

Preface

Creativity is an exciting area for both researchers and practitioners. The recent financial crisis highlighted the importance of creativity in the sense that no matter how companies tried to improve their performance, the crisis could not be avoided with conventional strategic measures. Creativity has been called a fifth management resource, following human resources, hardware resources, monetary resources, and knowledge resources. Creative products and services can turn the tide in a target market quite suddenly, transforming an underdog company into one of the most admired companies in the world. Creative strategies can impel previously hesitant consumers to open their wallets to purchase products and services in a frenzied fashion. The iPhone, produced and distributed by Apple, is a very good example of this phenomenon. Google is another example. Customers always feel a bit of nostalgia and admiration whenever they use Google services. Most of us are already addicted to using Google products and services. This phenomenon is just the tip of the iceberg in terms of what creativity can bring to companies.

The concept of creativity spans a multitude of domains, from art to science to literature to business and beyond. Even within any one context, researchers have long recognized that creativity can refer to a person, a process, a product, or an environmental response. By one count, well over 50 definitions for creativity were found, and the list continues to grow. It is easy to understand, given the wide scope of creativity, why organizations often have a difficult time capturing exactly what they mean when they strive for creative outcomes—or knowing when they have achieved them. Current definitions of cognitive creativity (e.g., scientific or organizational) typically describe the construct as involving “the generation of novel behavior that meets a standard of quality or utility.” Traditionally, this is accomplished by research and development scientists through qualitative means such as fluency, flexibility, and originality. Quantitatively, it is measured by item counts in brainstorming lists, numbers of patent applications, and citation counts.

As digital innovation has permeated our daily lives and become part of our environment, creativity has started to take a new shape compared to its past form—digital creativity. The Internet has changed everything we know. Web technologies and the related dazzling advancements have drastically altered our living patterns,

affecting the way we shop, how we receive health care, our choice of entertainment, the methods we use to vote, the officiating and broadcasting of sports, educational delivery techniques, and more. Without exception, all the realms of our lives are now influenced by a wide variety of digital technologies such as the Internet.

Similarly, one would expect that studies about creativity would also have been influenced by the Internet. Surprisingly, however, sufficient attention has not been paid to how the Internet and related digital technologies have changed all the aspects of creativity—the source of creativity, the process of revealing creativity, team creativity, and organizational creativity. A typical example of how digital technology influences creativity is social networking, where individuals connected to others online can access a more plentiful supply of relevant information than ever, enabling them to focus on target issues and themes more effectively. Even companies have become more creative in locating potentially loyal customers by using digital technologies that provide excellent data mining mechanisms, enabling companies to search for target customers with high effectiveness and efficiency.

Summarizing all the arguments so far, now is the time for us to consider the potential influence of digital technologies on creativity. Now, with Internet usage so prevalent, many types of technology jumping out of the lab and becoming ubiquitous, and all kinds of digital devices available on the market and at home, it is the perfect time to discuss digital creativity, which is defined as all forms of creativity driven by digital technologies. In this book, we will discuss the vast influence that digital technologies have on creativity from the individual level to the team level and all the way to the organizational level. This book proposes a new kind of creativity model encompassing all levels of creativity—individual, team, and organizational. These three levels of creativity should, ideally, be combined into a unified creativity framework in which organizations, regardless of their industry, benefit by re-engineering their business processes and strategies. Toward that end, this book considers various factors that affect creativity, including individuals' digital efficacy, heterogeneity among team members (i.e., demographics such as age, gender, race, tenure, education, and culture), computer-mediated communication (CMC), task complexity, exploitation, exploration, culture, organizational learning capability, and knowledge networks among members.

The influence of digital creativity is reshaping the way individuals, teams, and modern organizations operate. Although creativity has been studied for many years by organizational researchers, as digital technologies such as the Internet become established as the standard tools for communications, work, and entertainment delivery, the conventional definition of creativity needs to be redefined and reinterpreted from the perspective of digital technology. When information is digitized into a stream of bits, it is easily distributed through computer networks, becoming accessible through the Internet to any person who needs it, thus increasing its value tremendously.

By using a wide variety of digital technologies, individuals can stimulate their own untapped creativity. Individuals who were previously isolated from the creative influences of cultural and educational opportunities by distance or circumstance can now nourish themselves with the rich supply of information available

from the borderless and seemingly limitless digital world powered by the Internet. Teams that had to work on their own before the digital age, communicating with outside teams in only a very limited way, can now work in a truly networked fashion, connecting to other teams, persons and organizations through digital networks. Organizations that were previously confined to searching for valuable resources through outside agencies that were often notorious for their poor quality of service are now free to use digital technologies to pursue any purpose they want. In a word, now is the time for individuals, teams, and organizations to harness the power of digital creativity, and they can do so if only they have the will.

This book introduces a theoretical and systematic glimpse into the exciting realm of digital creativity. To help keep readers interested and motivated all the way to the end of the book, I have organized the contents by focusing initially on individuals and then progressing to teams and ultimately to organizations, highlighting specific techniques and cases along the way. Each chapter will show you how individuals, teams and organizations can become creative through digital technologies. Individual creativity is discussed through Chaps. 1–6. Creativity in teams and organizations is investigated in Chaps. 7 and 8. At the end of book, I introduce two chapters (Chaps. 9 and 10) showing the possible directions of future studies regarding creativity. Chapter summaries are as follows.

Chapter Summaries

Chapter 1 discusses the effects of team member exchange (TMX) and coworker helping and support (CHS) on individual creativity. Job stress was considered to be a negative antecedent of creativity, and researchers hypothesized that TMX and CHS would decrease job stress within Korean Information and Communication Technology (ICT) companies. It was found that although CHS does not have a sufficient effect on individual creativity, it is positively related to individual creativity. TMX, on the other hand, was found to directly and strongly influence individual creativity, and job stress was found to negatively influence individual creativity.

Chapter 2 is concerned with investigating the relationship between stress and performance. A computer game was used as a way of sharing common features with computer-mediated tasks under manipulated job-related stress conditions. Respondents were divided into two groups: the stress-manipulated group and the non-stress group. During the experiments, each group was measured using galvanic skin response (GSR) technology and by electrocardiogram (ECG) to ascertain the level of stress. The experiment results showed insignificant differences between the control group (non-stress) and the manipulated group (stress) in performing the computer-mediated tasks.

Chapter 3 It is widely known that modern companies try to enhance their digital creativity to more firmly establish their competitiveness in the marketplace. The purpose of Chap. 3 is to longitudinally explore the evolutionary pattern of digital creativity to explain how communication effectiveness, task expertise, and the ten-

dencies of digitalists affect digital creativity, with a focus on task diversity. Using multi-agent simulation (MAS) on the NetLogo platform, it was proved that these elements help form a valid model for digital creativity.

Chapter 4 In this study, a physiological approach was employed to study the relationship between stress and creativity using a controlled experiment. For the sake of the experiment, participants were categorized into a stress group and a non-stress group. The experiment results revealed that self-reported creativity did not correspond with an assessment by experts of participants' creativity. Also, there was no statistically significant relationship between stress and creativity, indicating that other factors may play a role and further studies are necessary in this respect.

Chapter 5 explores the revelation process for individual creativity based on exploitation and exploration. The purpose of this chapter is to investigate how task difficulty and emotion, as sources of stress, affect creativity manifestation activities such as exploration and exploitation in the decision support system environment. During the experiment, a specific situation was presented to the participants where the subjects needed to exert creativity to accomplish a task, and the result was analyzed through the measurement of physiological signal data as the subjects attempted to complete the task. The empirical results revealed that exploration activities are facilitated in less stressful environments and that exploitation is facilitated in stressful situations.

Chapter 6 proposes an individual creativity model that consists of personal psychological characteristics and creative processes. To test the model, researchers investigated how emotional and social intelligence positively, effectively, and successfully lead to harmonized human relationships in the existing social order, affecting the creative process and individual creativity. This chapter is particularly concerned with understanding how exploration and exploitation are related to personal psychological characteristics and individual creativity. Survey analysis results showed that personal psychological characteristics, measured by social and emotional intelligence, significantly affect the creative process and individual creativity. Another interesting finding is that exploration reinforces individual creativity whereas exploitation does not directly strengthen individual creativity.

Chapter 7 explores the issue of team creativity by using a unique intelligent method known as a Bayesian network. It is generally understood that team creativity influences corporate performance in a decisive manner, and improving it significantly is at the heart of most strategies. Accordingly, organizations have been concerned not only with fostering creativity and innovation among individual employees, but also with developing creative and innovative teams. However, when it comes to enhancing the level of team creativity, decision makers are embarrassed and even intimidated by the huge number of relevant factors waiting to be analyzed and the degree of complexity of the causal relationships existing among them. To address that obstacle, this chapter proposes useful management methods for improving team creativity by performing a variety of scenario-based sensitivity analyses based on a General Bayesian Network (GBN). More specifically, this study proposes a GBN-driven approach to effectively managing team creativity, in which five variables—exploration, exploitation, knowledge sharing, expertise heterogeneity,

and organizational learning culture—are handled in the context of causal relationships with team creativity.

Chapter 8 is unique in that it investigates the effects of network structure-related factors on team creativity. The network structure factors under consideration include heterogeneity, degree centrality, and structural holes among various contextual and social factors that affect team creativity. In addition, this chapter focuses on the longitudinal evolution patterns of team creativity to address how the effects of heterogeneity and the network structure change over time. The main method adopted is an agent-based modeling (ABM) approach, which was used to longitudinally analyze the change and evolution patterns of team creativity. It was found that the network structure, particularly the elements of degree centrality and structural holes, is more effective in improving team creativity than heterogeneity over the long term, although both heterogeneity and network structure positively affect team creativity.

Chapter 9 examines the effect of short-term robot-mediated training for creativity education. Individual creativity was measured in terms of creative self-efficacy and creative outcome. In the study, some of the participants were allowed to play with the robot, and their creativity was compared with other groups who either just watched robot-related movie clips or designed the robot's behavior. The results showed an improvement in creative self-efficacy among the participants who designed the robot's behavior.

Chapter 10 explores the interrelationship between creativity, technology, and social practices. It is clear that continual exploration is necessary for us to shape and transform our practices in a rapidly changing and intensely complex world, thus digital creativity is crucial. This chapter examines how digital creativity is transforming our practices—what we know, how we act, and who we are becoming. It is this continuum—the interrelationship between the creativity of action and the digital world—that is reconfiguring social practices in new and critical ways.

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