level perspective.

It is possible for users to interact with an ESN as individuals (creating blog posts and status updates), as groups (in projects and communities of practice) and as organizational networks, such as when engaging in "Enterprise Q&A" (McAfee, 2011). It is also conceivable that individuals could gain personal benefit by using an ESN to share information or hold social discussions in ways that provide little benefit to the overall organization. Therefore, the amount of "perceived usefulness" of the same system might vary widely depending on whether the measure is done at the individual, group, or organizational level. There have been calls for increased multilevel research of technology adoption in general (Burton-Jones & Gallivan, 2007), and of social business in particular. De Guinea points out that "an overwhelming majority of studies of e-collaboration, although studying a multilevel phenomenon, are conducted theoretically

and empirically at a single level, leading to "the potential that apparent cumulative knowledge may actually be spurious." (De Guinea, 2011). In fact, one study found that over half the research papers analyzed over a four year period contained "one or more problems of levels incongruence that cast doubts on the validity of their results." Contractor et al. even go so far as to argue that "the research agenda needs to evolve from studying networks in (or between) organizations to grappling with the notion that the network *is* the organization" (Contractor, Wasserman, & Faust, 2006). Clearly there is a need for analytical measures and methods that take into account the multilevel nature of social business adoption.

When does adoption take place?

Analogous to the issue with levels described above, another deficiency in the technology adoption literature is the heavy focus on the adoption decision and initial use behaviors, with little attention paid to post-adoptive behavior (Jasperson, Carter, & Zmud, 2005). Viability of information systems depends on *continued* use rather than *first-time* use (Bhattacherjee, 2001), and even continued use is not necessarily *effective* use (Burton-Jones & Grange, 2013). This is especially true of enterprise social network platforms, where users are often not fully effective until they have had time to build up weak ties within the system. The presents a challenge for measuring adoption, since in a large organization adoption will not be a discrete turning point but rather a gradual shift in behavior over time.

Two adoption theories, Diffusion of Innovations theory and Representation theory, may

be of more use for understanding ESNs than traditional models such as TAM. Diffusion

of Innovations theory explains how new ideas spread through an organization (Rogers,

1962). It provides characteristics that help innovations to spread, such as compatibility,

trialability, complexity, and riskiness. Because it contains a temporal component, it can

be useful in tracking the progress of adoption over time and also can provide signals for

practitioners when an adoption has stalled at the organizational level, along with

suggestions for shifting strategies as the adoption progresses from early adopters to

majority to laggards (Pearce, 2013a, 2013b, 2013c). However, Diffusion of Innovations

theory does not have much to say about what adoption actually is, only that it follows a

certain pattern as it flows through an organization.

So, to better understand IT systems such as ESNs, it might be more appropriate to

reconceptualize users as social actors who do not "use" a tool in the traditional sense, but

rather work in a complex social environment where the tool is a part of that environment

(Lamb & Kling, 2003). Resistance to adoption of an ESN may have nothing at all to do

with the features or usability of the tool. It can easily be due to the individual tensions

each employee faces in balancing personally comfortable levels of visibility, engagement,

and sharing against what the organization is calling for (Gibbs, Rozaidi, & Eisenberg,

2013). One theory helpful in understanding adoption of social business platforms in the

context of broader social behavior is Representation Theory (Wand & Weber, 1990,

1995). Under this theory, information systems exist as representations of aspects of the

real world in order to help their users understand those aspects and act on them.

Therefore, what is most important for the adoption of systems such as ESNs is not that they fulfill a specific purpose but that they adequately represent the world in which their users work.

Recent research applying this theory to the concept of *effective use* of information systems (as opposed to simply *use*) finds that one of the drivers of effective use is *adaptation actions* by the users to bring the system into alignment with the domain in order to make it a more faithful representation of that domain (Burton-Jones & Grange, 2013). The authors point out that these actions can operate in both directions – the system can be changed to more faithfully reflect the domain, but the domain can also be changed to more faithfully reflect the system. This intertwining of system and domain can often be seen in successfully adopted ESNs. The domain of an ESN is essentially the world of work, which in the real world includes everything from tasks to meetings to coffee breaks. As employees shape the ESN to represent their work world, they often discover that the system provides them with new ways of working that are more advantageous than their old ways, so they change their business processes, work habits, even social behaviors in ways that bring them into alignment with the system they are using. Given that an ESN is a platform, if users can be persuaded to take these adaptation actions openly and visibly, they increase alignment of the system and domain not only for themselves and for their immediate co-workers, but for the entire organization. However, this alignment happens gradually over time.

If adoption is about behavior, rather than technology, what are the expected behaviors?

Four post-acceptance use behaviors of employees as they interact with enterprise social software platforms have recently been identified (Kugler & Smolnik, 2014):

- *Consumptive use* – passive use to acquire knowledge from the platform
- *Contributive use* – contributing knowledge to the platform
- *Hedonic use* – using the platform for fun and entertainment
- *Social use* – using the platform to establish and maintain social relations with co-workers

Two important elements of successful ESN adoption arise from a close examination of these four use types. First, while any one of these four may be strong enough on its own to create adoption at the individual level, organizational adoption happens collectively over time and is an aggregate of all four, thus they need to be in balance. For example, too much consumptive use at the expense of contributive can lead to the ESN becoming stale and outdated. ESNs are typically "voluntary" in the sense that they are just one of several choices employees have for how they interact with others to get their work done, so even with high value content there may be a need for hedonic and social elements in order to keep employees from finding other more enjoyable and rewarding ways to share the same information. But, too much hedonic and social use can lead to a perception that the ESN is a playground without any work value. If "contribution of knowledge" can be broadly taken to mean not just knowledge related to work but knowledge about oneself, about culture, about others, and about the world at large, then an argument could be made

that it is contributive use that drives the other three. Without it there would be nothing to consume, nothing to be entertained by, and no others to relate to.

Therefore, widespread active participation and sharing of information are key to any successful ESN deployment. The information shared could be functional, entertaining, socially engaging, or all three combined, but an ESN will quickly deteriorate if nothing is shared. The "90-9-1" rule is often invoked as a rule of thumb for discussion forums on the internet (Wikipedia, 2014). The notion is that only 1% of visitors to a typical active forum create content, 9% interact with it by commenting or editing, and 90% simply "lurk" and read. However, as has been shown repeatedly above, an ESN is not a platform for a single topic of discussion, but rather has many wide-ranging uses for both the organization and the individuals who interact with the ESN. Given that many of the purported benefits of social business adoption hinge on the fostering of social networks among employees through the use of their ESN, the higher the contribution rate the better.

Second is the importance of the ESN as a platform rather than a channel (McAfee, 2009). Unlike email, phone calls, or face-to-face meetings, an ESN can provide users with the ability to discover information and participate in conversations without having been specifically invited. It also maintains the persistence of those conversations so that they can be discovered at a later time by others who missed participating when they were created. This hearkens back to a point that was made earlier in this dissertation. Almost

all the research literature on ESNs recognizes that they are platforms and that the openness that stems from being a platform is at the heart of the benefits they create; however they almost all presume that this openness occurs automatically. But, if for example, conversations are held on the platform in a restricted space or team members work on the platform within a secret group, they may as individuals and teams receive tremendous benefit from the use of the tool's collaboration features. However, for the rest of the organization outside of these silos it is no better than if they were working in email. It is only when work and conversations are performed as openly as possible, so that "non-invited others" can see them, does the ESN differentiate itself from other more traditional communication methods.

Summary of Challenges and Response

Technology in the area of social software has been advancing at a speed that has outpaced many firms' ability to adjust work activities, business processes, and organizational culture to leverage it for competitive advantage. In both research and practice many names have been given to this set of tools and behaviors, many benefits have been touted, and many theories have been applied in an attempt to understand it. It has become extremely attractive for firms to deploy the technology, only then to discover that this intertwining of technology with business process and culture change makes it much more difficult to be successful than they anticipated, leading to a high failure rate of social business initiatives.

Because many companies are protective of their internal social platforms, it is also difficult for researchers to get a truly comprehensive understanding of their use, being limited mostly to individual case studies. Large-scale surveys done by the major consulting firms are aimed at executives and, thus, subject to some hearsay bias in that most executives are not heavy users of these tools themselves, and the benefits expressed are largely self-reported. Because of the close association of adoption with technology, rather than organizational behavior, much of the existing research mistakenly treats social business adoption as an event rather than as the ongoing process that it truly is, and does not necessarily discriminate between consumptive use and contributive use in assessing adoption.

Existing research also tends to focus on a specific capability such as micro-blogging or social bookmarking, rather than examining ESNs as holistic systems. It often presumes that because a social business platform can provide benefits to a firm through openness and transparency that other tools such as email cannot, that firms will naturally use the platform in an open, transparent manner even though silos of information and collaboration are just as easy to construct in social platforms as they are in other tools. Finally, a significant amount of the existing literature looks at social business only at the individual level, even though it is clear that a company-wide platform that fosters teamwork and social connections will have an impact at the group and organizational level as well.

For researchers to advance their understanding of social business as a behavioral phenomenon and for practitioners to become more successful in transforming their organizational cultures into social businesses, a new social business construct needs to be developed that would:

- Have the ability to be operationalized so that it could be correlated against other business measures such as financial metrics, employee engagement scores, and productivity measures.

- Represent the behavior of users within the ESN platform as opposed to simply measuring use of the platform

- Represent this behavior at the individual, group, and organizational levels

- View the ESN as a holistic entity, independent of any particular specific feature

- Incorporate openness, transparency, and contribution as key attributes of the desired behavior

It would need to be operationalized in such a way that the measure:

- Represents the behavior of actual users, not proxies such as executives or IT departments

- Is standard and general enough to apply to any organization so that comparisons could be across organizations

- Is simple enough that it could be used repeatedly without unduly burdening employees, so that changes in adoption within a single organization could be measured over time

This dissertation makes the argument that the existing concept of "working out loud" can be formalized to fulfill such a role, and that a survey instrument can be developed to operationalize it.

Chapter 3:   Defining and Refining the "Working Out Loud" Concept

What is "Working Out Loud"?

The phrase "working out loud" (hereafter abbreviated as WOL) has been used in education research for over 30 years (Cooper, Ayers-Lopez, & Marquis, 1982; Rees, 1981), encouraging children to show their work and thought processes as part of solving problems. However, in recent years WOL has been increasingly associated with social business and ESNs, although little research has been done using the term. An internet search on the terms "working out loud" and "social business" found only 3 hits on Google Scholar, none of them being peer reviewed journal articles. Only one journal article was found that used "working out loud" in a social business context (Muras & Hovell, 2014). Yet the same search terms on Google produced over 40,000 hits. WOL as used in the context of social business has an interesting history, and its increasingly widespread use is ironically an example of the very concept it conveys.

In the first few years of the 21st century the internet was transitioning from its original incarnation into what became known as Web 2.0 (O'Reilly, 2005), not only treating individual users as consumers of information but also providing them with the ability to interact with the Web by easily creating their own content, both individually and collaboratively, as well as by rating, "liking," and commenting on the content of others. Several popular books were published that speculated on the impact this new capability would have on business and society. These books floated a series of related ideas: that

the internet is in the process of making the world highly interconnected (Weinberger, 2002), allowing the occurrence of emergent organizing from the bottom up without the need for formal organizations (Shirky, 2008), and that this emergent interconnectedness would lead naturally toward more openness and sharing which would, in turn, lead to new external business activities such as mass collaboration (Tapscott & Williams, 2006) and crowdsourcing (Howe, 2008), as well as changes in how work is done inside the firm (McAfee, 2009). It was at this same time that blogging on the internet began to rapidly proliferate, so it was only natural that some of these bloggers would be interested in how the broad societal changes outlined in these books would manifest themselves in the world of ordinary work. And being bloggers, they were already predisposed to sharing their thoughts and ideas publicly, so it was also natural that the idea of sharing work on an ongoing basis is something that would resonate with them.

In the time period 2008-2010 these ideas began to coalesce as they bounced back and forth in blog posts and trade conference presentations. Michael Idinopulos at Socialtext proposed that these Web 2.0 tools would lead to a "work-in-progress" culture where "we no longer think that something has to be finished before we let strangers into the conversation" (Idinopulos, 2008). Dave Winer, an early pioneer in developing weblogs and RSS syndication, wrote of the importance of "narrating your work" -- in other words talking about and sharing your work as you are doing it, rather than waiting until it is finished (Winer, 2009). John Udell of Microsoft gave a keynote address at the 2009 Open Education conference explaining that work and education were observable and connected in the pre-industrial era, but lost those characteristics as society became

industrialized (Udell, 2009). It was not long after this that management consultant Jim

McGee blogged that knowledge work is best understood as "craft work," but suffers from

the same technologically-imposed invisibility that other forms of industrial work have,

and thus "the benefits of visibility are now something that we need to seek mindfully

instead of getting them for free from the work environment" (McGee, 2010).

Through the summer and fall of 2010, the terms "narrate your work" and "observable

work" were becoming associated with Enterprise 2.0 (Lloyd, 2010; McAfee, 2010). By

November, Brian Tullis and Joe Crumpler from Alcoa were at the Enterprise 2.0

conference in Santa Clara using both terms in a presentation describing the people,

process, and technology patterns that can arise from observable work (Crumpler & Tullis,

2010). In discussions during that conference, those terms along with "working out loud"

were used interchangeably to describe the sharing, open behavior that the conference

participants hoped to instill in their companies. A few weeks later, Bryce Williams from

Eli Lilly (who had attended the conference) was trying to make sense of the various terms

and proposed in a blog post that

Working Out Loud = Observable Work + Narrating Your Work

"Narrating your work implies the act of journaling (blogging, micro-blogging, etc.) what you are doing in an open way for those interested to find and follow … however, by terminology doesn't necessarily describe creating the work outputs/deliverables themselves in a manner for others to consume. It also brings with it a feel of an additive activity to already-existing workload, which in my experience, some folks can be reluctant to accept …

"Whereas Observable Work to me implies creating/modifying/storing your work in places that others can see it, follow it and contribute to it IN PROCESS. The key being that items are available during the course of being

worked on, and not waiting until a 'final' deliverable to publish to a broader audience … I think having two elements with which to break down 'Work Out Loud' helps with teaching key behaviors of social collaboration and providing examples of how software capabilities help contribute to each (ex. Wikis/Discussions/Open File Libraries = observable, Blogs/Micro-blogs = narrating)" (B. Williams, 2010)."

This definition of WOL resonated with many social business advocates, and the term quickly began appearing in a variety of contexts. In addition to being discussed in countless blog posts, it has been adopted as a term of art by major social software vendors such as IBM (IBM, 2012a), Jive (Butler, 2013), Salesforce.com (Salesforce.com, 2013), and Microsoft (Slemp, 2013). It has been included as a key component in major consulting firm studies of collaboration and social business (McConnell, 2014; E. Williams & Brill, 2011) as well as referenced in books (Carr, 2014; Jarche, 2014), recently even as their primary subject (Bozarth, 2014; Stepper, 2015).

Working Out Loud and Enterprise Social Networks

Although ESNs greatly facilitate WOL, it is possible to engage in that behavior without necessarily relying on social platforms to do so. The essence of WOL is sharing your work with people who were not specifically invited to see it, so just as it is possible to use ESNs for purposes that are not WOL, it is possible to work out loud without using ESNs. An interesting example of how this can be done in the physical world was demonstrated in an experiment performed by Jonathan Anthony of TeeKay (a large Canadian oil company). Anthony moved his desk and chair from his office to a high-traffic location

below the stairs of his office building. For one week he did his work out in the open

stairwell, posting his in-progress work on the walls and giving twice-a-day presentations

on his work to whoever might happen to show up. He claims this experiment sparked his

creativity and created a large number of useful interconnections with employees "outside

my echo chamber" (Anthony, 2014). While this was a highly unusual experiment, it and

the examples of ESN use previously described demonstrate that WOL activities and

enterprise social software usage can be done independently of each other in theory. But,

from a practical perspective, especially for large global organizations, an ESN should be

considered a necessary, but not sufficient, component of WOL. So, given the various

aspects of WOL described so far, a more detailed definition is proposed:

> *Working Out Loud" is the act of doing work and/or narrating that work,*
> *whether individually or as a group, as it progresses such that it is*
> *immediately observable on an organization's internal enterprise social*
> *network or on external social platforms and available for review and*
> *comment by others who may not necessarily be part of a specific intended*
> *audience.*

Examples of Working Out Loud

When organizations work out loud, benefits can accrue at multiple levels. The following

examples taken from Lexmark's experience illustrate how benefits can occur at the

individual, group, and organizational levels.

Example 1: Benefits at the Individual Level

Several months after Lexmark's social business platform was deployed, the author wanted to hold a web conference with early adopters as a way to exchange learnings and best practices that had been discovered. Traditionally, this would have been done by coordinating an agenda with a few of them via email, then broadcasting an email invitation to the larger group. Instead, I decided to use the ESN to openly create the agenda and select the date. In the course of discussion, and employee from Colombia commented that I should verify that I had enough phone lines available because the default number of lines for an employee account is 30. I was able to increase the available lines to 60 prior to the call. There were 38 employees who participated in the meeting, so if the Colombia employee had not seen the discussion and provided the information on conference call limitations, there would have been eight employees unable to participate.

When employees work out loud, they give themselves the opportunity to benefit from the knowledge that others who they may not know can provide. This additional knowledge may sometimes prevent major mistakes from occurring. But even if it results only in small incremental improvements in an employee's productivity, those improvements aggregated across a large organization can be significant. In addition, because the communication is taking place on a platform instead of channels such as email or phone calls, that knowledge has been captured and preserved and is available for others to discover at a later time.

Example 2: Benefits at the Group Level

Lexmark was asked by a large customer to create a custom printing application for them.

The product development team had five possible designs in mind, each with its own pros

and cons in terms of cost, reliability, serviceability, etc. The traditional process of

determining the final design would be for the design team to get together, compare and

weigh the various attributes, and then make a selection. In this instance, the team leader

(who was a proponent of WOL) decided to post the details openly in the ESN and allow

the entire company to participate in the discussion. Within 36 hours there were 40

responses from 17 people in 3 different countries. The respondents came not only from

hardware and software design, but also from Technical Support and Field Engineering,

areas not usually represented in these discussions. The result was not only a quick

decision but a design that was actually a hybrid of two of the original concepts.

Here one can see that working out loud often brings ideas and perspectives into the

conversation that might not traditionally be included. The impact on a group working in

this way can be faster and higher quality decisions, as well as innovative solutions that

might not have occurred to the team if it had worked in isolation.

Example 3: Benefits at the Organizational Level

Lexmark provides large customers with software that allows them to manage networks of

printers. This management software includes internet-based error reporting, as each

printer on the network has its own IP address. One particular customer in Maryland was

finding an occasional anomaly in reports that showed an error coming from an unknown

IP address. When the Lexmark account manager and service engineer responsible for

that customer investigated the problem, they found that the IP address actually belonged

to a printer at Lexmark's headquarters in Lexington, Kentucky. The account team

opened a case with the Lexmark Technical Support Center, but they were unable to

determine the location of the rogue printer, even after escalating to IT for assistance. The

account manager then contacted the author, and we decided to post the case information

to the Lexmark ESN and ask the community to help.

The request for help garnered responses from employees in Hardware and Software

Development, Service, Technical Support, Operations, and Sales. No one person had the

answer, but the puzzle was solved in 11 days using contributions from 8 different people.

When defective printers are returned from customers, they are typically shipped to a

depot where their memories are wiped clean. But this printer had a defect that was of

particular interest to the product development team, and so it was shipped directly to the

lab for analysis without going through the depot process. Thus, every time the printer

was powered up and created an error condition, that error was recorded on the customer's

monthly report. Once the problem was identified and corrected, changes were made to

the return process to prevent this from happening again.

In this example, working out loud led to the solution of a difficult problem after more formal processes had failed. It not only eliminated a specific customer problem, but created the impetus for improving a complex process via cooperation among several different business functions.

Chapter 4:   Research Question

Within the design science research paradigm, "demonstration of a novel artifact can be a research contribution that embodies design ideas and theories yet to be understood" (Gregor & Hevner, 2013). In addition, it has been suggested that the design science perspective is interdependent with the behavioral perspective, and that both are necessary for a complete understanding of information systems (Niederman & March, 2012). Clearly this is the case as firms strive to become social businesses. ESN software tools are essential for enabling this transformation, but they alone are not sufficient without a WOL culture. Therefore, what is needed is a quantitative measure of WOL to complement the activity metrics already provided with most social tools. Given the two distinctive aspects of WOL present in its original definition (i.e., narrating work individually and performing observable work as a group), the primary research question is:

Do these two dimensions of WOL really exist as constructs, such that two survey instruments could be created: One focused on narrating work that would measure individual working out loud (IWOL), and one focused on the creation of observable work that would measure group working out loud (GWOL)?

To answer this question in a practical way that maximizes value to both practitioners and researchers, the instruments should be designed with these characteristics:

- Have as few items as possible without sacrificing validity and reliability. Not only is this good practice in general when developing survey instruments (Hinkin,

1998), but is especially important in this particular case for two reasons. First, social business platforms are primarily used for internal collaboration within organizations, thus it is very difficult for researchers to gain access to that data. Many companies are not predisposed to sharing internal information with outsiders, and the idea of a lengthy survey may likely strengthen that predisposition. Second, social business adoption within organizations is not a discrete event but changes dynamically over time, often in pockets of the organization. Therefore, it will be necessary for organizations to survey frequently in order to track changes in WOL over time and measure conditions before and after attempting improvement initiatives. Employees in large organizations often already suffer from "survey fatigue" because of the number of questionnaires and quality surveys deployed by internal business functions such as HR, IT, Facilities, Food Service, etc. They are likely to resist being asked to repeatedly complete lengthy surveys, driving down participation and degrading the usefulness of the instrument. In addition, if the number of questions is small enough it may be possible to incorporate them into other existing surveys that may already be routinely administered, such as employee engagement or satisfaction surveys.

- Be applicable across a broad array of industries and social software. One of the challenges of understanding the benefits of social business so far is that when comparing adoption across multiple organizations, information on behavior has been limited to the perceptions of executives, rather than coming from the

employees doing the work. Questions worded in a way that focuses too heavily on a particular industry trait are restricted in their generalizability. Questions relying too heavily on specific features of a social software platform such as blogging or status updates are susceptible to becoming outdated and irrelevant as technology changes.

- Use a 7-point Likert scale for responses. The Likert scale is the most widely-used scale for organizational surveys (Edwards, Thomas, Rosenfeld, & Booth-Kewley, 1997). Although 5 points has been shown to be sufficient for reliability (Lissitz & Green, 1975), a 7-point scale provides better means for discriminating extreme differences without complicating respondents' ability to complete the survey. Reichheld (Reichheld, 2006) points out that respondents who lie at the extremes of the distribution are often the ones with the most useful information for change. Modern online survey tools feature conditional branching, so it would not be difficult to prompt a respondent who answered a question '1' or '7' to answer an additional open-ended question asking why that response was given. Using this form of open-ended question in conjunction with the Likert-based items in this dissertation gives practitioners a numerical score to track over time and descriptive information that could be used to suggest improvement initiatives.

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Chapter 5:   Methodology

Survey development for this research used the process commonly followed in the

literature (Burton & Mazerolle, 2011; Hinkin, 1998).

Item Definition

As described earlier in this dissertation, the goal is to create two constructs to represent

the two facets of WOL, individual working out loud (IWOL) and group working out loud

(GWOL), as measured using a 7-point Likert scale. Because the goal is to measure actual

WOL behavior as opposed to attitudes about it, questions were worded to capture actions

rather than feelings or opinions. There are no existing survey instruments from which

items can be directly reused, but there do exist instruments of similar concepts from

which items have been taken and modified to use as a starting point. These include

questions measuring knowledge management success (Kulkarni, Ravindran, & Freeze,

2007), success of communities of practice (Verburg & Andriessen, 2006), prediction of

collaboration technology use (S. A. Brown et al., 2010), and sharedness of team-related

knowledge (Johnson et al., 2007). Based on a review of these surveys and the author's

own understanding of WOL, five items for each construct were created (Table 5.1).

Many organizations give their social platforms evocative names such as "The Loop,"

"The Hub," "Spark," etc., so in practice the generic <social platform> label would be

replaced by the organization's chosen name.

Table 5.1 Initial Survey Items

Item	Description	Response Options (1 to 7)
Ithoughts	I share my thoughts and ideas on <social platform> with others beyond my immediate co-workers.	Never ←→Always
Icollab	Given my choice of collaboration methods such as email, phone, face-to-face meetings, and <social platform>, when I need to collaborate I use <social platform>.	Never ←→Always
Iproblems	I share difficult work-related problems on <social platform> with others beyond my immediate co-workers.	Never ←→Always
Iinfo	When I discover interesting information, I share it on <social platform> even when it may not be directly related to my work.	Never ←→Always
Ipart	I participate in <social platform> by starting discussions, making comments, creating status updates or blog posts.	To No Extent ←→ To a Great Extent
Ggoals	When I work on a team, we share the team's goals in ways that those in other parts of the organization can see.	Never ←→Always
Gcomm	When I work on a team, we communicate with each other in ways that those in other parts of the organization can see.	Never ←→Always
Gwork	When I work on a team, we make our work visible to the larger organization before it is complete.	Never ←→Always
Gusek	When I work on a team, we use knowledge that was contributed to <social platform> by other groups not directly related to mine in order to do our work.	Never ←→Always
Gproblems	When I work on a team and we have a difficult question or problem, we seek help from others by using <social platform>.	Never ←→Always

Validity

To establish content validity, the proposed items were posted to the ESN platform of

Change Agents Worldwide (Change Agents Worldwide, 2014), an organization of which

the author is a member. CAWW is a network of independent consultants and enterprise-

based professionals, several of whom have been cited in this dissertation (Bryce Williams, John Stepper, Harold Jarche, Jon Husband, Jonathan Anthony), and who are focused on improving organizations through the adoption of collaboration and social business tools and behaviors. The items were reviewed and deemed acceptable. To ensure that items are understandable by non-native English speakers, the survey was also pretested by 16 Lexmark employees from the Philippines, Hungary, Germany, France, Switzerland, the Netherlands, Colombia, India, and China. Based on this feedback, a slight wording change was made to item Gusek.

In addition to the 10 items listed above, two demographic questions were added in order to understand the geographic and functional distribution of the respondents (Table 5.2). These questions were designed to be as generic as possible (rather than Lexmark-specific) so as to be applicable most companies. Choices for the geographic question include what have become standard regional classifications for global firms: North America; Latin America; Asia Pacific; and Europe, Middle East, and Africa (EMEA). Business function classifications were taken from APQC's Cross-Industry Process Classification Framework (APQC, 2014).

Table 5.2 Survey Demographic Questions

Item	Description
Geo	I am located in … 1. United States or Canada 2. Latin America 3. EMEA (Eurpoe, Middle East, or Africa 4. Asia
Role	My primary role in the company is best described as … 1. Developing vision and strategy 2. Developing products and services 3. Marketing and selling products and services 4. Delivering products and services 5. Providing customer service and support 6. Developing human capital and resources 7. Managing information technology 8. Managing financial resources 9. Acquiring, constructing, and managing physical assets 10. Managing enterprise risk and compliance 11. Managing external relationships 12. Other

Six questions from a previously published survey were also included to aid in testing

criterion validity. Hinkin suggests that criterion validity can be tested by including items

from pre-existing scales that measure related constructs (Hinkin, 1998). One such

instrument measures beliefs and attitudes affecting intentions to share information in an

organizational setting (Kolekofski Jr. & Heminger, 2003). This would seem to be a

logical fit, because it is to be expected that those employees who most exhibit WOL

behavior would also have attitudes that encourage such behavior. This instrument also

uses a 7-point scale, so scales among questions are similar. The Kolekofski survey

measures three dimensions related to information sharing: stewardship attitude,

instrumentality, and value for feelings. An examination of the questions indicated that

stewardship attitude was the most applicable dimension to WOL, so these six questions

were included in the survey (Table 5.3).

Table 5.3 Sharing Attitude Survey Items

Item	Description	Response Options (1-7)
SA1	When another employee requests company information from me, my first tendency is to …	Protect it (don't share) ←→ Share it
SA2	As a general rule, I feel that company information belongs to …	The office or project for which it is used ←→ The whole organization regardless of who is using it
SA3	As a general rule, I feel that company information should be …	Tightly controlled ←→ Freely shared
SA4	When sharing company information with other employees, I tend to …	Limit access to individuals within my own office or project ←→ Make it available throughout the organization
SA5	When sharing company information with other employees …	The information's worth determines whether I share it ←→ I am willing to share it regardless of its worth
SA6	I agree with the company when it …	Encourages employees to tightly control information ←→ Encourages employees to share information within the organization

taken from (Kolekofski Jr. & Heminger, 2003)

A survey was administered containing 18 questions and made available internally to all

Lexmark employees. An email was sent to 187 employees in various parts of the

company containing a link to the survey and a request to forward it on to others. A

request containing the link was also posted on the company social network. The link

remained available for two weeks. In addition to the Lexmark-specific survey, a link to a

more generic version of the survey was posted to Jive Software's customer community

and to the Change Agents Worldwide web site in an attempt to obtain data from multiple

companies, but there were insufficient responses to provide enough data for analysis.

Chapter 6: Analysis and Results

Initial Data Analysis

The Lexmark survey resulted in 313 complete responses. While there were responses from every geographical area and business function, the overall response was heavily skewed toward North America and Product Development (Table 6.1).

Table 6.1 Demographic Distribution of Responses

Category	Pct of Employee Base	Responses	Pct of Total Responses	Response Rate as Pct of Employee Base
North America	44.2	275	87.9	4.6
EMEA	15.3	19	6.1	1.1
Asia	28.1	16	5.1	0.4
Latin America	12.4	3	0.9	0.2
Product Development	20.7	123	39.3	4.4
Sales & Marketing	23.1	32	10.2	1.0
Other	--	31	9.9	--
Product Delivery	12.9	29	9.3	1.7
IT	8.2	24	7.7	2.2
Service & Support	24.5	22	7.0	0.7
Strategy	0.1	18	5.8	90.0
HR	1.5	11	3.5	5.6
Finance	6.1	9	2.9	1.1
Risk & Compliance	0.3	7	2.2	15.6
External Relationships	0.1	6	1.9	75.0
Facilities	1.3	1	0.3	0.6

An examination of the descriptive statistics showed that the data for the 10 items to be analyzed were not normally distributed, with almost all values for standardized kurtosis

and skewness being outside the -1.96 to 1.96 acceptable range (Table 6.2). Significant

results for the Kolmogorov-Smirnov and Shapiro-Wilk tests (Table 6.3) confirmed the

non-normality of the data.

Table 6.2 Descriptive Statistics

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis			
	Statistic	Statistic	Statistic	Statistic	Std. Error	Std. Statistic	Statistic	Std. Error	Std. Statistic
Ithoughts	313	3.00	1.811	.634	.138	4.594	-.806	.275	-2.931
Icollab	313	2.44	1.427	1.143	.138	8.283	.811	.275	2.949
Iproblems	313	2.13	1.571	1.525	.138	11.051	1.526	.275	5.549
Iinfo	313	2.72	1.824	.868	.138	6.290	-.494	.275	-1.796
Ipart	313	3.23	1.961	.497	.138	3.601	-1.056	.275	-3.840
Ggoals	313	3.61	1.695	.227	.138	1.645	-.976	.275	-3.549
Gcomm	313	3.33	1.602	.352	.138	2.551	-.815	.275	-2.964
Gwork	313	3.30	1.735	.424	.138	3.072	-.889	.275	-3.233
Gusek	313	3.15	1.718	.505	.138	3.659	-.773	.275	-2.811
Gproblems	313	2.80	1.738	.803	.138	5.819	-.394	.275	-1.433
Valid N (listwise)	313								

Table 6.3 Tests of Normality

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Ithoughts	.233	313	.000	.878	313	.000
Icollab	.277	313	.000	.841	313	.000
Iproblems	.266	313	.000	.738	313	.000
Iinfo	.263	313	.000	.833	313	.000
Ipart	.211	313	.000	.883	313	.000
Ggoals	.149	313	.000	.934	313	.000
Gcomm	.163	313	.000	.930	313	.000
Gwork	.178	313	.000	.917	313	.000
Gusek	.190	313	.000	.911	313	.000
Gproblems	.233	313	.000	.867	313	.000

a. Lilliefors Significance Correction

The intent of this study was to create valid, reliable instruments with the minimum number of required items. A typical rule of thumb is a minimum of three items per factor (Kim & Mueller, 1978). SPSS 22 and AMOS 22 were used to perform exploratory and confirmatory factor analyses on the data with that goal in mind. The data were randomly split into two groups for use in the two factor analyses. Because of the non-normality of the data and knowing that confirmatory analysis can be sensitive to small sample sizes (Hoelter, 1983), instead of splitting the data equally, 200 samples were allocated for confirmatory analysis and the remaining 113 used for exploratory analysis.

Correlation coefficients were examined prior to the exploratory analysis and all but one were found to be significant, most at the $p < 0.01$ level (Table 6.4). In addition, most of

the items correlated most strongly with their conceptually related items (individual and group WOL). Spearman's method was used, rather than Pearson's, because of non-normality and the ordinal nature of scale items, but a cross-check using the Pearson method produced almost identical results.

Table 6.4 Item Correlations

Correlations

	Ithoughts	Icollab	Iproblems	Iinfo	Ipart	Ggoals	Gcomm	Gwork	Gusek
Ithoughts									
Icollab	.751**								
Iproblems	.617**	.711**							
Iinfo	.505**	.600**	.482**						
Ipart	.708**	.752**	.553**	.667**					
Ggoals	.219*	.243**	.240*	.308**	.169				
Gcomm	.392**	.366**	.406**	.276**	.326**	.656**			
Gwork	.344**	.361**	.446**	.340**	.317**	.510**	.713**		
Gusek	.407**	.560**	.553**	.392**	.406**	.312**	.348**	.383**	
Gproblems	.490**	.592**	.466**	.474**	.497**	.212*	.268**	.222*	.708**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Exploratory Factor Analysis

An exploratory factor analysis was performed on the 113 sample subset using the principal components method. Oblique rotation (direct oblimin) was used rather than the typical orthogonal rotation, because it is assumed by the proposed theoretical model and

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indicated by the correlation matrix that the factors are correlated. Several tests were

performed as part of the analysis to ensure that the sample size was adequate. Bartlett's

test of sphericity was significant, indicating that the correlation matrix is not an identity

matrix, and the Kaiser-Meyer-Olkin measure of sampling adequacy was well above the

0.50 threshold of acceptability (Table 6.5). In addition, the anti-image correlation matrix

also showed all correlations on the diagonal to be significant and well above 0.5 (Table

6.6). Communalities were also high (Table 6.7), supporting use of the smaller sample

size, and the determinant of the correlation matrix was 0.001, greater than the threshold

of 0.00001 and indicating no multicollinearity.

Table 6.5 Sampling Adequacy

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.830
Bartlett's Test of Sphericity	Approx. Chi-Square	714.692
	df	45
	Sig.	.000

Table 6.6 Anti-Image Correlation

Anti-image Correlation

	Ithoughts	Icollab	Iproblems	Iinfo	Ipart	Ggoals	Gcomm	Gwork	Gusek	Gproblems
Ithoughts	.891[a]	-.312	-.191	.055	-.317	-.009	-.108	.055	.186	-.120
Icollab	-.312	.881[a]	-.463	-.105	-.256	.001	.026	-.005	-.173	-.092
Iproblems	-.191	-.463	.885[a]	-.030	.111	.124	-.101	-.140	-.181	.042
Iinfo	.055	-.105	-.030	.813[a]	-.470	-.301	.240	-.133	.084	-.137
Ipart	-.317	-.256	.111	-.470	.843[a]	.192	-.147	.032	-.020	-.025
Ggoals	-.009	.001	.124	-.301	.192	.711[a]	-.495	-.057	-.152	.059
Gcomm	-.108	.026	-.101	.240	-.147	-.495	.733[a]	-.537	.064	-.065
Gwork	.055	-.005	-.140	-.133	.032	-.057	-.537	.813[a]	-.128	.136
Gusek	.186	-.173	-.181	.084	-.020	-.152	.064	-.128	.806[a]	-.605
Gproblems	-.120	-.092	.042	-.137	-.025	.059	-.065	.136	-.605	.830[a]

a. Measures of Sampling Adequacy (MSA)

Table 6.7 Item Communalities

Communalities

	Initial	Extraction
Ithoughts	1.000	.669
Icollab	1.000	.838
Iproblems	1.000	.682
Iinfo	1.000	.515
Ipart	1.000	.700
Ggoals	1.000	.695
Gcomm	1.000	.822
Gwork	1.000	.736
Gusek	1.000	.549
Gproblems	1.000	.600

Extraction Method: Principal Component Analysis.

The scree plot (Figure 6.1) and eigenvalue cut-off at 1 (Table 6.8) both suggest that a two-factor model is acceptable.

Figure 6.1 Scree Plot
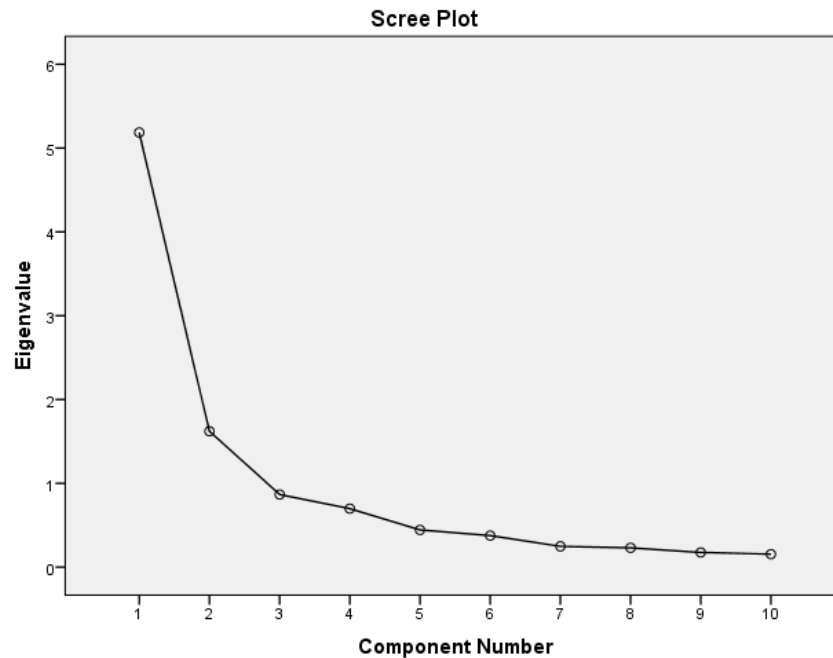
Table 6.8 Variance Explained After Initial Analysis

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	5.185	51.852	51.852	5.185	51.852	51.852	4.934
2	1.621	16.207	68.059	1.621	16.207	68.059	3.039
3	.867	8.669	76.728				
4	.698	6.979	83.707				
5	.444	4.440	88.147				
6	.376	3.758	91.906				
7	.248	2.483	94.389				
8	.230	2.301	96.689				
9	.176	1.757	98.446				
10	.155	1.554	100.000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

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Because this was an oblique rotation, the pattern matrix was used to examine the factor

loadings (Table 6.9).

Table 6.9 Factor Loadings After Initial Analysis

Pattern Matrix[a]

	Component	
	1	2
Ithoughts	.822	-.011
Icollab	.916	-.001
Iproblems	.768	.124
Iinfo	.714	.009
Ipart	.869	-.090
Ggoals	-.095	.868
Gcomm	.070	.876
Gwork	.089	.818
Gusek	.681	.126
Gproblems	.799	-.065

Extraction Method: Principal
Component Analysis.
Rotation Method: Oblimin with Kaiser
Normalization.[a]
a. Rotation converged in 3 iterations.

Although Gusek and Gproblems were expected to be items used to measure Group WOL,

they load more heavily on the Individual WOL than on Group WOL. A closer

examination of the wording of the questions indicates that Gusek is asking if the

respondent's team uses knowledge, rather than whether they are sharing it, which in

retrospect is not completely aligned with the construct the latent variable is intended to

measure. Gproblems is very similar to Iproblems in wording and intent, which may

explain the high cross-loading. Eliminating these two items and re-running the analysis

increased the explained variance from 68% to 73%, and provided a more well-defined

separation between the factors (Table 6.10).

Table 6.10 Factor Loadings After Reduction of GWOL Items

Pattern Matrix[a]

	Component	
	1	2
Ithoughts	.867	-.013
Icollab	.911	.015
Iproblems	.766	.135
Iinfo	.741	.011
Ipart	.910	-.092
Ggoals	-.112	.875
Gcomm	.079	.876
Gwork	.102	.812

Extraction Method: Principal
Component Analysis.
Rotation Method: Oblimin with Kaiser
Normalization.
a. Rotation converged in 4 iterations.

Reliability testing of the remaining three Group WOL items indicates that they are still

highly reliable with a Cronbach's alpha of 0.826.

In attempting to reduce the number of IWOL items (factor 1), there were no obvious

statistical choices as there were for the GWOL items (factor 2), because all IWOL items

loaded very high on factor 1 and very low on factor 2. Reviewing the wording of the

questions, a decision was made to retain Ithoughts and Iproblems because they both

describe specific but very different kinds of work-related information that should be shared. Also, the decision was already made to eliminate Gproblems because of its similarity to Iproblems, providing further rationale for keeping that item. Of the remaining three items, Ipart comes closest to capturing WOL behavior. Iinfo includes the phrase "even when it may not be related to my work." The original intent was to capture the idea of sharing useful information that may not be related to the respondent's own work. But on reflection, it is possible that this question may be interpreted as sharing information that is not work-related at all, especially in organizations that allow the use of their ESN platforms for social uses. Iinfo also happens to be the lowest loading of the five Individual items.

A decision was also made to remove Icollab even though it was the highest loading of any of the items. The question reads "Given my choice of collaboration methods such as email, phone, face-to-face meetings, and <social platform>, when I need to collaborate I use <social platform>." While this might indirectly indicate WOL and sharing behavior, a direct reading of the question implies more of a tool or method choice than an actual behavior. The question wording and extremely high loading also created some suspicion of multicollinearity, even though the initial overall multicollinearity testing was acceptable. It is reasonable to assume that a question asking if one uses a social platform would correlate highly with questions asking what one does when on a social platform. To explore this further an inter-item correlation was performed, indicating that Icollab correlated more highly across the board than any of the other items (Table 6.11). In

addition the Variance Inflation Factor, while not above the traditional 5.0 threshold, was

around 4 for Icollab compared with 2 to 3 for the other items (Table 6.12).

Table 6.11 Inter-Item Correlation for IWOL Items

Inter-Item Correlation Matrix

	Ithoughts	Icollab	Iproblems	Ipart
Ithoughts	1.000	.754	.661	.701
Icollab	**.754**	**1.000**	**.791**	**.724**
Iproblems	.661	.791	1.000	.559
Ipart	.701	.724	.559	1.000

Table 6.12 Variance Inflation Factor for IWOL Items

		Dependent Variable				
		Ithoughts	Icollab	Iproblems	Iinfo	Ipart
Independent Variable	Ithoughts		2.479	2.636	2.717	2.410
	Icollab	3.971		2.914	4.233	3.979
	Iproblems	2.670	1.861		2.761	2.738
	Iinfo	1.919	1.885	1.925		1.539
	Ipart	2.657	2.767	2.981	2.402	

A final analysis was run after removing Icollab and Iinfo. Items loaded very well on their

appropriate factors (Table 6.13), cumulative variance was 76% (Table 6.14), and

reliability still held. Cronbach's alpha was 0.841 for IWOL (factor 1) and 0.826 for

GWOL (factor 2). This is the model that was used for confirmatory analysis.

Table 6.13 Final Factor Loadings after Exploratory Analysis

Pattern Matrix[a]

	Component	
	1	2
Ithoughts	.911	-.015
Iproblems	.783	.142
Ipart	.892	-.065
Ggoals	-.153	.893
Gcomm	.130	.855
Gwork	.128	.802

Extraction Method: Principal
Component Analysis.
 Rotation Method: Oblimin with Kaiser
Normalization.
a. Rotation converged in 6 iterations.

Table 6.14 Final Variance Explained After Exploratory Analysis

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	3.209	53.485	53.485	3.209	53.485	53.485	2.660
2	1.368	22.794	76.279	1.368	22.794	76.279	2.574
3	.509	8.485	84.764				
4	.396	6.593	91.357				
5	.282	4.705	96.062				
6	.236	3.938	100.000				

Extraction Method: Principal Component Analysis.
a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Confirmatory Factor Analysis

The two-factor model with correlated latent variables that was generated from exploratory factor analysis was tested using confirmatory factor analysis in AMOS. The Maximum Likelihood method of analysis was used with Bollen-Stine bootstrapping to correct for the non-normality of the data. A diagram of the model with associated factor loadings is shown in Figure 6.2 All items in the two-factor model loaded at 0.70 or higher.

Figure 6.2 Loadings for Confirmatory Two-Factor Model
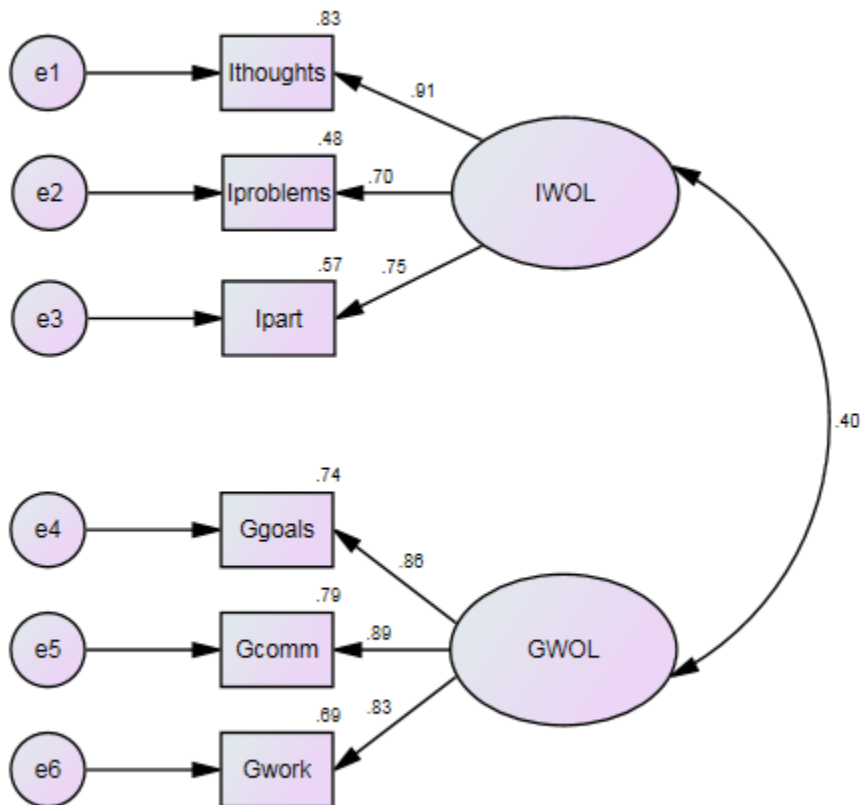
Because of the correlation between the latent variables, the two-factor model was also compared to a single factor model, as shown in Figure 6.3

Figure 6.3 Loadings for Confirmatory Single Factor Model
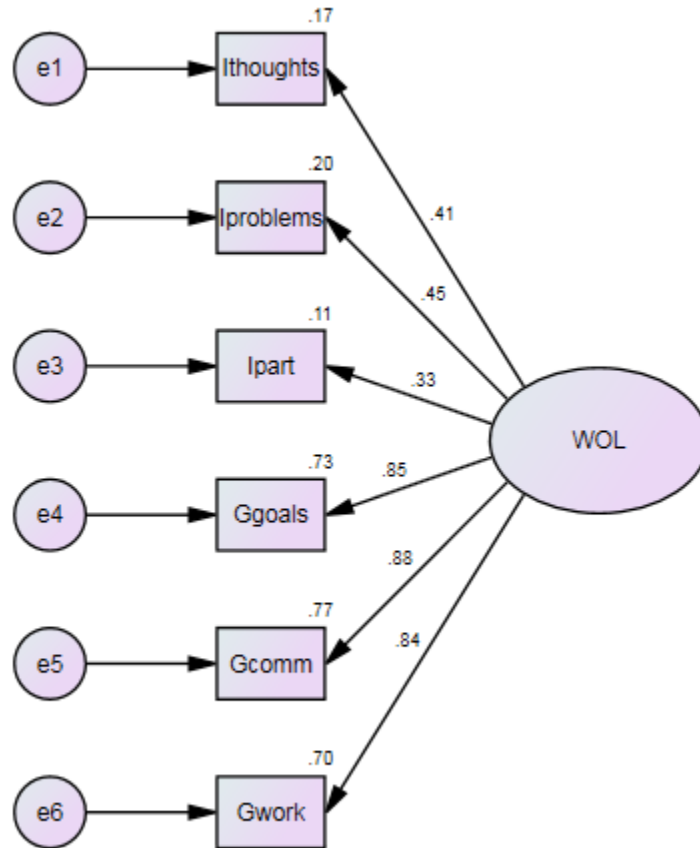
Goodness-of-Fit measures as recommended by Jackson et al. (Jackson, Gillaspy, & Purc-Stephenson, 2009) are shown for both models in Table 6.15 . The results reinforce the choice of the two-factor model as preferred. Only the two-factor model passed the chi-squared test, and all measures were within limits except RMSEA, which at 0.062 was just slightly above the recommended threshold of 0.06.

Table 6.15 Goodness of Fit

	Two-Factor Model	Single Factor Model
Chi Squared	14.058	196.353
Degrees of Freedom	8	9
Bollen-Stine p (> 0.05)	0.10	0.000
SRMR (< 0.08)	0.044	0.178
RMSEA (< 0.06)	0.062	0.323
CFI (> 0.95)	0.990	0.697
TLI (> 0.95)	0.982	0.495

Convergent and Discriminant Validity

As per Hinkin's (1998) recommendation, the Multitrait-Multimethod Matrix (MTMM) was used to evaluate convergent and discriminant validity. Because there were only two latent variables, there was only one correlation, and it equaled 0.405. This was lower than the square root of the average variance extracted (AVE) of both IWOL (0.791) and GWOL (0.861), as required by MTMM. Table 6.16 shows that all remaining MMTM criteria for both convergent and discriminant validity (using maximum shared variance (MSV), average shared variance (ASV), and Composite Reliablity (CR)) were also met.

Table 6.16 Factor Validity Results

Factor	CR	AVE	MSV	ASV	Convergent Validity CR > AVE AVE > 0.5	Discriminant Validity MSV < AVE ASV < AVE
IWOL	0.832	0.626	0.164	0.164	Yes	Yes
GWOL	0.896	0.742	0.164	0.164	Yes	Yes

Criterion Validity

As mentioned previously, six items from a pre-existing scale designed to measure attitude

toward sharing company information were included in the survey as a means of

assessing concurrent criterion validity. WOL is largely about being open and sharing, so

if the newly created scales are truly measuring this behavior, they should correlate

somewhat with attitude toward sharing. Based on the proposed theoretical model, IWOL,

GWOL, and SA (sharing attitude) should all correlate with each other, however IWOL

and GWOL should correlate with each other more highly than either does with SA. The

means of the items associated with each factor were used to create values so that the

factors could be correlated. Table 6.17 shows that as expected, all correlations between

factors were highly significant, but the two WOL factors correlated more highly.

Table 6.17 Correlations Between IWOL, GWOL, and Sharing Attitude

Correlations

			IWOL	GWOL	SA
Spearman's rho	IWOL	Correlation Coefficient	1.000	.371**	.172**
		Sig. (2-tailed)	.	.000	.002
		N	313	313	313
	GWOL	Correlation Coefficient	.371**	1.000	.206**
		Sig. (2-tailed)	.000	.	.000
		N	313	313	313
	SA	Correlation Coefficient	.172**	.206**	1.000
		Sig. (2-tailed)	.002	.000	.
		N	313	313	313

**. Correlation is significant at the 0.01 level (2-tailed).

Discussion of Results

The primary goal of this study was to determine if the two dimensions described by practitioners of "working out loud" exist in a form that can be operationalized. A secondary goal was to create a scale to measure them that would be minimally intrusive to employees in large organizations so that it can be administered repeatedly over time without creating survey fatigue. Goodness-of-Fit data from confirmatory factor analysis suggest that the two-factor model of WOL using only three items per latent variable is an acceptable one. Thus, these dimensions can, in fact, be operationalized with a minimal number of items. Cronbach's alphas of 0.841 for IWOL items and 0.826 for GWOL items demonstrate that those items reliably measure the constructs they are associated with. Results from testing of convergent and discriminant validity confirm that while IWOL and GWOL are related, they are distinct constructs. A comparison the correlations of IWOL and GWOL with Sharing Attitude demonstrated that they do in fact fit within the conceptual space of openness and sharing within a work environment.

Chapter 7:   Contributions and Limitations

Implications for Practitioners

Numerous results referenced in this dissertation have shown that while many companies are purchasing social software for internal use and have high expectations for increased collaboration, innovation, and productivity, they frequently fail at these deployments and have difficulty understanding why or what to do to change and improve. A simple-to-measure numerical score of Working Out Loud can provide an aid in understanding whether the activities occurring in the ESN reflect a desired change in behavior. As a relatively simple survey, it can be applied repeatedly at regular intervals to determine progress and to assess the effects of improvement interventions. A numerical score also provides the ability to correlate social business behavior with other organizational metrics such as financial performance, productivity, defect rates, employee engagement, and customer satisfaction. By adding open-ended questions to probe extremely high or low responses, it can be used as a diagnostic tool to aid in improvement of an organization's collaborative culture.

Implications for Researchers

By focusing on behavior rather than activity (blogging, bookmarking, microblogging, etc.), the WOL constructs are insulated from changes in technology and, thus, should be reliable indicators of social business adoption over time and across varying platforms. This provides researchers with a method for quantitatively measuring social business

adoption across multiple organizations and industries in order to possibly discover universal patterns related to adoption. The two components offer measures at both the individual and the group level, and responses come from the actual employees engaged in the behavior rather than from proxies such as management, HR, or IT departments. Research possibilities for WOL as an independent variable include how its existence might improve and amplify communities of practice and and virtual teams, how it might influence the ability to create new structures such as holarchies and complex adaptive organizations, and how it impacts productivity, agility, innovation, and reputation. As WOL's effects on the firm are demonstrated, it might also become important to study as a dependent variable. Examples include how changes in ESN software design and addition of new features might influence WOL, how WOL is improved by knowledge chain activities such as leadership, control, and measurement, and how changes in WOL might correlate with increasingly popular organizational network analysis research.

Limitations

This research has a number of limitations. The survey data were acquired from only one organization (Lexmark) so it may be that this definition and operationalization of WOL only holds within specific organizations or industries and cannot be generalized in any meaningful way. There is a recognized trade-off when reducing items to the bare minimum. In an attempt to create a survey instrument that can gain wide acceptance, the minimalist approach to survey design may sacrifice some robustness and generalizability. A relatively small number of potential items was provided to test, and there may be items

that better capture the essence of WOL that were not evident to this researcher. There may be cultural and/or job function biases inherent in the data because of the large number of North American product development respondents. A similar survey conducted at another organization would help to strengthen or negate the conclusions in this dissertation.

Chapter 8:   Directions for Future Research

Tools for Enhancing WOL

There are several interesting research opportunities where an operationalized concept of WOL could be applied. While there has been essentially no academic research on WOL, there *are* three closely related lines of research which could possibly be integrated using WOL as a unifying concept. The first was touched on earlier in this dissertation, and involves investigating various aspects of social business as a result of the adoption of tools rather than behaviors. Where the research treats ESNs holistically as a suite of social tools, it tends to focus on the flexibility of use of these systems for a variety of purposes such as content management, collaboration, knowledge transfer, without a specific focus on WOL (McAfee, 2006; Murphy & Salomone, 2013; Parameswaren & Whinston, 2007b). Research on specific ESN features can sometimes get close to the concept of WOL, but it depends on the particular feature being studied. For example, case studies of organizations that use microblogging have found that it can provide "open information infrastructures" (D. Richter, Richter, Hamann, Riemer, & Vehring, 2013) that "make daily experiences visible to others" (Oulasvirta, Lehtonen, & Kurvinen, 2009) and allow employees to "extend conversation beyond the water cooler" (Howard & Ryan, 2010). But, in every case, the emphasis is on the tool as the agent of this openness and visibility. Operationalizing WOL could provide a means for greater understanding in how specific software features lead to the outcomes being attributed to them.

Amplification of Existing Organizational Structures and Processes

A second line of research involves how WOL might aid and amplify existing

organizational group structures and business processes. *Virtual teams* and *Communities*

of Practice (CoPs) are two group structures that have decades of academic research

behind them. Virtual teams are "groups of people who work across time, space, and

often organizational boundaries using interactive technology to facilitate communication

and collaboration" (Gillam & Oppenheim, 2006). Communities of Practice are "groups

of people who share a concern, a set of problems, or a passion about a topic, and who

deepen their knowledge and expertise in this area by interacting on an ongoing basis"

(Wenger, McDermott, & Snyder, 2002). Although virtual teams are typically pre-defined

with formally assigned members, while CoPs are emergent networks with self-selected

members, both kinds of groups often make use of an ESN if it exists within their

organization. However, it is possible for both kinds of groups to perform their activities

within the ESN without working out loud. For example, a virtual team might use the

ESN to effectively collaborate among themselves, but do so within a restricted section of

the ESN not visible to others. A CoP may likewise operate in a closed space and vet

prospective members before they are allowed to participate. WOL can enhance the

effectiveness of both of these group structures in several ways.

Virtual teams often suffer difficulties that arise from cultural differences, lack of context,

and uneven distribution of information (Gillam & Oppenheim, 2006). Developed

relationships, shared understanding, and trust are important antecedents for effective

virtual collaboration (Peters & Manz, 2007), so it seems reasonable that an organizational culture already predisposed to WOL would have higher levels of these attributes prior to a virtual team even being formed, thus ensuring these antecedents for success are in place. Once the team is in place, narrating one's work within the team has been shown to encourage self-reflection among the team members, help them gain awareness of their peers' specific areas of expertise, and increase their awareness of what others in the organization are doing that might impact their own projects (Margaryan, Boursinou, Lukic, & de Zwart, 2014). And at the organizational level, each team that works out loud contributes to the overall aggregate WOL culture that fosters the antecedents mentioned earlier, thus increasing the effectiveness of all future teams.

Similarly, with regard to CoPs, organizations can be thought of as "communities of communities" (J. S. Brown & Duguid, 1991). CoPs that share information with each other and with the larger organization as a whole are more likely to be aligned with the overall business strategy (Annabi & McGann, 2013). This can be important since CoPs are emergent ongoing networks of individuals linked by their passion or interest for a particular topic or skill, not groups formed by management to accomplish a specific goal, which means it is possible for them to drift into areas that are not an optimal use of the organization's resources. WOL at the organizational level can be one way to mitigate this and increase alignment with business strategy, but without the need for management intervention.

Traditional business processes can also be enhanced by WOL. The Lean and Six Sigma methodologies, which focus on statistically analyzing defect rates and eliminating waste in order to continuously improve processes, have been used effectively in many businesses since the 1990s. Although originally created to improve manufacturing, over the years their application has spread to a variety of other kinds of business processes as well (Pepper & Spedding, 2010). Because of their manufacturing origins, they tend to take a formal mechanistic view of process steps as being similar to stations on a manufacturing line with waste, defects, takt times, etc. But business processes, particularly those that heavily involve knowledge workers, are not always that well structured. Even when they are, there is often interaction and collaboration that goes on "behind the scenes" outside the formal process steps in order to either make the process work as intended or to handle exceptions.

As a WOL culture takes hold in a firm, the entire organization becomes a resource that can be leveraged to improve processes, especially those having steps that involve problem solving such as in new product development and technical support. A simplified illustration is shown in Figure 8.1.

Figure 8.1 Enhancing Business Processes with Enterprise Social Networks
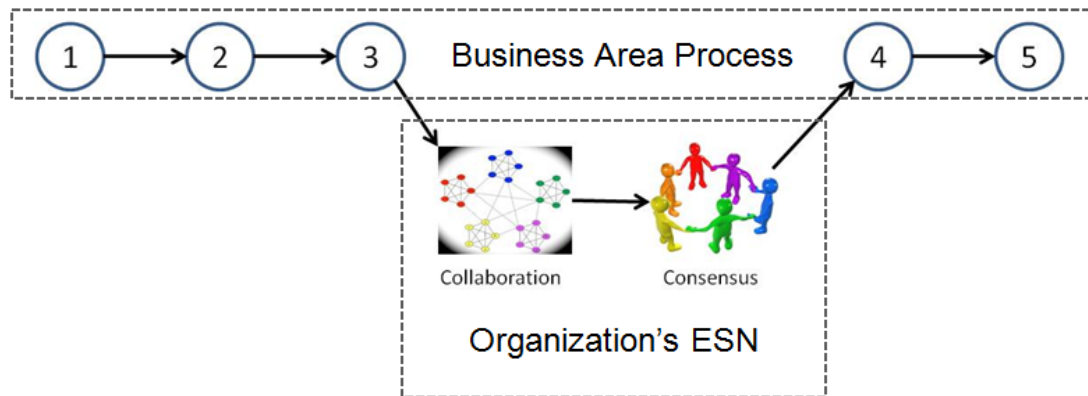
Within a given process, there may be certain predefined conditions that cause a step in

that process to route information from the process to the organization's ESN, for

example, when a particularly complex problem is encountered for help in solving it.

Results are then passed back into the formal process for continued processing.   An

overall WOL organizational culture might thus create a feedback loop, ensuring that there

is always a critical mass of employees available as an audience to see when a process

action in the ESN occurs and help with it (because they are already doing their own work

in that environment), while at the same time providing a way for the process to generate

signals to the organization at large as to what the most difficult problems in the

organization are, thereby helping them to align their own work to resolve them. While

there do not yet seem to be any examples of this at the full organization level, there are

trends in this direction in the banking industry (Capodieci, Del Fiore, & Mainetti, 2014)

and in the "swarming" model that is beginning to take hold in the technical support

industry (Folk-Williams, 2011; Gloor, 2006; Oxton, 2012).

Shaping the Networked Organization

The third line of existing research views organizations as networks and studies the

emergent properties that arise from those networks, often under the assumption that the

rapid pace of the 21st century business environment will require new forms of

organizations that are to some extent self-organizing and adaptive, and thus present-day

hierarchical organizational structures will need to change. They often draw analogies

with biological systems, viewing organizations as organisms. Members of the

organization are seen as cells or nodes in the network, with the communication between

those nodes being the driving force that gives rise to the emergent properties of the

organization. Biological organisms can be considered *autopoietic systems*: continually

self-organizing, self-referential, simultaneously open and closed, and constantly

observing both their environment and their internal state.

Autopoietic organizations not only have the characteristics described above but are self-

similar, in the sense that the way they produce knowledge is the same at the individual,

group, and organizational level (scaling). This scaling is achieved through the use of

language. Von Krogh and Roos describe barriers to becoming an autopoietic organization

that include lack of communication, hoarding of expertise, and self-difference (difference

across scales, as opposed to self-similarity), all barriers that a WOL culture can help to

mitigate. On the importance of communication, they write:

> "For knowledge to develop in organizations, communication is a prerequisite.
> Communication allows for language games to be played out, new themes to
> be conveyed and explored, and misunderstandings to be clarified. Unless

communication functions, knowledge will cease to develop in the organization … Communication, and hence knowledge development, is also bound by time and space. It is unlikely that communication should be developed outside the group that is present in each situation." (von Krogh & Roos, 1995).

Clearly here they are speaking of communication as ongoing dialogue and conversation, not as finished documents. Similar themes can also be found in the theory of *fractal organizations*, which have emergent properties that tend to increase their capacity for creativity, adaptation, vitality, and innovation. The qualities of a fractal organization include shared purpose and values that create pattern integrity, universal participation in ideas and solutions for continuous improvement, and decision making at functional levels. Flow of information through the system is enabled by development of relationships, and members at all levels share information iteratively and make decisions collectively in response to constantly changing conditions (Raye, 2014).

A third organizational theory in line with the previous two and often mentioned together with them is the view of the firm as a *complex adaptive system*. Complexity theory can be applied to any system made up of large numbers of elements, connected in webs that produce chains of interaction, at least some of which are non-linear (Goldspink & Kay, 2003). The existence of just a few non-linear sub-systems can sometimes be enough to make the entire system non-linear. Weather systems, stock markets, ecologies, and traffic flows are all examples of complex adaptive systems found in nature. Such systems can be one of three states: stable, quasi-stable (temporarily unstable), or chaotic (unstable) depending on the system's response to triggers. Organizations are best served

by being quasi-stable systems, because they can maintain some sense of stability while still allowing adaptive behavior to emerge.

Complex adaptive organizations have components (people) that are structurally coupled through language. Therefore, language in a quasi-stable (adaptive) system can destabilize the system and destroy existing order through the introduction of new information and then re-stabilize it in a new order through the creation of new norms. Organizations can reach this quasi-stable state of optimal complexity and performance by aligning strategic direction, increasing collaboration opportunities, facilitating learning and availability of expertise, and increasing innovation and creativity (Bennet & Bennet, 2004). These are all activities that can be enhanced by working out loud.

The above theories also have a close relationship to development of the *learning organization* (Senge, 1990). Key characteristics of a learning organization are mental models, shared vision, and team learning. In organizations with highly interconnected social networks, their autopoietic nature can lead to emergent properties such as trust, commitment, and reframing combining to create social learning (Hall, 2005; Sol, Beers, & Wals, 2012).

In addition to network-based theories of the firm, this line of thinking has also led to the discovery of specific beneficial organizational properties and to proposals for new ways

of structuring organizations to take advantage of them. For example, the *collective intelligence* of a team has been shown to sometimes exceed the intelligence of its individual members (Woolley et al., 2010), and this intelligence can be increased through activities such as collaboration and group decision making (Malone, Laubacher, & Dellarocas, 2009). Highly networked organizations can also transfer knowledge between members through *ambient awareness*, the absorption of knowledge simply by being exposed to it, even though that knowledge may have no relevance to the immediate task. Ambient awareness has been shown to reduce ambiguity and ease knowledge transfer by acting as a "social lubricant," making it easier for a knowledge worker to ask a stranger for information (Leonardi & Meyer, 2014). The use of activity streams within ESNs, especially when those activity streams are ubiquitous across both desktop and mobile platforms, can lead to increased ambient awareness which in turn can increase employee collaboration and engagement.

New organizational structures also become possible as technology provides the ability for complex networks to form. In addition to fractal organizations mentioned above, wirearchies (Husband, 2001) and holarchies (Gidley, 2013) are also models in which the structure of the organization is much flatter than traditional hierarchies and emerges from the interaction of its components rather than being dictated from the top down. A key component for making these kinds of organizational models work is enabling employees to become a "massively parallel" network with communication flowing in every direction.

In recent years as social software technologies are making this kind of communication more feasible, these models have begun to move from theoretical constructs into practice. For example, the Berkana Institute leverages emergence for social change by applying a four-step process of (1) identifying innovative pioneers who are dealing with a social problem, (2) connecting them in a global network, (3) nourishing that network to become a community of practice, and then (4) illuminating the work of that CoP to a larger worldwide audience so that it becomes an emergent "system of influence" (Wheatley & Frieze, 2006). In another example, a specific approach to holarchy called "holacracy" has been trademarked (Robertson, 2007), and recently online retailer Zappos announced that it would be reorganizing its 1,500 employees into a holacracy (McGregor, 2014).

Using WOL to Create a Unifying Model

Each of the three lines of research outlined above contains implicit assumptions about working out loud that may not even be recognized by the researchers themselves. Research into social software tools to determine their benefits often attributes those benefits directly to use of those tools under the assumption that working out loud will always occur. But, since it has been demonstrated that social software tools are extremely flexible and can be used for many different purposes, many of the benefits attributed to them are really the benefits of the *behavior* of working out loud using those tools as enablers of that behavior.

Research on existing social structures such as virtual teams and communities of practice often analyzes their impact on the organization by treating them as single entities rather than as a network of sub-communities within the larger organizational community, focusing on the benefits that arise from the particular team or CoP structure, but missing those that come about from the interactions between those teams and CoPs. All models having to do with organizations as networks, where structure is emergent (autopoietic, complex adaptive, fractal, holarchic, etc.), have to assume that there is a large amount of communication going on among all nodes in the network. Otherwise, in the absence of hierarchy, it would be impossible for these structures to hang together. Furthermore, there is also an underlying implicit assumption by vendors, by consultants, and by practitioners in their survey responses that, in order to obtain the benefits they claim to receive from ESNs, they need to become more networked organizations. Working out loud provides the means by which already existing organizational structures, activities, and processes can be amplified and transformed to facilitate the creation of beneficial emergent structures and properties. The relationships are encapsulated in Figure 8.2.

Figure 8.2 Integrated View of Working Out Loud

Existing internal Structures and Activities
- virtual teams
- communities of practice
- business processes
- departmental work
- individual work
- thoughts and ideas

are amplified by

Working Out Loud

to create

Emergent Organizational Structures and Properties
- autopoietic systems
- complex adaptive systems
- fractal organizations
- wirearchies
- holarchies
- ambient awareness
- collective intelligence

enabled by the use of

Enterprise Social Networks
- blogs
- microblogging
- activity streams
- status updates
- discussions
- comments

Traditional views of knowledge management often conceptualize knowledge flow as either being "pushed" or "pulled." Either knowledge creators create and package their knowledge for later use by knowledge consumers, or consumers search for and request knowledge from creators. But, in either case, it is assumed that there is a conscious effort by one party or the other to initiate the transfer. But, WOL creates a third possibility. By recording work as it happens, it generates knowledge as a byproduct of that work with an intended audience of everyone in general and no one in particular. Because it is on a social platform, this knowledge is rich in context and is both immediate and persistent over time. It can be transferred by search, by request, by conversation, or by ambient awareness. By leveraging the platform to overlay existing day-to-day work with a layer of connectivity to a broad network, WOL turns knowledge into a utility similar to electricity or water: always available to whomever might need it, with the ESN providing appropriate filters for the consumer to control the flow. Figure 8.2 illustrates, in very

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general terms, how WOL might accomplish this, but this remains to be verified. Operationalizing WOL would allow testing of the relationships in this model to validate them and, if true, improve and accelerate the transformation process.

Impact of WOL on the Knowledge Chain Model and PAIR

The knowledge chain model is a well-established knowledge management framework developed using a Delphi survey of international KM experts (Holsapple & Singh, 2003). Patterned after Porter's value chain model (Porter, 1985), it proposes nine fundamental KM activities that add value to the organization by improving productivity, agility, innovation, and reputation (PAIR) which, in turn, increase its competitiveness. Five of the activities (knowledge acquisition, selection, generation, internalization, and externalization) are considered primary. They are supported and guided by four secondary activities (knowledge coordination, control, leadership, and measurement). The relationships among the various activities as well as their connection to learning and competitiveness are illustrated in Figure 4:

Figure 8.3 The Knowledge Chain Model (Holsapple & Singh, 2003)
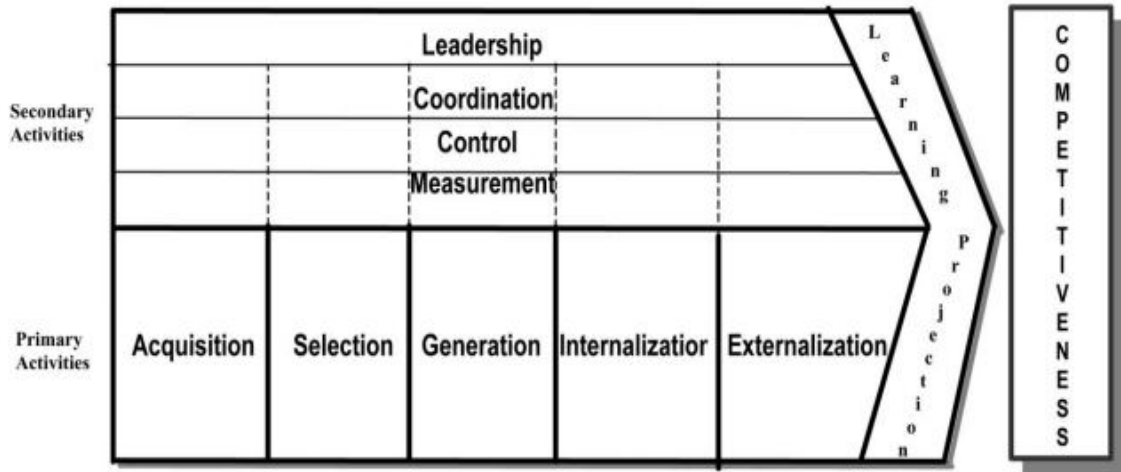
Interestingly, one plausible future scenario is that as firms increasingly shift toward

becoming autopoietic complex adaptive systems, these activities "flip" so that the

primary activities become secondary and the secondary become primary. When

employees are working out loud, knowledge is processed simply in the course of doing

work and, thus, that processing becomes "automated." At the same time, what are now

considered secondary activities become critical for ensuring that WOL can take place at

the scale required to maintain a highly networked organization. Below is a short

discussion of each activity in the context of working out loud on an enterprise social

platform.

Primary Activities

- *Knowledge Acquisition*: Knowledge acquisition involves bringing knowledge in from outside the organization. In a WOL environment, external knowledge can be absorbed by the organization in two different ways. It can be acquired because the nature of the work being done dictates it (training, competitive intelligence, adding a new team member, etc.) or it can be added because the individual sharing has found it interesting and is participating in knowledge sharing as a social activity. In either case, when the knowledge is shared on the ESN it instantly becomes available to anyone who finds it useful.

- *Knowledge Selection*: Knowledge selection is similar to knowledge acquisition except that the knowledge in question is internal rather than external. Much of the knowledge selection effort in a traditional organization involves identifying valuable knowledge and transferring it to where it is needed. In a WOL environment, knowledge, from its inception, exists surrounded by rich context in a highly visible environment, so the selection activity may be simply clicking the "share" or "like" button,

- *Knowledge Generation*: Knowledge generation produces new knowledge, either by discovery or from the combination or modification of existing knowledge. When employees work out loud, their activities and thought processes are recorded within the ESN platform. This not only allows widespread access to new knowledge immediately after it is created, but also preserves a history of the

antecedent knowledge and activities leading up to the creation of that new knowledge. All of this happens relatively painlessly as employees simply do their work on an open platform.

- *Knowledge Internalization (also known as Knowledge Assimilation)*: Knowledge internalization shapes knowledge by indexing, sorting, categorizing, etc. and then delivers that knowledge to the target audience. In a WOL environment, there may still be a specific target audience driving the need for a specific knowledge structure. But at the same time, ESNs provide the ability for knowledge to be shared with a much broader audience than the targeted one. They also allow that broader audience to individualize the representation of that knowledge through the use of features such as tags, following, and activity streams. Thus, much of the knowledge structure in a WOL organization will be emergent based on the incremental efforts of a large number of employees.

- *Knowledge Externalization (also known as Knowledge Emission)*: External knowledge is organizational knowledge that is released into the external environment. Three economic and industry trends make this an interesting activity to follow over time: (1) the trend of many firms to shift toward providing services rather than products; (2) the trend toward ubiquitous access of information across multiple platforms, especially mobile devices; (3) the trend toward social business and WOL as mentioned throughout this dissertation. These three trends combined mean that it is increasingly likely that a firm's

knowledge will be shared externally, not through physical products, but through

customer interactions such as sales, technical support, service, and professional

services. Given that scenario, those employees who interact with customers will

increasingly be able to appear as the "smartest person in the company" because

they will have the knowledge of the entire company at their fingertips through

their phone or tablet.

At the same time that WOL makes primary KM activities simpler and easier to engage in,
it makes secondary activities more critical to the organization's success.

Secondary Activities

- *Knowledge Leadership*: Because social tools are often "voluntary" in the sense

  that employees can find other ways to accomplish their tasks, full adoption

  throughout the organization is highly dependent on the signals sent from

  executives. Many employees resist sharing their work in an open platform either

  because they are intimidated by the openness or because it is not clear that the

  ESN is to be used for work. In fact, two of the top three barriers to social

  business adoption for companies just starting out are lack of strategy and lack of

  management understanding (Kiron, Palmer, Phillips, & Berkman, 2013).

  Therefore, it is essential for executives to clearly explain the purpose and value of

  the ESN and to be, not just advocates of working out loud, but also role models.

- *Knowledge Coordination*: Often KM systems and processes are treated separately

  from day-to-day work processes, but they are most effective when they are

  designed to be "in the flow" of work instead of outside it (R. Williams, Brill, &

  Trees, 2012). ESNs are no different in this regard, and in fact the goal of working

  out loud makes it even more critical that this particular form of KM application is

  designed to be in the flow of work. One of the barriers to achieving this is a lack

  of integration between the ESN and other enterprise applications (Rozwell &

  Sussin, 2014). Often, the goal of integration is to overlay the collaboration

  capability of the ESN on top of the existing functionality of another enterprise

  application (ERP, CRM, PLM, etc.). This means there must be extensive

  knowledge coordination in the integration design phase to answer such questions

  as what information should be passed to the ESN, where within the ESN it should

  be placed, who gets access to it, and how notifications of new information should

  be made.

- *Knowledge Control*: Permissions and access control play a critical role in

  enabling WOL. The ESN environment must strike a proper balance, being as

  open as possible to foster WOL, while still protecting the firm's sensitive

  information such as employee personal data, unannounced product information,

  or discussions of planned acquisitions. There must also be a balance between the

  overall corporate stance on the openness of the platform as a whole and the

  flexibility to allow individual space or group owners within the platform to

  determine their own levels of security. In addition, good permission management

becomes essential not just in the ESN but across multiple applications as they are integrated with the ESN as described above. Ironically, poor integration and overly tight security of collaboration systems can lead to "silos of collaboration," defeating their very purpose (Patel, 2014).

- *Knowledge Measurement*: One of the weakest aspects of the current state of knowledge surrounding social business adoption is the availability of meaningful standard metrics. Most organizations are limited to "countable" metrics provided by the vendors such as number of views, likes, comments, and files uploaded. These can give an indication of the level activity in the ESN, but not whether it is successful from a business perspective (Chui et al., 2012). Because of this, many firms are "flying blind" as they struggle to make changes and adjustments in order to improve adoption, because there is no quantitative measure of success. In addition, the lack of that quantitative success metric hinders firms from correlating ESN performance against more traditional financial or productivity metrics to determine the platform's ROI.

Although there has been no direct peer-reviewed research on the impact of WOL on productivity, agility, innovation, and reputation (PAIR), there is substantial secondary research on each of these aspects of competitiveness that can link together with WOL in the model described below.

Productivity

One clear area where collaboration systems improve productivity is in a team's ability to operate and make decisions. Most face-to-face decision meetings consist of a "divergent" review of agenda items followed by a "convergent" summary and actual decision. ESNs can provide a means for the divergent portion to take place asynchronously prior to the meeting so that the majority of the face-to-face meeting can be spent discussing the actual decision (Guerrero & Pino, 2009). WOL allows employees who may not be part of the meeting to contribute pertinent facts and agenda items that might not have been considered otherwise. WOL should also create shared mental models among employees as they view each others' work and position it in relation to their own, and teams with higher shared mental models have been shown to reach higher levels of consensus (De Vreede, Reiter-Palmon, & De Vreede, 2013).

Major team activities in addition to decision making are identifying and getting to know each other, building trust, identifying problems, and evaluating alternatives. These activities can become barriers to team performance if team members have difficulty with them, but ESNs can help overcome those barriers (Rosen, Furst, & Blackburn, 2007; Turban et al., 2011). For example, most ESNs allow users to create a profile that can include a photo, description of expertise, and links to that user's activity in the system. In a WOL culture, members of a newly formed team who may not know each other can easily become familiar with each others' previous work and get a sense of skills and

personalities before the first meeting, thus speeding the development of trust within the team.

Beyond improving team performance, WOL can also increase productivity at the individual and organizational levels. In surveys done by consulting organizations and vendors, a majority of ESN users say that using these tools has made them more efficient (AT&T, 2008), especially in operational efficiency and project delivery (Aberdeen Group, 2013). Companies using ESNs have also reported increases in productivity through faster onboarding of new employees, more effective corporate communications, lower employee turnover, and reduced support costs (Jive Software Corporation, 2013).

Innovation

Innovation is often a highly social collective process, and problems are often solved by those who are available in the moment (Hargadon & Bechky, 2006). Teams can increase their creativity in solving these problems by pulling in knowledge from other sources within the organization (Khedhaouria & Ribiere, 2013). In a WOL culture, where individuals narrate their work, a rich accumulation of knowledge is available for use at any time. Team members might actively search for specific knowledge necessary to achieve their goals, but they might also come across knowledge serendipitously through ambient awareness that triggers creative connections to knowledge they already have. Employees can share their ideas in a highly visible way with no one in particular, relying

on "human innovation catalysts" to carry those ideas to the parts of the organization most likely to put them to use (Majchrzak, Cherbakov, & Ives, 2009).

Innovation can be either exploitative or exploratory (March, 1991), and connectedness and informal social relations are important antecedents to both forms. In fact, informal coordination mechanisms such as these are better predictors of both kinds of innovation than more formal mechanisms such as centralization and formalization of information (Jansen, Van Den Bosch, & Volberda, 2006; Reidl, Hainzlmaier, & Picot, 2013). As employees narrate their work, they provide not only the actual ideas that are the fuel for innovation, but also contextual information about themselves that allows for connections to be made with other employees who previously might have been strangers. So as WOL increases, innovation should increase for two reasons: (1) increasing the amount of information obtained as well as the number of sources providing that information increases the likelihood that an individual will discover novel ideas, and (2) individuals whose social networks bridge structural holes are likely to be more innovative (Gray et al., 2011).

Agility

Business agility can be defined as the ability of an organization to detect changes (either opportunities or threats) in its business environment and provide focused and rapid responses to its customers and stakeholders by reconfiguring its resources, processes, and strategies (Mathiyakalan et al., 2005). Through the narration of work, including ideas

and opinions, WOL aggregates and amplifies the signals employees are providing from their interactions with both internal and external sources. Through observable work, it enhances the speed and coordination required to implement the innovative changes.

Therefore, in a sense, agility requires both innovation and productivity as prerequisites. When the business environment changes, new ideas are needed in order to determine what changes are possible to make, and the more ideas available the broader the range of directions in which the firm can move. Once a new direction is chosen, the productivity benefits of WOL outlined above enable the enterprise to rapidly make decisions, coordinate work, and create a shared vision around the new direction. Agile enterprises must have the ability to both redesign existing processes (exploitation) and develop completely new ones (exploration) (Sambamurthy, Bharadwaj, & Grover, 2003). They need to have "organizational ambidexterity" in order to appropriately balance these two capabilities (Reidl et al., 2013), which requires an approach to knowledge transfer beyond the traditional mapping of explicit knowledge flows. It must also include an understanding and improvement of the social interactions between members of the organization in order to facilitate the diffusion of tacit knowledge throughout the network so that the culture maintains alignment with the strategy as changes take place (Perez-Bustamante, 1999). WOL helps to shape the enterprise social network in a way that develops it into an organizational "central nervous system," increasing the opportunities for sensing changes in the environment and providing a multitude of pathways for signals to travel, thus speeding reaction time to those signals.

Reputation

WOL can positively influence organizational reputation through its effects on employee attitudes and behavior and, secondarily, through its impact on productivity, innovation, and agility. A firm's reputation can be conceptualized in three dimensions: being known, being known for *something*, and generalized favorability (Lange, Lee, & Dai, 2011). As employees work out loud together and develop a shared vision of company strategy and mission, they are more likely to speak with a single voice to customers and other stakeholders, helping to ensure that the firm is known for what it *wants* to be known for. Generalized favorability can be enhanced by WOL through many different paths, most of them related to productivity, innovation, and agility. A recent McKinsey survey found that executives whose firms were using internal social collaboration tools identified the top five benefits of these tools as increasing speed to access knowledge (improving innovation), reducing communication and travel costs (improving productivity), increasing speed to access internal experts (improving agility), and increasing employee satisfaction (Bughin & Chui, 2013). Other research has also shown the use of ESNs to improve employee satisfaction and engagement (Murphy, 2010) and there is a long history of research showing that increasing employee satisfaction increases customer satisfaction (Schmit & Allscheid, 1995), thus increasing the firm's reputation.

A firm's reputation is affected by the signals it emits to its environment. These signals can be accounting signals, market signals, or social responsibility signals (Fombrun & Shanley, 1990), and appear to relate directly to productivity, innovation, and agility.

Accounting signals provide an indication of the firm's profitability. Clearly, a firm with more productive, efficient internal processes than its competitors has more leeway in setting prices and, thus, larger opportunities for profitability. In today's internet economy as investors, analysts, and media focus on entrepreneurial start-ups and companies such as Apple and Tesla, innovation is becoming an increasingly important factor in influencing a firm's reputation (Henard & Dacin, 2010). Agility has traditionally been considered important for ensuring that the firm is constantly well positioned to do business in a dynamic environment. But with the advent of Twitter and Facebook, where an organization's reputation can drastically change overnight, agility is also essential for managing social responsibility signals (Seebach, Beck, & Denisova, 2013). As described previously, WOL can positively influence business agility, specifically "customer agility," the degree to which a firm is able to sense and respond quickly to customer-based opportunities for innovation and competitive action. This customer agility can be in the form of "knowledge-creating synergy" for sensing customer perceptions and "process-enhancing synergy" for acting on them (Roberts & Grover, 2012). Thus a WOL culture can enhance a firm's ability to quickly detect changes to its reputation in the external environment and take action to exploit them (if positive) or mitigate them (if negative).

Analyzing the interconnection of the various PAIR attributes with WOL suggests some interesting possible relationships. Recall that WOL has two components: Narrating one's work and doing work in a visible, transparent manner. It would seem than narrating work is largely an individual activity, while observable work in an ESN (especially in the

context of large firms) is more of a group activity. As work is narrated through blog posts and microblogging, ideas and thoughts are shared with others either directly, via sharing and following, or indirectly through ambient awareness. In either case this increased network of ideas and connections should positively impact the firm's ability to innovate.

As teams work in an observable manner, allowing others who are not on the team to view their activities, new information may become available to the team which makes its tasks easier, its decisions faster and better, and which adjusts or reshapes the team's goals and outcomes to synergize with other teams and to better align with overall business strategy, thus making the firm more productive. In addition, as a critical mass of groups do their own work out loud in an ESN platform, they aggregate into a large company-wide audience that are always available to answer questions or to be leveraged for improving existing business processes (see Figure 2 above), further improving productivity. In a densely connected organizational network, these improvements in innovation and productivity increase business agility as the firm is more capable of sensing external signals, disseminating those signals quickly throughout the organization, understanding their implications, formulating plans of action, and acting on those plans. As productivity, innovation, and agility all improve along with employee engagement, corporate reputation subsequently also improves, almost as an emergent property of the other factors. These interrelationships are illustrated in Figure 8.4.

Figure 8.4 WOL Influences on PAIR Attributes
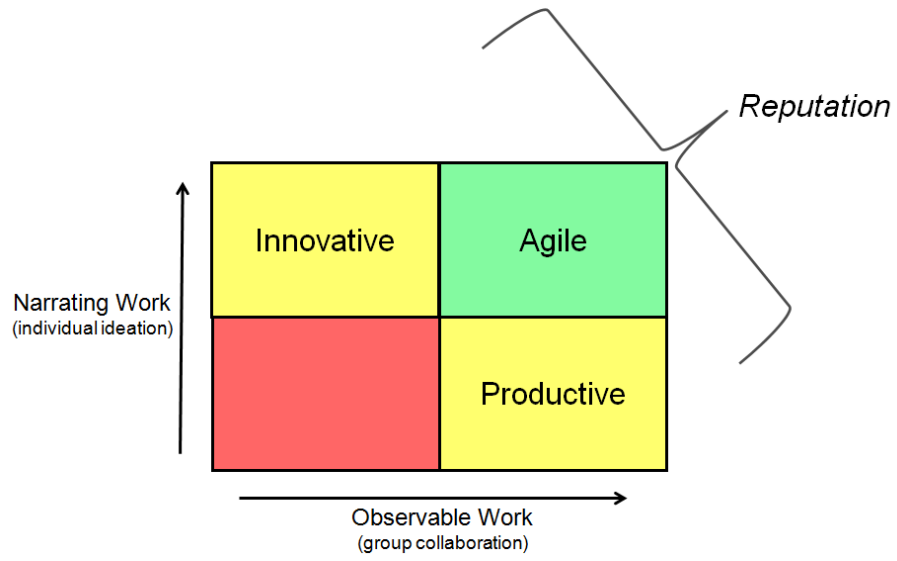
Chapter 9: Conclusion

The purchase and deployment of social software for internal organizational use is rapidly outpacing the speed at which researchers have been able to understand its implications. As knowledge workers increasingly mingle work and social life through the use of corporate-owned IT systems, new research tools and theories will be necessary to make progress in assessing the impact this pending upheaval in systems, behaviors, organizational structures, and business models will have on the viability of the firm in an increasingly dynamic economic environment. As organizations begin to view themselves more as networks than as hierarchies, behavioral constructs that can be codified and operationalized will become essential metrics to fill the gap between the activity-based metrics inherent in social software systems and the organizational-level metrics provided by techniques such as social network analysis. A quantitative understanding of Working Out Loud will be one step necessary for filling that gap. The research provided in this dissertation is far from meeting that goal, but it is hoped that it is a small initial step in that direction.

Appendix A: Summary of Key Definitions

- *Enterprise Social Network (ESN)*
  The instance of a social software collaboration platform deployed internally within an organization

- *Social Business*
  An organization that uses an Enterprise Social Network

- *Working Out Loud (WOL)*
  The act of doing work and/or narrating that work, whether individually or as a group, as it progresses such that it is immediately observable on an organization's internal enterprise social network or on external social platforms and available for review and comment by others who may not necessarily be part of a specific intended audience

- *Individual Working Out Loud (IWOL)*
  Narrating one's work as it happens by openly posting status updates, blog posts, tweets, etc. so that others may follow its progress

- *Group Working Out Loud (GWOL)*
  Work performed by a team or group through the use of an internal or external social network such that its work is visible for others not directly involved with the work to follow and comment on

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<u>Place of Birth</u>

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<u>Education</u>

Bachelor of Science in Chemical Engineering
Lehigh University 1977

Masters in Business Administration
University of North Carolina-Charlotte 1982

Graduate Certificate in Applied Statistics
University of Kentucky 2007

<u>Professional Positions</u>

1977-1983   Plastics Manufacturing Engineer, AMP, Inc
1983-1986   Plastics Manufacturing Engineer, IBM
1986-1993   Plastics Technology Center Staff, IBM/Lexmark
1993-1994   Personal Printer Strategic Planning, Lexmark
1994-1995   Ink Jet Printer OEM Project Manager, Lexmark
1995-2002   Information Technology Solutions Architect, Lexmark
2002-2008   Knowledge Management Applications Manager, Lexmark
2008-Present Enterprise Knowledge Architect, Lexmark

<u>Academic Experience</u>

2004   Chapter reviewer, C. Holsapple (ed.), Handbook on Knowledge
                Management, Springer

2004-2007   Teaching Instructor, University of Kentucky (DIS 300 – Quantitative
Operations Management)

2005-Present   Journal Article Reviewer
Knowledge Management Research and Practice
Journal of Organizational Computing and Electronic Commerce

Honors, Awards, and Activities

1985 - IBM Division Award for animated tutorial program to illustrate DOS commands, used by over 4000 people throughout IBM

1990 - IBM Corporate Award for developing expert system to estimate injection mold tooling costs, used by over 20 IBM facilities world-wide and made into an IBM product

2003 - Co-author of Fayette County School District's Parent Involvement Policy 2003

2005 - Paper "You Can Lead a Firm to Knowledge But Can You Make It Think?" one of ten accepted for presentation at the Knowledge Management Doctoral Consortium, Queens University, Kingston Ontario, 2005.

2006 - Appointed to Kentucky Department of Education Textbook Commission

2006 - Appointed to the Prichard Committee for Academic Excellence

2007 - Co-Chair, Education Commissioner's Parent Advisory Council Report to the Kentucky Department of Education, "The Missing Piece of the Proficiency Puzzle: Recommendations for Involving Families and Community in Improving Student Achievement"

Publications

"A Statistical-Heuristic Approach to Estimating Mold Costs", *Plastics Technology*, June 1989

"The Role of Convergence in Information Systems and Business Planning," with S. Sasidharan, J. Wu, A. Lederer, and G. Kearns, *Journal of International Technology and Information Management*, Vol. 15, No. 3, 2006