

Digital Natives vs. Digital Immigrants: A Multidimensional View on Interaction with Social Technologies in Organizations

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Abstract

Research objectives: Generational membership is argued to have an impact on how social technologies are used for knowledge sharing and communication in organizational contexts. Previous research has especially underscored the difference between digital natives and digital immigrants in how they make sense of and interact with social technologies for work. This paper provides a multidimensional perspective, and explores generational differences as well as other factors deriving from both work-related and personal characteristics.

Design methodology: The paper presents a summary of the findings from interviews with 58 consultants from 17 managing consulting firms. Participants were selected based on their knowledge-intensive roles and their willingness to share information about their knowledge practices.

Findings: Findings highlight the significance of the organizational rank, knowledge needs, individuals' enthusiasm for technology use, and personality disposition in shaping workers' attitudes towards social technologies for knowledge practices. This work builds from a social construction of technology perspective to provide a comprehensive insight into the roles played by work and personality-related factors beyond age and generational differences in the use of social technologies in and for work.

Originality: This research contributes to the discourse on generational differences and the use of social technologies. It puts this question into a broader context and highlights other factors that shape this relationship.

Keywords: Social technologies, digital natives, digital immigrants, technological frames, extroversion, organizational level, knowledge requirements; technophilia

1. Introduction

This research is motivated by the need to understand the effect of generational differences among knowledge workers that shape uses of social media in organizational contexts. Social media have played an increasingly important role in organizational activities, ranging from knowledge sharing to marketing functions (Leonardi, 2017). Since these technologies made inroads into organizations, key discourses have revolved around ways these technologies may instantiate and fuel the tension between different generations of workers, including how they view work practices and digital technologies (Jarrahi, Crowston, Bondar, & Katzy, 2017). The role of age on organizational uses of social media is highlighted by both the practitioner and academic literature (e.g., Bolton et al., 2013; Deloitte, 2017; Khoir & Davison, 2014; Puybaraud & Hahn, 2012). These studies suggest that the use of information and communication technologies (ICTs) in organizations in general, and the use of social media in particular, may vary across different generations of workers, namely digital natives and digital immigrants. We specifically explore the generational differences in the context of consulting firms. In doing so, we also point to other differences among knowledge workers that may influence how these technologies are put into practice.

Our premise is that an exclusive focus on intergenerational discrepancies can mask the effects of other work-related and personal differences. Hence, we seek to provide a richer account of how knowledge workers may differ in their uses of social technologies for knowledge sharing.

The paper proceeds as follows: In the next section, we review the literature on social media use in organization and generational gaps. Then, we develop our theoretical framework by introducing the sensitizing concepts of technological frames and relevant social groups. This is followed by a section on research methodology. Next, we report the research findings based on several relevant social groups that represent important differences among interviewed knowledge workers. Finally, we provide a multidimensional perspective on factors shaping social media use in organizations.

2. Literature Review

2.1. Social Media Use and Knowledge Sharing in Organizations

ICTs offer unique capacities to overcome knowledge sharing obstacles as they generate new possibilities for creation, modification, transmission, and storage of information. Early ICT researchers (Zuboff, 1988) found that new technologies could provide information that was previously unavailable or inaccessible to organizational members. Recent generations of ICT-based systems, e.g. social media, have blossomed, changing how millions of people communicate and keep in touch with their social networks. This group of technologies includes (but are not limited to) blogs, wikis, and social media sites such as Twitter, Facebook, Flickr, and YouTube.

The adoption of social media has been viral, meaning that applications spread quickly using social mechanisms such as word-of-mouth and peer referrals (Mangold & Faulds, 2009). In contrast to impersonal solutions that condense knowledge into databases and repositories, social media, which underpin Enterprise 2.0 initiatives, let human actors locate sources of knowledge (often another organizational member) and transfer it through social interactions (McAfee, 2009) as an organic mode of knowledge sharing (Jarrahi & Sawyer, 2013; Leonardi, 2017). For example, based on Goffman's notion of co-presence, Subramaniam et al (2013) developed the concept of

“virtual co-presence” in a dispersed work context to refer to new forms of relationships (re)created by social media during the collective completion of tasks.

Recent developments in critical studies of technology and the growing utilization of social technologies in organizations call for a multidimensional perspective on social media use, which integrates multiple factors the conceptualization of relationships between social media and work (Ford & Mason, 2013). While policies and cultural norms matter (Jarrahi & Sawyer, 2015), knowledge workers have the agency to bring their own personal identities into organizational uses of social media (Engler & Alpar, 2017). Therefore, new patterns of social media use are shaped at the intersection of work-related purposes and individual preferences (Chin, Evans, & Choo, 2015).

2.3. Generational Gap in Social Media Use

In recent years, research has pointed to generational differences: workers belonging to different generations may demonstrate different interpretations and uses of ICTs, particularly social media (Vodanovich, Sundaram, & Myers, 2010). In this equation, the younger generation is often labeled as the *Net Generation*, *Generation Y*, *Millennials*, or *digital natives*. One of the common themes of recent research is the comparison between digital natives and *digital immigrants*, an older generation of workers who supposedly immigrated to the digital world during their adult life, and therefore adopted its norms (Ahn & Jung, 2016; Metallo & Agrifoglio, 2015). Whereas “the positive experience” of digital natives during their formative school years influenced the way they currently perceive technologies and interact with them (Hershatter & Epstein, 2010), digital immigrants “always retain their own accent more or less,” and some continue to resist new digital technologies (Chris Zhao, Xu, Sun, & Zhu, 2014, p. 223).

Digital natives are argued to have developed unique networking and interaction skills around digital technology, which are essentially different from the skills of digital immigrants who came to interact with digital technologies later in their lives (Braccini, 2013). For example, digital natives have a preference for using social networking and microblogging platforms, whereas digital immigrants are more likely to use asynchronous means of communication such as email (Khoir & Davison, 2014; Metallo & Agrifoglio, 2015).

Several studies have explored how these divergent sets of assumptions and preferences may manifest themselves in the selection of and interaction with social technologies (Hoffmann, Lutz, & Meckel, 2014; Hrastinski & Aghae, 2012). For example, the two generations are argued to have differences in their understandings of privacy on social media (Halperin & Dror, 2016). While digital natives are more technologically adept and more willing to share information online (Nedbal, Auinger, Hochmeier, & Holzinger, 2012), they may be less prudent when sharing information on social media (Väyrynen, Hekkala, & Liias, 2013). Empirical studies underscore the generational differences in the adoption of enterprise social technologies. Koch, Leidner and Gonzalez’s study (2013) reveal conflicting interpretations and use patterns of an enterprise social technology by baby boomers (holding managerial positions in the organization) and millennial new hires. Similarly, older and younger workers approach corporate blogging systems differently (Yardi, Golder, & Brzozowski, 2009).

These studies suggest that varied interpretations of technologies can result in inter-generational tension in organizations (Barzilai-Nahon & Mason, 2010; Vodanovich et al., 2010). For instance, tensions can build around information sharing on social

technologies across organizational boundaries, potentially prompting the leakage of intellectual property (Väyrynen et al., 2013; Vodanovich et al., 2010).

Despite the rise of digital natives in organizations, research on generational technological dynamics is mostly restricted to educational contexts with a focus on students (Braccini & Federici, 2013; Davison & Ou, 2014), so the understanding of digital natives' interactions with technologies in organizational contexts is in its infancy (Khoir & Davison, 2014; Mäntymäki & Riemer, 2014; Väyrynen et al., 2013). Moreover, most theories of technology adoption in organizations (e.g., models of technology adoption and resistance) are still grounded in studies of digital immigrants (Wang, Myers, & Sundaram, 2013) and hence as Colbert et al (2016) suggest, new empirical studies are required to illuminate how digital natives react to digitally-mediated organizational environments. In particular, there is a need to go beyond the fascination with a "homogenous" technology-literate generation and explore variance in social media use along other dimensions (Braccini, 2013).

3. Conceptual Framework: Social Construction of Technology

To explain different interpretations and uses of social technologies by knowledge workers we build from the concept of technological frames and relevant social groups. These two concepts are developed under the larger approach of the social construction of technology (SCOT). The SCOT perspective is concerned with the influence of social, political and cultural structures on technological innovations (Pinch & Bijker, 1987).

As the name implies, SCOT argues that technology does not determine human actions, but humans socially construct technology (Bijker, 1995). The constraining and enabling effects of technologies are therefore matters of interpretative practices of people in a social context. SCOT explains how relevant social groups use technologies to solve their problems. These groups are defined by their shared technological frames, which consist of assumptions, expectations and knowledge about how technology can be utilized.

3.1. Technological Framing

As part of the SCOT perspective, the notion of technological frames is particularly relevant to this work and refers to the "*shared cognitive frame that defines a relevant social group and constitutes members' common interpretation of an artifact*" (Bijker, 1995, p. 125-126). Technology can be subject to radically divergent interpretations that are associated with various relevant social groups (Kline & Pinch, 1999). A technological frame embodies the diversity of interpretations and interactions among actors and also the resultant structures (Davidson, 2006). The frame simultaneously builds alongside interactions between the actors and artifact. However, it develops only if these interpretations among social actors converge. The technological frame comprises a multitude of elements that wield influence on interactions which consequently leads to the manifestation of meanings in technical artifacts.

3.2. Relevant Social Groups

Another concept developed in relation to the SCOT is the notion of relevant social groups (RSGs). RSG centers on the similarities among members relative to the interpretations of specific technological artifacts. Such interpretations, to varying degrees, are shaped and narrowed down by factors such as a group's purpose, context, knowledge base, and the artifact itself (Pinch & Bijker, 1987).

The most important theoretical utility of RSGs is that they help explain how technologies reach stabilization. That is, a particular technology becomes stabilized when RSGs see their problems as having been solved by the technology in question. This state of technology is also known as “closure”. Since differing social groups have different perceptions on the nature of the problem, they hold different opinions about the achievement of closure and stabilization.

RSGs can also be delineated based on variables such as socioeconomic status. At the most basic level, social groups can be distinguished in accordance with their shared or diverging interpretations of technology. As the concept of RSGs is used to denote both “organized and unorganized groups of individuals” (Pinch & Bijker, 1987, p. 30), we use it here to distinguish between distinctive groups of knowledge workers based on similar interpretations of social technologies.

4. Methodology

4.1. Research Strategy

The empirical basis of this work consists of two elements: a pilot study and the main study.

4.2. Pilot Study

The pilot study relied on semi-structured interviews with 16 knowledge workers from management consulting firms. This was used to refine our understanding of worker’s uses of social media, improve the interview protocol, and ensure that the sampling approach was viable. The pilot study interview protocol centered on the ways knowledge workers obtained both information and expertise for accomplishing their work, and used various social technologies for sharing knowledge, communicating and collaborating with others. Analysis of the pilot study identified several characteristics of the participants (e.g., technophilia and extroversion), which influenced their use of social technologies; and these findings were augmented and refined in the main study. Another major finding of the pilot study was a holistic approach participants took in describing their use of knowledge sharing technologies. Therefore, we decided to not only focus on social media but also integrate into our analysis other key technologies facilitating knowledge sharing (communication technologies (e.g., email or instant messaging systems) and other knowledge-based technologies (e.g., enterprise knowledge repositories).

4.3. Main Study

The interview protocol was refined based on emergent themes from the pilot study and generated more targeted questions, emphasizing certain group of technologies and knowledge practices. Based on feedback from several pilot study participants, we shifted from narrative approaches to a more focused elicitation structure drawing on the critical incident technique (CIT) (Flanagan, 1954). The CIT approach helped participants focus on knowledge-intensive practices in which they needed to seek out knowledge from other people.

As in the pilot study, participants were identified through a purposive sampling of knowledge workers, primarily from multiple management consulting firms. We focused on consulting firms because relevant literature suggested they are archetypical knowledge-intensive environments, and therefore are ideal places for the study of knowledge sharing (Anand, Gardner, & Morris, 2007). The resulting data set includes

interviews of 58 people. These interviews took 55 minutes on average; they were recorded and then transcribed verbatim.

Table 1 outlines the distribution of participants. It is important to note that we used the most commonly-held definition of digital natives: those born after 1980 (Palfrey & Gasser, 2013; Tapscott, 2009).

Gender	Male	35
	Female	23
Organizational Role	Non-managerial	34
	Managerial	24
Age	Under 30	25
	30 and above	33
Total	58	

Table 1 Distribution of Participants

With participants' permission, we also connected with them on LinkedIn and Twitter. This system level analysis allowed us to observe the way participants employed Twitter and LinkedIn in their knowledge practices. Examining LinkedIn profiles allowed for further examination of users' activities, as well as their credentials, backgrounds, areas of expertise, and skills. For example, we learned how often the participants updated their profiles, what communities they were a member of, and how they generally shared information with their connections.

As recommended, qualitative data collection and analysis proceeded concurrently (Miles & Huberman, 1994). The analysis involved numerous iterations between data collection and construction of an emerging theoretical framework. We began the analysis by subjecting the interview transcripts to interpretation using initial coding as the analysis technique (Glaser, 1978). In this stage, the data from different sources generated a list of recurring themes centering on semi-distinct groups of knowledge workers and respective technological frames. We refined this list after the first set of interviews and refined again after the remaining analyses were completed (Miles & Huberman, 1994).

Through this process, we analyzed the data to identify the emergent patterns of technological frames, and this led to the formation of multiple categories of participants (RSGs). We coded interview transcripts using the qualitative research software package NVivo. Passages perceived as relevant to similar concepts were coded in the same category.

5. Findings

In addition to generational differences, we found two key sets of differences among knowledge workers. We discovered variations among interviewed knowledge workers based on their work-related and personality-driven technological frames. Work-related dimensions stem from organizational and knowledge needs. Two important personality traits that shape the use of social media are enthusiasm for technology and personal disposition (extraversion vs introversion).

Along these dimensions, we established pairs of RSGs that are distinguished based on their differential technological frames. Each RSG deploys its technological frames to enact a distinct use of social media and other technologies undergirding knowledge practices. Following is a detailed description of these various RSGs and respective technological frames on the grounds of age, work-related and personality-driven dimensions.

5.1. Generational Differences

Consistent with prior research, we found that age played a role in social media uses among knowledge workers (e.g., Archambault & Grudin, 2012; Barzilai-Nahon & Mason, 2010). However, we recognize that boundaries between different age groups are vague, and therefore, it is difficult to draw fine distinctions between the technological frames of knowledge workers belonging to different age groups. Finally, we also acknowledge there are nontrivial variations among individuals within the same age groups. All this noted, attitudes towards and patterns of ICT use by digital natives bear additional attention relative to their uses of social technologies (see Table 2).

Relevant Social Groups	Technological Frames	Emerging Patterns of Social Media Use
Digital Natives	<ul style="list-style-type: none"> • Positive attitude toward digital networking • Positive experience with social technologies from teen years 	<ul style="list-style-type: none"> • Extensive use of a variety of social technologies for mediating knowledge sharing • Use of social technologies for socializing and making connections • Friending coworkers on Facebook • Informal knowledge sharing on social networking tools
Digital Immigrants	<ul style="list-style-type: none"> • Face-to-face as the fundamental mode of interactions • More formal attitude towards the use of social technologies • Less comfortable with self-disclosure 	<ul style="list-style-type: none"> • Use of email and phone for a vast majority of knowledge practices and business needs • Little use of informal social technologies for building relationships and socializing • Professional networking via LinkedIn

Table 2 Two Social Groups Based on Age and Respective Technological Frames

5.1.1. Digital Natives

Many of our younger participants were in college or high school when social media such as Facebook and Twitter became popular, so we found them to be generally more comfortable in reaching out to or networking with their peers using social technologies. Moreover, individuals often feel more obligated to use the same technology if their peers have already adopted it (Quan-Haase & Young, 2010). Joining organizations may not cause this pattern to cease. A 24-year-old participant pointed out:

“I use Twitter quite heavily, especially for getting advice, or if I’m thinking about something that I’m wondering what other people think. I really look to my peers many times for a review of something. So, before I do certain activities, I wanna see what my friends have done on that respect.”

Younger participants seemed to have developed certain technological behaviors regarding communication practices. For example, reaching out to colleagues via digital technologies is more common among this younger group.

“We live in that generation, I grew up in the instant messenger world, so sometimes even if the person is next to you, you might IM them something ...if we’re working on something and you need a quick question, even if the person sits a row behind you, it’s sometimes quicker to just type out hey do you have this or something, rather than getting up every time you have a question.” (Participant 32)

Digital natives have been accustomed to the use of social technologies for sharing knowledge across personal networks since their teen years:

“Unless what I’m working on is confidential, or too private, I have no hesitation in just tweeting’ out, hey, has anybody heard this? Or, hey, I’m having this problem, has anybody else had this?” (Participant 1)

The digital natives we interviewed tend to have a higher appreciation of social technologies’ affordances for socializing and networking as a tool for building new social and professional ties.

This group was also more likely to maintain social ties on social platforms. We observed that younger participants were much more likely to “friend” coworkers on Facebook, as this was often seen as a means of raising awareness about colleagues’ personal lives and fostering informal relationships that help future knowledge exchanges.

5.1.2. Digital Immigrants

A primary difference between the technological frames of digital natives and digital immigrants may revolve around the applicability of social technologies for work-related knowledge practices. For older knowledge workers, face-to-face interactions are seen as a more preferential mode of social interaction:

“I will say that there is nothing like a face-to-face communication. So no matter what, there’s nothing more valuable than a face-to-face communication, meeting, presentation, etc.” (Participant 28)

Findings further suggest that in situations where face-to-face interactions are less feasible, digital immigrants see communication technologies (primarily phone and email) as adequate enablers of knowledge practices:

“I’m just old fashioned as far as back and forth communication. Most of that still for us is done via the phone, or if it is not a specific personal conversation or anything urgent, an old-fashioned e-mail is sufficient. So I’ve never really been into Twitter to start tweeting to following particular groups and comment back and forth with members of a particular subject matter.” (Participant 24)

Likewise, socializing and networking practices of this RSG tend to be less mediated by social technologies. Some work-related networking is still done face-to-face or by email or phone. In our observation, older knowledge workers are also less likely to leverage public social media to expand their networks:

“I don’t currently use any of the enterprise social networking and public social media for that. I don’t usually need to go out and try and find people to communicate with similar jobs or roles... We have a lot of networking events and things that we do where you get to know people in person rather than using social media.” (Participant 7)

The technological frame coextensive with this RSG embodies a more formal attitude towards knowledge sharing and use of technologies in that members of this group typically do not view informal orientation of communication transpiring over social networking technologies positively. In fact, the attitude that the majority of digital immigrants in our sample held towards social technologies was business-centered and less focused on informal aspects of communication and knowledge sharing.

Furthermore, we found self-exposure (expression of personal information) on social networking to be less common among older knowledge workers. This may partly explain why social networking technologies are not seen to be as useful as email for many work-related practices. Among these knowledge workers, enterprise social networking platforms, which mimic informal features of Facebook, are also greeted with hesitance. A participant pointed out:

“I don’t want to browse on [enterprise social networking platform] to see who’s doing what and who’s had a baby and who I might meet at the restaurant; for update our profile, you need a lot of time, which is really not what I have on my hand all the time.”

According to this technological frame, informal social networking technologies are considered less useful for creating new connections. For example, several older participants do not find the friend's suggestion feature on an enterprise social networking platform very useful:

“That feature doesn’t seem to work well, because it shows people, it does not show us why I should be networking with them. So I don’t know what email I’m gonna send to ‘em, other than Hey, (enterprise social networking platform) says we should network.” (Participant 4)

In contrast with social networking tools targeting informal social networking, LinkedIn is perceived as a more professional networking tool and more amenable to professional networking:

“LinkedIn is a professional network of mine and I can control who can see what and so it’s a very mature, it’s always a professional network.” (Participant 28)

This supports Archambault’s and Grudin’s (2012) observations that Facebook use is inversely correlated with age, whereas LinkedIn appeals to digital immigrants.

5.2. Work-Related Attributes

As noted, data analysis pointed to two major work-related attributes that partly define differences among knowledge workers in how they may view and use social media. Table 3 summarizes the potential effects of organizational level and knowledge requirements.

Dimension	Relevant Social Groups	Technological Frames	Emerging Patterns of Social Media Use
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Organizational Level	Managerial Positions	<ul style="list-style-type: none"> • Extensive coordination and communication needs • Requirement for constant reachability (as reference points) • Expert locating via extensive inter-organizational social networks 	<ul style="list-style-type: none"> • Extensive use of phone and email • Use of internal social networking platforms for staffing purposes • Use of LinkedIn for maintaining ties with professional contacts and for recruiting from outside the organization
	Non-Managerial Positions	<ul style="list-style-type: none"> • Limited knowledge about organization and colleagues • More tendency for conformity • Smaller social networks, and reliance on more senior team members for locating experts and expertise 	<ul style="list-style-type: none"> • Use of knowledge repositories • Use of internal social networking platforms for learning about colleagues • Communication with managers via email, phone and IM
Work-Based Knowledge Requirements	Consultants	<ul style="list-style-type: none"> • Global knowledge • Reliance on standardized methods and common expertise 	<ul style="list-style-type: none"> • Inclination to use knowledge repositories and databases
	Topic Experts	<ul style="list-style-type: none"> • Organizationally and individually specific knowledge • Exploration of unknown and less-explored areas • Centrality of expert locating 	<ul style="list-style-type: none"> • Inclination to use social technologies for knowledge sharing

Table 3 Social Groups Based on Work-Related Attributes and Respective Technological Frames

5.2.1. Organizational Level

Managers differ from non-managers in two distinct ways. First, managers lead teams and projects, performing common managerial duties such as coordination. Second, managers have other workers reporting to them. Therefore, whereas other workers can be involved in teams and work closely with others, they are distinct from managers. In consulting firms, managerial levels are often defined by job titles such as managers, senior managers, directors, principles and partners. Non-managerial roles include job titles such as analysts, associates, senior associates, consultants, and senior consultants.

5.2.1.1. Managerial Roles

In consulting firms, managerial work normally focuses on business and people development. Although their internal duties involve leading their team, inter-organizational activities are also performed by managers (e.g., initial contact with clients, and different aspects of relationships with client organizations). While managers are less involved in doing the actual work (e.g., writing proposals, data collection and analysis), they extensively rely on communication and knowledge sharing with both team members and client organizations. The interaction of more low

rank knowledge workers with client organizations focuses on operational issues, such as transferring documents and information. Managers' interactions are more social, focusing on issues such as conflict resolution between their team and clients.

Basic communication technologies (e.g., email, phone, or IM) were found to be employed extensively by almost all of the participants holding managerial positions. A majority of the managers consider these ICTs adequate for most knowledge-related practices. The combination of these allows managers to be constantly reachable and to stay in touch with the flow of information within and across the organization. As knowledge workers move up the organizational ladder and gain experience over time, others under their supervision tend to reach out to them. This affects their communication style:

"I'm always on the phone, I'm always reachable. Any time I get a call, I am available; I am reachable. The only times is when I go on vacation or need to disconnect or just there is no coverage wherever I am!" (Participant 17)

In their role as senior managers in consulting firms, partners, directors and principles rely on extended social and personal networks to locate and interact with other internal and external knowledge workers. Hence, these extended networks increase social capital:

"People who've been here a long time, have a bigger network and have a lot more resources to talk to if they have questions." (Participant 7)

These extended networks are critical resources for managers when they face many types of knowledge problems, and need to locate the right expert, especially as the expert is often *"a phone call or maybe two to three phone calls away"* (participant 32). This noted, the project leaders may also draw on enterprise social networking tools to find knowledge workers with certain expertise and experience for staffing projects.

A substantial portion of managers' networks is contacts outside of their current organization. In this role, managers act as gatekeepers who tap into external sources of knowledge and link the organization with its environment (Katz & Tushman, 1981). We found that resources inside the organization may not be adequate to address many types of knowledge situations managers have to deal with. Managers need to more frequently identify and reach out to experts across organizational boundaries. A director noted:

"In my position there's nobody in the organization to go to, so typically I have to go outside my organization to get answers."

LinkedIn is often regarded as useful for this purpose and maintaining inter-organizational relationships. Managers, principles, directors and partners are commonly involved in recruiting consultants and, in some cases, constantly monitor activities and relevant individuals on LinkedIn.

5.2.1.2. Non-Managerial Roles

Non-managerial work in consulting firms focuses on data collection from customers and other sources, data analysis, and preparing reports and deliverables (e.g., presentations or "decks"). Because this work involves collection and analysis of more explicit knowledge, non-managers tend to draw on knowledge repositories more frequently than managers do. These technologies include internal knowledge repositories, storing products of past projects, and external databases, such as those

storing accounting and tax standards (e.g., Factiva and Bloomberg that provide market research data).

Occupying a lower rank position is often associated with less certainty and knowledge about unwritten rules and implicit norms, and may therefore affect how non-managers interact with their coworkers and use social technologies for that purpose; these employees can be more cautious of using social or communication technologies for social interactions. For example, participants in non-managerial ranks avoid using IM for communicating with senior managers such as partners. Within the technological frame of these knowledge workers, IM is often considered overly informal, leading them to use email to start a conversation with senior colleagues:

“I think instant messenger is informal because you don’t ping a very senior person using instant messenger, you first send an e-mail, and you wait for that person to respond. Even if I see that person online, and I do not know him, I would prefer to send an e-mail. It tends to be more formal.” (Participant 54)

Being new to the organization may also propel lower rank knowledge workers towards a higher level of conformity since these individuals may feel insecure due to their short tenure. This could explain why their technological frames reflect more compliance with organizational expectations; as such, we found these knowledge workers to be more sensitive towards organizational guidelines and policies.

In contrast to managers, non-managers often have smaller social networks on which to build their knowledge practices. Lower rank knowledge workers may need to work harder to develop their social networks. Hence, they find enterprise social networking platforms more useful for familiarizing themselves with the organization, its members and sources of expertise:

“It allows you, especially new employees or people who are trying to get more involved, and who might not necessarily know who you’re reaching out to. You can research on (enterprise social networking platform) just to learn more about the different contacts and learn how to get more involved.” (Participant 45)

We further found that for most immediate work-related knowledge problems, these knowledge workers see social and information resources within the organization to be mostly adequate, and so are less likely to reach out to knowledge sources outside of the organization. Instead, they are more likely to reach out to their managers and members of immediate project teams for most knowledge problems.

By anchoring themselves in the formal structure of organizations, knowledge workers in lower ranks receive support from more senior colleagues, invoking formal relationships and leveraging their managers’ extended social network. To communicate with their managers, these workers typically use traditional communication technologies (e.g., email) with which managers are more comfortable.

5.2.2. Knowledge Requirements (Consultants vs Topic Experts)

By synthesizing the ways knowledge practices are conducted in consulting firms, we identified two forms of knowledge needs that also shape how workers use social and other forms of knowledge-based technologies. These present two disparate sets of knowledge work in many knowledge-intensive environments (see Werr & Stjernberg, 2003). This characterization of knowledge work rests upon a dichotomy of

organizational knowledge: (1) global knowledge, and (2) organizationally and individually specific knowledge.

While global knowledge includes broad methods and toolkits commonly acquired through formal education or industry-level accredited training, organizationally and individually specific knowledge is less explicit. Therefore, global knowledge constitutes models, routines and templates whereas local knowledge is generated through path-dependent processes and has limited general applicability. Creplet et al (2001) call knowledge workers whose work primarily involves standardized methodologies and global knowledge “consultants,” and call knowledge workers who need to create fresh knowledge for dealing with unknown knowledge situations “experts.”

In this regard, our findings point to two major groups of knowledge workers based on their knowledge needs: 1) *consultants* whose functions involve more global knowledge, and 2) *experts* who require more organizationally specific knowledge for accomplishing work. Contrasting knowledge requirements may explain different uses of social technologies by consultants and experts in consulting firms.

5.2.2.1. Consultants

For areas such as audit and tax consultancy, the essential knowledge encompasses technical knowledge about industry-level accounting and tax standards. Therefore, consultants in these areas stay current by participating in training programs or using databases and knowledge repositories to learn about new standards, methodologies and best practices. For new client assignments, they are more likely to draw on a “locally developed adaptation of the global method” (Werr & Stjernberg, 2003, p. 889). An audit consultant(participant 21) stated:

“We have a technical library; it’s like a big resource of anything that we need. It includes all sorts of learning material, and any sort of guides that we need [...] A few times a week I’ll probably use those resources.”

Consulting firms often have knowledge databases updated by teams of internal experts who compile detailed commentaries on new accounting standards. Still, not all knowledge issues in tax and audit can be addressed using databases. Situations involving subjective judgment are important exceptions to this. One participant reported that for “5% of knowledge problems,” he needed to reach out to other colleagues. This noted, knowledge practices defining the work of consultants generally require less social interaction with colleagues within and across organizational boundaries. So, the use of social technologies for these practices is seen as less useful compared to the work of experts from advisory areas.

5.2.2.2. Topic Experts

Whereas standard methodologies could often be reapplied from project to project for consultants, problems are less known and often require new explorations for topic experts. Many knowledge problems do not have clear solutions at the outset and so cannot be addressed by applying standardized methodologies (global knowledge). The first step for experts, working in advisory practices, is to reach out to colleagues for advice or to identify experts via a social network. The main outcomes of such social practices are a heightened understanding of knowledge issues and highly customized solutions to unique business problems. Argyris and Schonv (1987) call this process “double-loop learning” since, in the light of experimentation and evaluation of actions, new methodologies and new procedures are constructed.

In the process of developing unique solutions, experts may have regularly tapped their network of colleagues. Here, knowledge repositories and databases are deemed less instrumental and social technologies facilitating social interactions provide unique affordances:

“Database would normally be for more obvious standard things like overview of the market, but for many situations where you need qualitative inputs and need to ask more creative questions, I would go to my colleagues.” (Participant 46)

The use of communication media such as email, phone, or IM allows topic experts to access a close circle of colleagues, whereas the use of online forums, Yammer, and enterprise social networking platforms are considered more useful for locating experts outside of this close circle. Social technologies such as LinkedIn or Facebook, are regarded as helpful since they generate additional awareness about professional and social contacts, as well as their backgrounds and areas of expertise.

5.3. Personality Attributes

In addition to work-related characteristics, we found two important personality traits to shape how knowledge workers in consulting firms may make sense of social media and their utility (See Table 4).

Dimension	Relevant Social Groups	Technological Frames	Emerging Patterns of Social Media Use
Enthusiasm For Technology (Technophilia)	Technophiles	<ul style="list-style-type: none"> • Enthusiasm for new technologies • High computer self-efficacy and fluency 	<ul style="list-style-type: none"> • BYOD (Bring-Your-Own-Device) • Drawing on a more diverse suite of social technologies (larger base of use) • Comfort in navigating across different technological platforms
	Average Adopters	<ul style="list-style-type: none"> • Lack of enthusiasm for the technology itself • Functional perspective 	<ul style="list-style-type: none"> • Use motivated by concrete personal and work-related needs • Slower adoption of social technologies
Personal Disposition	Introverts	<ul style="list-style-type: none"> • Not comfortable with reaching out to less known colleagues • Less interested in building new relationships 	<ul style="list-style-type: none"> • Use of social technologies as channel technologies • Use of email to start knowledge practices • Avoiding using IM for communicating with less known colleagues
	Extroverts	<ul style="list-style-type: none"> • Preference for verbal and face-to-face communication • Interested in building new relationships 	<ul style="list-style-type: none"> • Use of phone to start knowledge practices • Use of IM for communicating with less known colleagues • Connecting and socializing on social networking platforms

Table 4 Social Groups Based on Work-Related Attributes and Respective Technological Frames

5.3.1. Enthusiasm for Technology

Technophilia is defined as enthusiasm for technology, and technophiles are individuals who regard most technologies positively, adopting new technologies eagerly (Richards, 1993). Technophiles are often individuals with higher *computer self-efficacy*, defined as “belief in one’s actions on the computer” (Barbeite & Weiss, 2004, p. 30). Findings indicate differences between the technological frames of technophiles and average technology adopters.

5.3.1.1. Technophiles

We identified technophiles based on responses to a question and phrases designed to signal the participant’s enthusiasm for new technologies. Examples are: “*I am a person who loves technology*” (Participant 13); “*I have kind of a passion for social media*” (Participant 15), and “*when cool things come out, I’ve usually played around with it and, we like to figure out what it’s all about*” (Participant 8). These individuals are eager to experiment with newly released consumer technologies, including new iPhones or social networking technologies.

We found that the adoption of public social media is generally associated with knowledge workers’ enthusiasm for new technologies fueled by the cycle of technologies emerging first in the consumer market, then spreading to organizations (Jarrahi et al., 2017). We further observed that participants from certain organizational departments are more likely to show a passion for new technologies. For instance, most IT-related positions (e.g., individuals working in IT advisory) found themselves inclined to try out new tools:

“I’ve been a CIO for many years and I’ve been a flag bearer of IT. I think all IT professionals should be running on the forefront of the new technology as long as it’s tested and security is not a concern.” (Participant 17)

Moreover, the findings indicate that technophiles tend to draw on a more diverse suite of social technologies. A central dimension of this technological frame lies in the superior ability of this RSG to navigate across different technological platforms. This enables them to create a more coherent technological experience and more cohesive integration of various social technologies:

“I don’t have the desire to hit four different services to share the same content. [I use applications] through which all I have to do is send an email, and it will publish the blog post to my blog, it will publish it on Twitter with a short link and if I wanted I could publish it to LinkedIn or any of the other services.” (Participant 50)

5.3.1.2. Average Adopters

Interviews uncovered a larger group of knowledge workers who hold a different perspective towards new (social) technologies. These individuals may use social technologies because of either work needs or social pressures. In contrast to technophiles, these knowledge workers do not necessarily have the innate desire to use social technologies – mainly because they do not see enough utility in the use of these technologies. Uses of social technologies for this social group are primarily directed at personal and work needs, and are less motivated by a fascination with technology itself. A knowledge worker echoed this sentiment:

“I don’t normally try things just for the sake of trying it. I am willing to try something out, but it does not, like, scare me. I remember being one of the last people that I knew to get a cell phone.”

We previously posed that knowledge workers with IT-related work would be more likely to have a passion for technology. However, technophilia does not have a fundamental association with technical backgrounds. For example, not all system developers can be regarded as technophiles. An IT manager argued:

“I had people ask us ‘well you work on the computer all day you must have a problem with not getting on the computer when you go on vacation.’ There’s no problem here.”

In several cases, this lack of technological enthusiasm is reflected in a lack of knowledge about features of social technologies and their applicability (despite claims by some (e.g., McAfee, 2009) that social technologies are intuitive). For example, several participants admitted that they were unaware of important features of both internal and public social technologies.

5.3.2. Personal Disposition

Of the many elements of one’s character and nature that create a person’s disposition, we focus exclusively on extroversion and introversion. We do so for several reasons. First, extroversion and introversion are considered to be important components of personality (Jung, 1971). Extroversion refers to a desire to socialize with others and is associated with self-disclosure. It is often synonymous with sociability and social activity (Koch et al., 2013). Second, prior research has presented extroversion as influential to a person’s internet activities (Burke, Kraut, & Marlow, 2011). Furthermore, extroverts are more likely to be active on social networking sites and blogs (Schrock, 2009). Finally, we found extroversion to be consequential in relation to a knowledge workers’ decision to use different social technologies for knowledge practices.

We treated extroversion and introversion as extremes, knowing that in practice, most participants fell between the two extremes. We distinguished among participants based on their self-report: how they conducted knowledge practices and used social technologies. The following findings reflect a link between the way social technologies are used and personal dispositions of introversion vs extroversion.

5.3.2.1. Introverts

Those participants who considered themselves introverted tended to use social networking platforms, much like channel technologies (e.g., email) to support private and dyadic interactions. This is in contrast with more idealized uses of social networking technology as a public information platform that offers the sender greater visibility (Treem & Leonardi, 2012):

“For us I’m not one of these people that like to post to people of the world for the sake of it. I always feel like if I want to tell them something I just message them. There’s no point in posting it for everyone to see.” (Participant 21)

For most knowledge practices, email is typically suited to the personalities of introverted knowledge workers. Interviews with several participants highlighted the fact that email may have allowed introverts to interact privately with a smaller number of individuals. This concurs with Olson and Olson’s (2009) research showcasing that the use of email enables shy individuals to overcome their reluctance to verbally interact with others by composing text. In addition, most participants who perceive themselves as introverts underscored their preference for email communication:

“I don’t like to talk on the phone, and so for that kind of thing, I usually will send an email and if I don’t get a response that’s when I’ll call them.” (Participant 16)

Furthermore, respecting the affordances of internal social systems for finding and networking with professional contacts, introverted participants are less interested in building new relationships. In particular, social features of enterprise social networking platforms such as finding new social ties are considered less appealing.

5.3.2.2. Extroverts

Most extroverted participants indicate a preference for face-to-face interactions in order to reach out to other colleagues:

“Typically when a challenge comes up, those things are dealt with face to face. Typically, it is quite challenging to explain sort of the detailed issues that arise through written word. It’s a lot easier to communicate verbally.” (Participant 32)

As opposed to introverts, extroverts view phone-based communication as a crucial component of their knowledge-sharing practices. At the same time, extroverted participants find other social and communication technologies useful for sharing knowledge and networking activities. Extroverted participants are more likely than introverts to use IM to reach out to colleagues they did not know.

In comparison to introverts, we found extroverted knowledge workers more likely to socialize and network using social technologies. Most of the extroverted knowledge workers perceived social media, such as LinkedIn, as great venues for pursuing their personal desires to connect and socialize with others:

“A lot of times, what will happen is we’ll meet someone, and we’ll connect on LinkedIn and then that’s the chance for us to say: ‘oh, I didn’t know you worked for so and so.’” (Participant 50)

In general, extroverted participants were more likely to view public social networking platforms as vehicles for professional networking.

6. Discussion

Our findings make clear that there are multiple *relevant social groups (RSGs)*, beyond generational differences, regarding the use of social technologies in organizations. These groups tend to construct upon and draw from divergent technological frames that have a significant bearing on how social technologies are interpreted and used for knowledge sharing. The RSGs identified in this study help explicate the distinctiveness of knowledge workers who share similar or different views on social technologies. Using the concept of technological frames, we conceptualize the uses of social technologies as an interpretive process in which users make sense of tools and appropriate them based on their knowledge, personal preferences, and organizational roles.

The disparate technological frames exhibited by different RSGs may complement a narrow preoccupation with the generational gaps pervasive in the extant literature on the adoption of social media in organizations. The RSGs identified here are not mutually exclusive and hence one cannot draw specific causal relationships between these individual characteristics, in particular the age factor, and the uses of social technologies. Different individual preferences and work-related attributes may interact with one another to create distinct uses of social media that differ from the patterns we have identified as characteristics of a broad RSG.

Given the fact that the previous literature has dwelt on generational differences and the effects of age, in this study we have shown instances in which the intersection of the age factor and other RSGs shaped social media uses. Such intersecting factors lead to more distinctive technological frames and behaviors. This highlights the social actor nature of technology users whose different roles and identities influence their interactions with technologies (Lamb & Kling, 2003).

One major contribution of this work is to demonstrate that a mere focus on the dichotomy of digital natives and digital immigrants might be challenging. Such a reductive approach masks the complex nature of social media use in organizations. Our findings emphasize that being a digital native does not adequately predict the desire and intention to use social media in organizational contexts. It is, therefore, more fruitful to focus on digital fluency or competence, which is not necessarily a function of generational membership (Khoir & Davison, 2014; Wang et al., 2013). Digital fluency primarily stems from personal interaction and experience with technology (Jarrahi & Thomson, 2017).

To accommodate the complex role of the generational gap, this paper advances a multidimensional view on the organizational uses of social media. As illustrated in Figure 1, digital natives and digital immigrants are only two RSGs among many others, and in the context of social media, users of technologies assume multiple roles and identities. Hence the generational gap needs to be understood in relation to other individual and work-related roles played by knowledge workers.

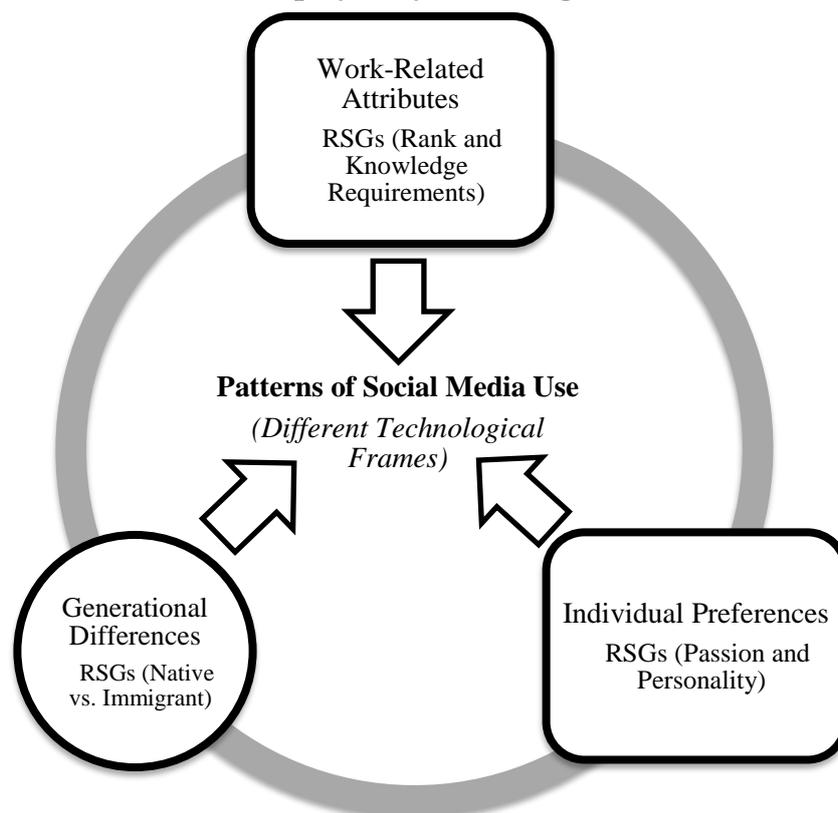


Figure 1 Multidimensional View on Social Media Use (Role of the Generational Gap)

While the generational gap can be a relatively important factor in defining the use of social media by knowledge workers, the performance of this age-oriented element is considerably subject to broader work-related dynamics (e.g. organizational rank) and individual factors (e.g. passion for adopting new technology). The emergent social

media use practices are a product of a complex web of technological frames shaped by various work-related, personal and technological elements. When workers, as members of various RSGs, develop and stabilize technological frames around social media, particular patterns of social media use are negotiated and instantiated in practice.

7. Conclusion

This study examined how the age factor is brought to bear and how this influence can coincide with that of other factors rooted in organizational roles and personality traits. Myers and Sadaghiani (2010) assert that although past research has studied some characteristics of digital natives, such as work ethic and work hours, it has ignored the roles of digital natives in their organizations as a primary explanatory variable.

Drawing on the concept of technological frames, we revealed several distinct social groups that demonstrate different attitudes to and uses of these ICTs for knowledge sharing. Therefore, this paper contributes to the developing research on digital natives' interaction with digital technologies in organizations (Khoir & Davison, 2014; Mäntymäki & Riemer, 2014). Our findings argue that workers bring their individual identities and preferences into work and technology use for work, and new use practices emerge at the intersection of individual and work-related realms.

7.1. Practical Implications

As a key practical implication, organizational leaders can use the findings of this study to better understand some of the underlying reasons for different conceptions and technological behaviors of different groups of knowledge workers with the goal of providing both more training and support. Therefore, an oversimplified emphasis on generational differences may generate blindspots in identifying and understanding important factors behind the low adoption of enterprise social technologies, evidenced by recent surveys (Huy, 2016).

By recognizing individual differences, organizations have the potential to create a hospitable environment for a diverse workforce. This environment is created based on an appreciation of the unique characteristics of different groups of employees, and acts as a “supporting infrastructure” when organizations aim to take advantage of new technologies (Kling & Lamb, 1999).

7.2. Limitations and Future Research

While this study attempts to examine the role of the generational gap in the context of a complex set of work-related and individual mediators, future studies are needed to better engage with the role of other technologies as well as the particular materiality of social media in shaping other use practices. Furthermore, this work adopted a snapshot approach, so to enhance the proposed multidimensional view, future studies may examine the role of extended settings and timeframes that mediate technological action beyond its immediate context and over time. For example, the digital immigrants' preference for face-to-face interactions may evolve given the rising ubiquity of remote working norms. Therefore, a processual approach can focus on changes in the perspective of different RSGs over time.

Moreover, from a methodological point of view, we speculate that the identified RSGs of knowledge workers are not idiosyncratic to consulting firms, so these

emergent patterns require further elaboration and testing in other contexts. Further research, especially quantitative examinations, can corroborate these patterns among larger groups of knowledge workers. This would enable to raise the external validity of our empirical observations.

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