

COMMENTARY

To understand ICT use, instead of defragmentation, we need to build requisite complexity

Michael Knoll* and Hannes Zacher

Institute of Psychology–Wilhelm Wundt, Leipzig University

*Corresponding author. Email: michael.knoll@uni-leipzig.de

We agree with Hu et al. (2021) that research on informational and communication technology (ICT) use in the workplace is important and that a better alignment with practice is needed. However, we question whether smoother operation due to “defragmentation” of existing knowledge is the best way for researchers in this domain to deal with the dynamics, uncertainty, and ambiguity that characterize the ICT-based transformation of work (Hanelt et al., 2020). We suggest that building requisite complexity (Uhl-Bien et al., 2007) will provide the heterogeneous community of ICT researchers with the ability to constantly adapt to the challenges of ICT use and to remain receptive to the potentials that emerge from the diverse and situated approaches that practitioners and researchers use to address these challenges. In this commentary, drawing upon complexity leadership theory (Uhl-Bien et al., 2007), we outline what we think is needed to build requisite complexity.

The need for requisite complexity in ICT research and practice

The ICT-based transformation of work represents a complex adaptive system (Hanelt et al., 2020), because many heterogeneous actors (e.g., manufacturers, designers, managers, users, researchers) interact at high speed and produce local solutions (e.g., telework arrangements, electronic surveillance systems) that constantly evolve after adaptation and may or may not be transferrable to other locations. According to the idea of requisite complexity (Uhl-Bien et al., 2007), a system “must possess complexity equal to that of its environment in order to function effectively” (p. 301). If we accept that the ICT-based transformation of work is a complex environment, our system of interest (i.e., a community that tries to understand the relevance of ICT for work and organizational behavior) should not simplify and rationalize its structures and processes (i.e., “defragmentation”) but build requisite complexity. Requisite complexity enhances this system’s capacity to adapt, that is, to search for solutions to challenges, to innovate, and to learn, because it releases and uses the capacity of the manifold agents who participate in the knowledge-production process.

Three functions to achieve requisite complexity

Complexity leadership theory suggests that three functions need to be fulfilled for a system to achieve requisite complexity—an administrative, an entrepreneurial, and an adaptive function.

Administrative function

Hu et al.'s (2021) call for defragmentation represents a call for an orderly regime (e.g., by overcoming construct proliferation) that is supposed to facilitate collaboration (among researchers and between researchers and practitioners) and allows the ICT research community to run its operations (e.g., designing and implementing studies, giving practitioner advice) at higher pace. According to complexity leadership theory, integrating existing knowledge and aligning members of a system (e.g., researchers investigating ICT) is important, as it allows to exploit what has been achieved (March, 1991).

Although organizing existing knowledge is important, as Hu et al. (2021) emphasize, the administrative function also includes identifying knowledge that is less useful or may even hamper further progress. This is particularly important in the ICT domain. For example, early ICT research (e.g., on computer-mediated communication) compared digitalized work with nondigitalized work. As there is now almost no work without digital components (Cascio & Montealegre, 2016) and all teams use some kind of computer-mediated communication, such dichotomies are less helpful (Landers & Marin, 2021). Besides, research that examined ICT use in the past may not be helpful because the reasons for negative effects (e.g., lower media richness) can be overcome due to permanent technological advancements (Raghuram et al., 2019). Finally, little might be gained from findings that are based on studies that did not provide contextual information (e.g., which kind of telework was practiced in the organizations that were studied; Landers & Marin, 2021). Given that organizations adapt technology in specific ways, generalized suggestions such as “telework is positively or negatively related to work–life balance” are not only of limited help; they may even bias interpretation, judgment, and practical advice.

By imposing order and control, a review that focuses on the administrative function reduces complexity, pulls the field toward stability, and, thus, reduces the ICT research community's capability to adapt to the complex environment that ICT use creates. That is why the ICT research community needs to secure fulfillment of the entrepreneurial function.

Entrepreneurial function

Similar to organizations, the scientific community is pulled toward stability. Researchers exploit existing knowledge, for example, when they are asked to write books that can be used in education or to give practical advice based on reliable knowledge. To be able to adapt to challenges from complex environments, just like organizations, the ICT research community also needs to find ways to complement exploitation with exploration (March, 1991). This is achieved by providing room for the emergence of knowledge that stems from individuals' and organizations' search and experimentation. An exemplary approach to facilitating such emergence in the scientific community is represented in online journals such as *Frontiers* that, facilitated by digitalization, enable and accelerate experimentation and exchange of innovative findings by allowing even early career researchers to set up platforms and special issue sections. ICT research also gains a lot of innovation and variety from practice. New issues and reassessment of established knowledge emerge from observing local and idiosyncratic applications, for example, when teams do not use technology in the way it was created but adapt it to support their purposes.

Reviews can contribute to the entrepreneurial function if they strive to highlight “what should be” instead of merely summarizing “what has been done.” Hu et al.'s (2021) review provides some research questions that might inspire studies, but these questions may be absorbed by the administrative tendencies toward stability. A systematic problematization of the field may be more resistant. Raghuram et al. (2019), for example, use co-citation analysis to examine the degree of segmentation of research on virtual teams and, based on this analysis, identify research clusters and structural holes. Their suggestions for building bridges and cross-fertilization allow

developments in one domain lead to experimentation and creative solutions in other domains—a mechanism that is typical for the digital transformation (Hanelt et al., 2020).

Adaptive function

A third function is needed to manage tensions between exploitation and exploration and to integrate the entrepreneurial function with the administrative function. A carefully edited special issue can fulfil this function if it shows how new empirical or conceptual articles help the field adapt to new challenges. Lanzolla et al. (2020), for example, elaborate on the nature of new “born-digital” phenomena and emphasize the role of idiosyncratic affordances in the emergence of specific advancements, including new work arrangements and business models. Review articles can contribute to the adaptive function by offering theoretical frameworks or models that integrate existing but scattered knowledge but also offering interfaces where new developments might connect and provide guidance when the framework itself needs adjustment. There are two existing frameworks on ICT use that are particularly useful in this respect.

First, the sociomaterial approach to technology adaptation (Orlikowski & Scott, 2008) allows us to consider contingencies in ICT use and effects and offers a way for integrating idiosyncratic, local arrangements that are typical for ICT use and experience. According to the sociomaterial approach (see also Landers & Marin, 2021), the practice of separately considering technical, psychological, social, and organizational elements must result in inconsistent research findings and resistance from practitioners due to questionable applicability. A better way to address the complexity of ICT application is to acknowledge that these elements are entangled. For example, teams that consist of members with heterogeneous skills and motives experiment with social media and change their features or use; subsequently, this may change social, organizational, and psychological processes based on social media’s affordances (Leonardi & Vaast, 2017).

The second framework, introduced by Parker and Grote (2020), combines two meta-theories—multilevel theory and work design theory—to model the interplay of ICT use, work arrangements, and employee well-being and health. Drawing on a multilevel approach allows us to consider the many potential influences on ICT use, ranging from the intra-individual level to technological advancements and legal regulation at the macro level. It also allows us to connect to a wealth of knowledge because many other areas in the organizational behavior and industrial-organizational psychology literature use level approaches. A multilevel approach can inspire strategies for both research and practical interventions, because the level heuristic helps practitioners to organize their observations and tailor interventions. Drawing on work design theory, in turn, provides the tools to use “work as action” as a nexus to examine the joint and dynamic optimization of employee characteristics, ICT, and context conditions. This nexus, in turn, provides a useful basis for intervention attempts (Parker & Grote, 2020).

Conclusion

If the objective is to conduct rigorous and practically useful research on the use and effects of ICT, the ICT research community needs to be able to adapt to the constantly changing context of work and the emerging knowledge that comes from the many actors participating in the knowledge-production process. These actors include researchers from various disciplines and experimenting practitioners. The administrative function fulfilled by “defragmentation” contributes to this purpose, but to achieve requisite complexity, the ICT research community needs to complement it with techniques that also fulfil the entrepreneurial and adaptive functions.

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