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Modern information technology in an old workforce: Toward a strategic research agenda

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ABSTRACT

As the workforce ages rapidly in industrialized countries, a phenomenon known as the graying of the workforce, new challenges arise for firms as they have to juggle this dramatic demographical change (Trend 1) in conjunction with the proliferation of increasingly modern information and communication technologies (ICTs) (Trend 2). Although these two important workplace trends are pervasive, their interdependencies have remained largely unexplored. While Information Systems (IS) research has established the pertinence of age to IS phenomena from an empirical perspective, it has tended to model the concept merely as a control variable with limited understanding of its conceptual nature. In fact, even the few IS studies that used the concept of age as a substantive variable have mostly relied on stereotypical accounts alone to justify their age-related hypotheses. Further, most of these studies have examined the role of age in the same phenomenon (i.e., initial adoption of ICTs), implying a marked lack of diversity with respect to the phenomena under investigation. Overall, IS research has yielded only limited insight into the role of age in phenomena involving ICTs. In this essay, we argue for the importance of studying age-related impacts more carefully and across various IS phenomena, and we enable such research by providing a research agenda that IS scholars can use. In doing so, we hope that future research will further both our empirical and conceptual understanding of the managerial challenges arising from the interplay of a graying workforce and rapidly evolving ICTs.

Introduction

Benita Oldfellow, who just turned 68, has to use information and communication technologies (ICTs) in support of her work as an accountant. She has a positive attitude toward the technology and believes it may be useful to her job, but she faces great trouble in using it effectively – in contrast to her grandson Frank who grew up with ICTs. Benita regularly asks Frank for help, and he gladly explains to her how to use such software as Microsoft Excel and how to exactly navigate the menu of her smartphone. In the process, he often notices that these technologies are clearly not designed with older people like his grandma in mind; it seems as if two different worlds were clashing. While these technologies do provide a few accessibility options for such older people as Benita, these options are often hidden in long and ambiguous click paths. As a result, Benita's interactions with contemporary ICTs are largely ineffective and discomforting; not surprisingly, she considers quitting her job as an accountant.

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This vignette illustrates the interdependencies in two workplace trends that are emerging across the world: the "graying" of the workforce and the persistent evolution of ICTs in organizations (Ginn and Arber, 1996; OECD, 2010a, 2011, 2013a, 2013b; Panek, 1997, p. 363). According to the Organisation for Economic Co-operation and Development (OECD), all of its current thirty-four member countries are experiencing rapid population and workforce aging (OECD, 2007, 2011, 2013a, 2013b).[1] More specifically, the number of older workers (i.e., 65 and over) has increased from 15,906,000 in the year 2000 to 24,548,000 in 2012 across the OECD countries, an increase of more than 50% (OECD, 2010b). This OECD trend index is consistent with the trend across the G7 countries[2], where the number of older people in the workforce has increased from 10,720,000 in the year 2000 to 16,868,000 in 2012, also an increase of more than 50% (OECD, 2010b).

Importantly, the trend toward an older workforce is not merely a phenomenon of the present but also one of the future; the participation of older people in the workforce is expected to *increase sharply over the next several decades* across the OECD member countries (OECD, 1998, 2011). The main reasons for this trend are pension policy changes (e.g., the reduction of existing incentives for early retirement), legislation against age discrimination, improvements in older peoples' health, public information campaigns, and greater financial incentives to extend the work life and to work at an older age (OECD, 1998, 2011, 2013a). Another important reason relates to the changing landscape of job demands; people can work longer today due to the shift from physically demanding work in mining, construction, and manufacturing to the less physically demanding computer-based work (OECD, 2013a). To maintain the size of the workforce in OECD countries, the OECD predicts that employment rates for the traditional retirement population have to increase from about 20% today to 40% in 2050 (OECD, 2011).

To provide a concrete and detailed example for the graying of the workforce from a particularly large OECD country, the number of older people (i.e., 65 and over) in the workforce of the United States has increased by more than 100 percent over the last thirty years (U.S. Bureau of Labor Statistics, 2008). The group of employees aged 75 and over (the older-old) has seen the most dramatic gain; it has risen by almost 175%. At the same time, total employment has seen a much smaller increase of only 59 percent. Thus, the population historically associated with retirement constitutes the fastest growing part of the U.S. workforce. This trend has arisen from legislation that prohibits age discrimination as well as mandatory retirement (enacted by Congress in 1986) and from economic factors that motivate employees to stay in the workforce longer (Panek, 1997; U.S. Bureau of Labor Statistics, 2008), and it is "definitely" here to stay (U.S. Bureau of Labor Statistics, 2008, p. 9). While the number of young workers (ages 16–24) is projected to decline between 2006 and 2016 and the number of middle-aged workers (ages 25–54) is expected to rise insignificantly by only 2%, the number of workers aged 55–64 are expected to climb by almost 40%. Still, the most dramatic growth is expected for the traditional retirement population; the number of workers older than 65 is projected to rise by more than 80 percent. Thus, the graying of the workforce "*is only just beginning*" (U.S. Bureau of Labor Statistics, 2008, p. 9), and organizations are left with a rapidly aging workforce.

In sharp contrast to the graying of the workforce, the technologies used to fulfill the primary tasks and responsibilities associated with most work roles are rapidly becoming ever more modern (Benbasat and Zmud, 1999; OECD, 2010a, 2010b). ICTs have evolved from "dumb" terminals over desktop PCs and more recent personal digital assistants to current smartphones and high quality Voice-over-IP applications (Somogyi and Galliers, 1987). This rapid evolution of ICTs implies a dramatic, continuous increase in technological complexity (Galliers et al., 2012; Ziefle and Bay, 2005) along with a shift of the paradigm according to which technology operates (e.g., the move from mainframe networks over the client–server model to service-oriented architectures, Somogyi and Galliers, 1987).

Since older individuals received their technological educations in former times when technology was far less complex than such current ICTs as smart-phones and when technology operated according to such out-of-date paradigms as mainframe networks, some older peoples' mental models of how technology works may not suffice to support adequate interactions with modern ICTs[3] (Ziefle and Bay, 2005). This notion is strengthened by the fact that – across OECD countries – older workers are less likely than their younger counterparts to participate in training initiatives to keep their technology-related knowledge up to date (because their pay-back period is shorter) (OECD, 2011). The dated mental models that result may often interfere with effective interactions between older people and modern technology. Older workers' difficulties in dealing with the complexity and paradigms of contemporary technologies might be amplified dramatically by cognitive aging (i.e., age-related changes in the allocation of cognitive resources) as well as by changes in personality, sensorimotor abilities, and culture (Leidner and Kayworth, 2006; McCrae et al., 2005; McElroy et al., 2007; Pak and McLaughlin, 2010; Pak et al., 2009; Rogers and Fisk, 2001; Walsh et al., 2010).

Yet, despite these problems, ICTs are still designed with little systematic regard for older users (Fisk et al., 2009). This lack of regard for older users may stem from the large age gap between older users and systems designers, who tend to be younger individuals (Hawthorn, 2007). Research suggests that systems designers are often unaware of this age gap (Newell et al., 2006) and design ICTs that generally neither account for older peoples' dated mental models of how

[1] Current OECD membership (February, 2014): Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israël, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, and Switzerland (http://www.oecd.org/about/membersandpartners/).

[2] G7 membership: the U.S., Japan, France, Germany, Italy, U.K., and Canada.

[3] With the dynamic nature of technological change that shows no sign of abating (Benbasat and Zmud, 1999), we suspect that the education gap with respect to technology between younger and older workers will be just as acute in the future as it is today. More specifically, since the nature of technology is continuously evolving and changing at a rapid rate (Benbasat and Zmud, 1999), older peoples' mental models of how technology works will continuously be grounded in the past and, therefore, dated and potentially incongruent with later technological developments.