Ricardo Sosa, Monash Art, Design, and Architecture, Monash University, Australia;
Faculty of Design and Creative Technologies, Auckland University of Technology,
New Zealand

Andy Connor, Faculty of Design and Creative Technologies, Auckland University of
Technology, New Zealand

Innovation Teams and Organizational Creativity: Reasoning with Computational Simulations

Abstract A computational social simulation encourages systematic reasoning about the management of innovation teams and organizational creativity. This article draws upon historical literature to identify a potential dilemma faced by business organizations: Is it better to promote creative behavior across a whole organization or focus on the development of small and highly creative teams? We formulate the dilemma from the literature on organizational creativity, and explore it using a multi-agent simulation. Our study models creative behavior abstractly, as the ability to introduce novelty. By varying the scale and scope of non-conformist behavior in the simulation, our research supports the systematic study of the *breadth vs. depth* dilemma. The results of this study invite an informed examination of strategies to sustain innovation based on the introduction of either a small number of significantly novel ideas, or a large number of novel but more familiar ideas. Results from this study on change agency also indicate that there is a possible trade-off between a highly creative team and its creative efficiency, drawing attention to the importance of a creative critical mass in an organization. We also discuss the implications of these results and our research approach.

1 Frederic D. Randall, "Stimulate Your Executives to Think Creatively," *Harvard Business Review* 33, no. 4 (1955): 128.

2 Andrew Hargadon, "Creativity That Works," in *Handbook of Organizational Creativity*, ed. Jing Zhou and Christina E. Shalley (London: Psychology Press, 2007), 340.

3 Michael D. Mumford, ed., *Handbook of Organizational Creativity* (London: Academic Press, 2012), 708.

4 Jing Zhou and Christina E. Shalley, eds., *Handbook of Organizational Creativity* (London: Psychology Press, 2007), 352.

5 Christina E. Shalley and Lucy L. Gilson, "What Leaders Need to Know: A Review of Social and Contextual Factors that Can Foster or Hinder Creativity," *The Leadership Quarterly* 15, no. 1 (2004): 39, DOI: https://doi.org/10.1016/j.leaqua.2003.12.004.

6 Ruth Richards, ed., *Everyday Creativity and New Views of Human Nature: Psychological, Social, and Spiritual Perspectives* (Washington, DC: American Psychological Association, 2007), 25.

7 Karan Girotra, Christian Terwiesch, and Karl T. Ulrich, "Idea Generation and the Quality of the Best Idea," *Management Science* 56, no. 4 (2010): 593, DOI: https://doi.org/10.1287/mnsc.1090.1144.

8 Randall, "Stimulate Your Executives to Think Creatively," 128.

9 Nigel Gilbert, *Agent-Based Models*, No. 153 (Los Angeles: Sage, 2008), 2.

Introduction

Scholars have noted the strategic role that creativity plays in business for more than six decades. As early as the 1950s, specialized articles recommended that business leaders "work hard at the task of maintaining a stimulating atmosphere for creative thinking."[1] Today, evidence-based recommendations to foster creative organizational climates include the recognition that "the challenge to creativity is understanding when and where to be creative, and the set of practices that support practical creativity entail strategically allocating your creative efforts."[2] Organizational creativity is highly complex because "creativity is complex, leading creative efforts is complex, and planning for creativity is also complex. Thus we are left with an array of interrelated factors affecting creative efforts which are complicated to articulate, and even more complicated to implement successfully."[3] A fundamental question related to this complexity is the tension between cultivating creativity widely across the organization or focusing on augmenting the creativity of a few specialists.[4] As with other dichotomies in the management of competing demands of creative and routine work, a critical leadership function is to ensure that support and resources are available for creative work, whilst "an overabundance may stifle their creativity."[5]

Businesses need leadership strategies to better support the kind of idea generation that leads to radical or disruptive change or innovation. On the one hand, creative capacities are universal and essential for "our health and well-being, offering richness and alternatives in what we do, and helping us move further in our creative and personal development."[6] In that sense, organizations could seek to promote the creative capacities of all their employees. However, considering the intricacies involved in evaluating new ideas, and the journey between idea and implementation, a substantial growth in new individual initiatives may lead to unfeasible and uncertain results at the organizational level. In the context of innovation, "an organization would prefer ninety-nine bad ideas and one outstanding idea to one hundred merely good ideas."[7] Some have characterized the question between exploitation and exploration as the *dilemma of management*: "great profits may result from increased efficiency, and equally great profits may result from creativity and inventiveness. Yet the means by which the two are stimulated are not necessarily compatible."[8]

In order to jump-start disruptive change, there are two possible types of strategies for organizational creativity: allocate resources to support new initiatives across the entire organization (*breadth-first*), or sacrifice scope and concentrate on specialized units of change agency (*depth-first*). Leaders face such breadth-first vs. depth-first dilemmas when it comes to facilitating change initiatives in their organizations. These strategies may lead to different types of outcomes. However, we do not sufficiently understand the effects of implementing the strategies and hence there is no clear guidance on how to resolve the breadth vs. depth dilemma.

In this article, we present a computational social simulation as a method for systematic inquiry into change agency principles in business organizations. We use agent-based simulation as a lens through which to consider key ideas related to organizational creativity. This approach enables us to define and implement models representing the characteristics and behavior of individual agents, and analyze multiple scales of interaction, including the emergence of macro or societal structures from aggregate, decentralized, individual action.[9]

In the second section of the article, we review the literature on organizational creativity, focusing on the breadth-depth dilemma as explained above, and previous studies of social creativity using computational social simulations. In section three, we describe a simulation model built to examine the effects of disruptive individuals in a societal group. Section four contains a summary of the results from