The impact of digital technology on the generation and implementation of creative ideas in the workplace

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ABSTRACT

This article discusses a variety of ways that digital technology can enhance innovation by facilitating the conditions necessary for the development of employees' creative ideas and the implementation of these ideas in organizations. We begin by arguing that three conditions are necessary if employees are to generate creative ideas: access and exposure to new and diverse information, full engagement in the work role, and the experience of socioemotional or instrumental support. We posit that the implementation of employees' creative ideas requires the mobilization of support and sponsorship of the ideas from credible allies. We then discuss the possibility that digital technology shapes the creativity of ideas generated by employees and the implementation of these ideas by influencing each of these conditions. We conclude with a discussion of some possible risks of digital technology use and some suggestions for several new directions for future research.

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1. Introduction

Commentators have long argued that innovation is a source of competitive advantage and is essential if organizations are to prosper and grow (Damanpour & Schneider, 2006; Tellis, Prabhu, & Chandy, 2009). Innovation is generally characterized as a process that consists of two broad stages: idea generation and idea implementation (Clegg, Unsworth, Epitropaki, & Parker, 2002; West, 2002). The first stage involves employees producing creative ideas about improving organizational products, policies, or procedures. The second stage, implementation, refers to the extent to which the organization actually adopts the creative ideas generated by these employees (Amabile, 1988; Bunce & West, 1995). Only implemented ideas add value to the organization and have the potential to contribute to its growth and effectiveness (Levitt, 2002; Robinson & Schroeder, 2004).

In this article we discuss a variety of ways that digital technology can enhance innovation by facilitating the conditions necessary for the development of employees' creative ideas and the implementation of these ideas in organizations.[2] Since little

research has directly tested the connections between digital technology and idea generation and implementation, we base many of our arguments on research in the areas of organizational behavior and psychology that has examined the social and organizational factors that stimulate the production of creative ideas and increase the chances of their adoption.

In the paragraphs below, we first discuss creativity and three conditions that are necessary if employees are to generate creative ideas in the workplace. We then discuss the implementation of employees' creative ideas and suggest that the mobilization of support and sponsorship of the ideas from credible allies is necessary if the ideas are to be adopted by the organization. Next, we discuss the possibility that computing technologies and devices might shape the creativity of ideas generated by employees and the implementation of these ideas by influencing each of the conditions described above. Some possible risks and unintended consequences of digital technology use are discussed next, followed by a discussion of several new directions for future research.

2. Background

Most contemporary theorists define creativity as ideas about products, practices, services, or procedures that are (a) novel or original and (b) potentially useful to the organization (Amabile, 1996; Shalley, Zhou, & Oldham, 2004). Ideas are considered *novel* if they are unique relative to other ideas currently available in the organization. Ideas are considered *useful* if they have the potential for direct or indirect value to the organization, in either the short- or

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  [2] This article focuses on the generation and implementation of employees' ideas— not on the ideas of competitors, suppliers, customers, or clients. However, we acknowledge that the creative ideas of individuals not employed by the organization also might make a substantial contribution to innovation (Bayus, 2013; Boudreau & Lakhani, 2013).

long-term. Given this definition, creative ideas can range from suggestions for small, incremental refinements in procedures or processes to radical, major breakthroughs in the development of new products or policies (Mumford & Gustafson, 1988). Finally, our definition assumes that creative ideas may be generated by employees in any job and at any level of the organization (Madjar, Oldham, & Pratt, 2002; Robinson & Schroeder, 2004).

A variety of measures have been used in previous studies to assess the creativity of employees' ideas. These include the number of patent disclosures or technical reports written by employees (Tierney, Farmer, & Graen, 1999), the number of ideas submitted to suggestion programs (Frese, Teng, & Wijnen, 1999; Oldham & Cummings, 1996), ratings by external observers, supervisors, or peers of employees' overall creativity (Tierney et al., 1999; Zhou, 1998) or of the creativity of their specific ideas (Baer, Leenders, Oldham, & Vadera, 2010; Binnewies, Ohly, & Niessen, 2008), bonuses awarded to employees on the basis of their evaluated creativity (Carrier, 1998; Liao, Liu, & Loi, 2010), and employee self-reported creativity (Bledow, Rosing, & Frese, 2013; Shalley, Gilson, & Blum, 2009).

As noted above, based on earlier research and theory, we propose that three general conditions are critical if employees are to generate creative ideas: access and exposure to new and diverse information (i.e., ideas, perspectives, and approaches), full engagement in the job and work role, and the experience of socioemotional or instrumental support. We are not suggesting that these are the only conditions that contribute to employee creativity at work—research suggests that there may be several others, including employee domain- and creativity-relevant skills (see Amabile (1996)). However, we focus on these three conditions since early research and theory suggest that they contribute to the development of creative ideas (Amabile, 1996; Madjar, 2008; Perry-Smith, 2006; Shin & Zhou, 2003) and because we can make persuasive arguments that digital technology can influence each of them.

With regard to the first condition, we propose that an employee's access and exposure to new and diverse information (i.e., ideas and perspectives different from each other and from the information held by the focal employee) contributes to the creativity of his or her ideas by energizing the combinatory processes that underlie the production of these ideas (Baer, 2010; Brass, 1995; Mumford & Gustafson, 1988; Perry-Smith & Shalley, 2003). Access to such new and diverse pockets of information has the potential to contribute to creativity by providing the employee with ideas that have not yet been applied in that employee's job or workplace and by providing him or her with different perspectives and approaches that might be combined and integrated to produce fresh ideas that contribute to the organization. It is possible that this new and unique information is accessible to employees via other individuals either inside or outside the boundaries of the organization, via knowledge repositories, or via organizational memory (i.e., "a repository for collective insights contained within policies, procedures, routines, and rules that can be retrieved when needed"; Day, 1994, p. 44). Regardless of the source, we expect that the more unique and diverse information is accessible to employees, the greater the number of potential creative combinations that can be derived from this information, and the greater the likelihood that creative ideas will emerge (Baer, 2010; Mumford & Gustafson, 1988).

Previous research provides results that are generally consistent with this position. For example, Anderson (2008) showed that managers with large networks of others were able to gather substantial amounts of task-relevant and diverse information. And McFadyen and Cannella (2004) demonstrated that biomedical researchers with large networks of contacts produced more impactful, innovative publications.

Our second condition, engagement, suggests that creativity is enhanced when individuals are fully engaged at work. When engaged, employees should be attentive, emotionally connected and totally focused on their full work role performance (Kahn, 1990; Rich, LePine, & Crawford, 2010). By contrast, those who are disengaged are best characterized as passive and as relatively detached from their work roles. We expect employee engagement at work to have substantial effects on the extent to which they generate ideas that are truly novel and creative. Rich et al. (2010) suggest that those who are engaged are likely to step outside the bounds of their formally defined jobs and engage in acts that might benefit the work unit or organization (e.g., generating ideas for improving the organization's product and service offerings). Moreover, previous research suggests that individuals who are fully engaged in their work are not only more curious but also more willing to take risks, such as engaging in exploratory behaviors and experimentation—all of which should facilitate the creativity of ideas (Baer & Oldham, 2006; Zhou & Shalley, 2003).

Finally, our third condition for idea generation, support, suggests that employees will produce more creative ideas when they receive support from others for the production of these ideas. The support provided to employees may be either socioemotional or instrumental (i.e., providing resources or removing obstacles) in nature and may be offered by others both inside (e.g., supervisors, coworkers, and subordinates) and outside (e.g., customers, clients, family, and friends) the boundaries of the organization. When employees experience such support, they are more likely to persist in the development and refinement of ideas by considering and screening available information and perspectives before deciding how to combine and integrate this information to form truly novel ideas (Nijstad, De Dreu, Rietzschel, & Baas, 2010). Moreover, those who experience support from others should feel comfortable taking risks at work such as engaging in experimentation, which also should facilitate creative idea generation (Zhou & Shalley, 2003). Consistent with these arguments, previous research has shown positive relationships between the creativity of employees' ideas and the extent to which they receive socioemotional and instrumental support from other individuals inside and outside the organization (Hammond, Neff, Farr, Schwall, & Zhao, 2011; Madjar, 2008).

With regard to the implementation of employees' ideas, conditions different than those described above are likely to play a significant role. The implementation of creative ideas entails risk, can disrupt the status quo in an organization, and can threaten stakeholders' positions and authority—particularly when the proposed ideas are radical or breakthrough in nature (Da Silva & Oldham, 2012; Sheaffer, Honig, Zionit, & Yeheskel, 2011). As a result, when key managers and stakeholders in an organization consider the implementation of creative ideas developed by employees, these ideas are often met with skepticism, opposition and resistance (Damanpour, 1988; Janssen, 2003; Wolfe, Wright, & Smart, 2006). Therefore, if these ideas are to be accepted and subsequently implemented, it may be necessary for the employees to neutralize this resistance by promoting the benefits of their creative ideas, by challenging those who oppose the ideas, and by building support for the ideas among others in the workplace.

We propose that employees are most likely to engage in such activities when credible allies offer their support and sponsorship of the employee's ideas. When employees experience support, they are likely to feel comfortable challenging those who have expressed opposition to the ideas and attempt to push their ideas through to realization. In addition, sponsors might boost idea implementation by endorsing and validating the employee's ideas and by encouraging key stakeholders to consider their adoption (Baer, 2012; Da Silva & Oldham, 2012). We expect that support and sponsorship for the adoption of employee ideas is most likely