Introduction: The Spatiality of Creativity

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The concept of creativity used to be seen entirely as an entity depending on the faculties of individuals. Research on creativity in psychology, philosophy, and art criticism focused on the attributes of geniuses, gifted persons, creative artists and scientists, and creative performance and problem-solving. Eventually, researchers acknowledged that the creative scientist or artist does not work in a social, cultural, and economic vacuum. It was accepted that creative individuals are inspired or impeded by societal and organizational structures and that they depend on evaluators, audiences, and research infrastructure. It was recognized that such people may meet with incomprehension, competition, hostility, and social conflict, that interactions play an important role, and that learning processes are situated in environments and spatial structures. With the ascendence of these new perspectives, creativity began capturing attention in other disciplines as well.

A Brief Retrospective

From Persons to Persons in Situations

When research on creativity was still in its infancy (for an overview, see Albert & Runco, 1999; Simonton, 1999), few scholars found it necessary to include the environment in their considerations. At best, they admitted that talented individuals could not develop their creativity in repressive societies. One of the first

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scholars to discuss the influence that external conditions (parents, schools, peers, role models, teachers, political institutions, and scientific policies) have on the scientific achievements and careers of eminent scientists was the German chemist and Nobel Prize winner Wilhelm Ostwald. In his 1909 book *Große Männer* (Great Men), which describes the careers of Humphry Davy, Julius R. Mayer, Michael Faraday, Justus Liebig, Charles Gerhardt, and Hermann Helmholtz, he addressed almost all individual, social, organizational, environmental, and political aspects now known to be capable of affecting creativity and scientific careers. However, this early pioneer did not work in any of the core disciplines of the social sciences. As for psychologists, they concentrated more on intelligence than on creativity, at least before Guilford's (1950) famous presidential address to the Association of American Psychologists. Ostwald's research was therefore largely ignored by the epistemic centers of the social and behavioral sciences of that time.

The environmental road to research on creativity was gradually charted in the 1940s and 1950s, beginning with Stallknecht's (1941) discussion of the relations between environment (reality and actual concrete existence) and consciousness. Osborn (1953) continued this line of thought by underlining the importance of environment for the development of creativity. So did Stein (1953) when he pointed out that there is an interaction between the creative individual, the problem on which he or she is working, and the environment in which that person exists.

> To speak solely of the existence of the stresses and strains in the environment without due consideration of the individual, as some investigators do, or to deal primarily with the stresses and strains in the individual and to overlook the nature of the problem or the environment as other investigators do, is an arbitrary approach which is a consequence of the specialization in our profession today. (p. 312)
>
> The creative product resonates with the needs or experience of a group. Art works resonate with feeling, while technical inventions find resonance because they fulfill practical needs. (p. 318)
>
> The creative work must strike a chord or resonate in some manner with the group that accepts it. (p. 321)

The way to the interactional and environmental study of creativity was also prepared by environmental psychologists focusing on the relation between actor, situation, and environment, especially by Barker's (1968) concept of action settings. Management studies, too, became interested in the psychological climate of organizations and found that creative persons are very sensitive and responsive to the attitudes and behavior prevailing within an organization or at their place of work (see Raudsepp, 1958).

Not until the latter part of the 1980s did mainstream research on creativity turn to the impact that situations and environments have on creativity. At that point, scholars increasingly began addressing issues that had been raised 80 years earlier by Ostwald (1909). More and more of these late twentieth-century social and behavioral scientists regarded behavior as a function of the interaction between a person and a situation, and situational determinants of creativity became a research focus of cognitive psychologists. It was accepted that creative individuals are embedded in particular environments capable of either fostering or hindering their

creativity and that cognitive processes are guided not only by personal capabilities or intrinsic motivation but also by interactions with and influences of the environment. This alteration in the study of creativity was summarized by two leading researchers of that period:

> There has been a concentration on the creative person, to the exclusion of "creative situations"—i.e., circumstances conducive to creativity. There has been a narrow focus on internal determinants of creativity to the exclusion of external determinants. (Amabile, 1983, p. 5)

> We cannot study creativity by isolating individuals and their works from the social and historical milieu in which their actions are carried out. This is because what we call creative is never the result of individual action alone; it is the product of three main shaping forces: a set of social institutions, or *field*, that selects from the variations produced by individuals those that are worth preserving; a stable cultural *domain* that will preserve and transmit the selected new ideas or forms to the following generations; and finally the *individual*, who brings about some change in the domain, a change that the field will consider to be creative.… Creativity is a phenomenon that results from interaction between these three systems. (Csikszentmihalyi, 1988, pp. 325–326)

> Creativity is a phenomenon that is constructed through an *interaction between producer and audience*. (Csikszentmihalyi, 1999, p. 314)

Whether in anticipation of or in response to this turn, some psychologists developed multilevel models of creativity to distinguish between the creativity of individuals, groups, and organizations (e.g., Woodman et al., 1993). Other psychologists applied a systems perspective of creativity, including contextual variables that influence creativity (Csikszentmihalyi, 1999; Simonton, 1975, 1977, 1988, 1990). All this work drew attention to the processes of problem-solving, the interaction between members of teams, the various phases of a creative process, the spatial diffusion of creative ideas and products, and the contextual or environmental determinants promoting or suppressing creativity. When referring to environmental variables, though, most authors mentioned only organizational, cultural, socioeconomic, or political factors. They disregarded the spatiality of creativity and the role of places and spatial contexts.

Some psychologists hypothesize that multiple components must converge for creativity to occur and that creativity evolves through a confluence of various individual abilities, societal structures, economic resources, political conditions, and cultural values (for an overview see Amabile, 1983; Sternberg & Lubart, 1999). This confluence or convergence is inconceivable without a spatial coincidence or co-presence of these components. Processes of learning and gathering experience are inseparable from interactions with a specific environment and from situational challenges.

Creativity and Space

The constituents of creativity and their interrelations materialize in social macrophenomena called creative environment, milieu, or context (see the chapter by

Meusburger in this volume). Such spatially rooted social macrophenomena are not identical with the sum of their components. A creative milieu is not produced solely by a co-presence of particular constituents. Much more decisive are their interrelations and mutual modifications. A creative milieu is a possibility or potentiality, not an actuality. According to Stallknecht (1941), a possibility or probability can be an efficient cause for action. Possibility directs attention to concrete situations, "and this direction is the mainspring of conscious initiative" (p. 622). Possibility can be an efficient cause only when in contact with mind that acts as a "catalytic agent", so to speak (p. 622). Recognizing a possibility earlier than other people do is an important constituent of creativity and competitiveness.

A creative milieu or environment represents a certain potentiality that must be activated through human communication and interaction. What makes a location attractive is its possible or imagined advantages, not the realized ones. It is the potential to communicate with other highly creative persons that attracts artists and scientists from elsewhere. It acts like a magnet for other creative people and thus enhances the attractiveness of a place. One cannot predict whether and how often this potential for integrating diverse viewpoints and knowledge bases is activated and how the relationships between creative agents develop. Those aspects can be described only after the fact. If potential, possibilities, and resources go unexploited, if agents stagnate, if they cling to dominating networks and do not listen to adherents of other paradigms or exchange knowledge beyond their discipline's borders, then locally available intellectual resources may be of little benefit. The mode and intensity of the interrelations between given components vary in time and space; they are not fixed or predictable.

There is also another reason why spatial context is more than the sum of its parts. Its symbolic meaning, reputation, and attractiveness lie not only in its present merits and achievements but also in those gained previously by agents no longer belonging to the context. A place is like a screen on which possibilities, expectations, benefits, and hopes are projected, a surface that reflects reputation back onto the persons and institutions located there.

Interdisciplinarity

The longest tradition in creativity research stems from discussions by philosophers about aesthetic creativity and from investigations by psychologists into intelligence, problem-solving, and individual creativity. But for many decades, these two pioneering disciplines of creativity research did not have much in common when it came to their concepts of creativity. According to Wittgenstein (1966), "aesthetic questions have nothing to do with psychological experiments, but are answered in an entirely different way" (p. 17). Judgment about a work of art is only remotely connected with laboratory-confirmed creativity. Similar gaps exist between other approaches and disciplines.

Human geography, too, has a long tradition in the study of the generation and spatial diffusion of innovations. However, researchers in this discipline did not

enter the field of creativity research until the 1990s after first detouring through several other areas of inquiry. Some of these scientists studied spatial disparities of educational achievement, the migration of highly skilled labor, and the importance of co-presence and face-to-face contact for the generation and transfer of scarce and valuable knowledge. Others sought reasons for the spatial concentration of high-level decision-makers, the disparities of knowledge between the center and the periphery, and the role of networks and clusters in the accumulation of knowledge (see Meusburger, 2008). Human geographers began looking into subject-oriented action theory, cognitive processes, relations between structure (environment) and agency (Werlen, 1995, 1997), and theoretical concepts of space. The more they delved into these topics, the more geographical research moved from the macro- and mesoscale (spatial structures and processes) to the microscale (human agency). The deeper they probed, the more their focus shifted from spatial units to individuals and the more they had to incorporate theories and research results from sociology, psychology, and philosophy. As they progressed, they built more and more bridges between geography and the other social and behavioral sciences.

Each discipline that is engaged in creativity research has its strengths in certain aspects and its weaknesses in others. An ever-present danger is the tendency of unidisciplinary researchers "to view a part of creativity as the whole phenomenon" (Sternberg & Lubart, 1999, p. 4). Another hazard is that their narrowed vision of creativity seduces them into downplaying the research questions and methodologies of other disciplines. Human geographers, for their part, are not greatly concerned with analyzing the characteristics of creative persons and with ascertaining the creativity of individuals or work groups with psychometric exactitude. That research agenda falls to psychologists, who have developed various experimental processes for those purposes. Geographers pursuing the topic of creativity focus mainly on the role and impact that milieus, contexts, or environments have on creativity, on the spatial distribution, disparities, and diffusion of creative ideas and products, on the factors constituting creative environments, and on the spillovers of knowledge from science parks and universities.

Geographers examine creative milieus from a variety of angles. In one strand of argumentation, places, locales, and areas are ascribed a constitutive role in the generation of career paths (Pred, 1986; Thrift, 1983). Just as certain age cohorts or time periods offer different opportunities and risks, certain locales and spatial contexts offer different learning opportunities, role models, value systems, challenges, social networks, opportunities for professional careers and vertical social mobility, and face-to-face contact with high-level decision-makers of various fields. From this point of view, a locale is a "meeting place of social structure and human agency, substantive enough to be the generator and conductor of structure, but still intimate enough to ensure that the 'creature-like aspects' of human beings are not lost" (Thrift, 1983, p. 38). A location influences the aspirations, motivations, and interaction of individuals and organizations disposing of the skills, prior knowledge, and resources to exploit these chances.

Economic geographers and regional economists have contributed to the interest in creative milieus by studying the spatial distribution of technical and organizational innovations, innovative products and processes, patents, and research input

and output and by analyzing the impact of clusters and networks. Taking a different route, other students of creativity retrospectively explore its spatial disparities by analyzing the careers, professional achievements, and social mobility of elites and the performance of outstanding scientists and artists. This biographical material serves as background information about a creative person, the conditions of his or her early socialization, and the chances and challenges that contributed to that individual's creative career. The emphasis falls on the interrelations of factors and the influence that various spatial contexts and path dependencies have on creativity and scientific careers. Such research on creativity thus complements and amplifies the work done in this area by other social and behavioral sciences.

The attention that creativity has received in an increasing number of disciplines has enriched the work on this subject and has broadened scholarly horizons. The researchers from each field of inquiry bring their own specific ideas, core competencies, and main interests to the task. At the same time, this expansion of research has been problematic. The scales, methodologies, theories, definitions, and indicators of creativity used in research differ from one discipline to the next (and even from author to author within the same discipline). Recognizing that elucidation of a lengthy creative process requires resources other than the description of a creative environment, scholars agree that an individual's creative performance must be measured, analyzed, and explained with resources and techniques that diverge from those used to study the spatial distribution of creative products. In short, the resulting variety complicates interdisciplinary discourse and sometimes dilutes concepts of the core disciplines.

Although innovation, invention, and the generation of scientific knowledge are closely related to creativity, surprisingly few economists and economic geographers have taken notice of the results reported in science studies, psychology, and the geography of knowledge. Until recently, psychologists have similarly disregarded the vast amount of relevant work in science studies. This aglossia results partly from the fact that the concepts, definitions, and methodologies in these disciplines differ from those in economics and economic geography. But it might also be due to parochialism that leads publishers and readers to assume that the most innovative ideas, theories, and results appear in a few journals of one or two disciplines. Until recently, the exchange of ideas and concepts across disciplinary borders left much to be desired.

Goals and Content of This Book

The very appearance of this book in a series entitled "Knowledge and Space" indicates one of the goals behind this enterprise: to raise awareness that spatial disparities of creativity exist and that spatial contexts are important in knowledge generation and creative processes. Are societal factors spatially footloose? What is the point in focusing on places, spatial structures, and spatial relations in creativity research? How should the term *environment* be conceptualized? Are only

social factors relevant for the development of creativity or should one also include material artifacts and resources in its definition? How can relationships between environment, cognitive processes, and action be explained without falling victim to geodeterminism? Environmental psychology, human ecology, social geography, semiotics, and actor-network theory offer at least some ways to link between nature (material objects) and society (humans) and thereby find out how sociomaterial things act upon humans and what meaning "materiality [has] in the course of knowledge production" (Jöns, 2006, p. 559).

Yet gaps and contradictory results of the continuing inquiry into creativity remain. Another goal of this book is, hence, to address at least a few of them and to promote an understanding of the approaches taken in other disciplines and at other levels of analysis. In the first six chapters the authors review the most fundamental results of research on creativity from the perspectives of psychology, philosophy, and geography. Psychologist Joachim Funke (Chapter 1) focuses on possible definitions, the methods of analysis, and known determinants of the construct called *creativity*. Robert Sternberg (Chapter 2), drawing on his "investment theory of creativity," argues that creativity is not the same across different domains (e.g., art and science) and that knowledge is one crucial variable explaining why creativity is domain-specific. To be a creative individual in a given domain, one must at least know what the state of the art in that domain is. But knowledge is by no means sufficient for creativity. The third psychologist, Dean K. Simonton (Chapter 3), focuses on scientific creativity, trying to predict creative performance in science by using combinatorial models.

The philosophers Günter Abel (Chapter 4) and Hans Lenk (Chapter 5) deal with possible typologies of creativity, analyzing the typical structures of creative processes. Both authors highlight the importance of symbolizing signs in that approach, the relationship between creativity and rules, and the use of creative metaphors to help overcome limits of human understanding and explanation. The geographer Peter Meusburger (Chapter 6) discusses fundamental concepts of creativity research from the viewpoint of their applicability to human geography. Asking why highly creative individuals are not evenly distributed over time and space, he points out the crucial role of particular milieus in which individuals are raised, trained, and embedded.

Chapters 7–15 delve into rather specific problems and case studies in an investigation of the role that milieus, contexts, and social spaces have in the emergence of creativity. James Kaufman (Chapter 7) is concerned with the relationship between creativity and intelligence, which seems to be amazingly varied across different cultures and ethnicities. To understand the factors that support or hinder the creativity of individuals of differing problem-solving styles, Scott Isaksen (Chapter 8) examines how those people rate their working climates. Similarly, the aim of Ricarda Bouncken's study (Chapter 9) is to explore the effects that national culture has on teamwork and innovation in global teams. The results indicate that cultural values have unequal effects on teamwork and creativity in the innovation process. Martina Fromhold-Eisebith (Chapter 10), an economic geographer, is concerned with the problem of why innovative actors agglomerate and how local

contexts sustain economic creativity. On the basis of social cognitive theories, the psychologist Jens Förster (Chapter 11) conducts an experiment with a special priming procedure. He finds that exposing participants to the name of a city they regard as a creative place enhances their performance on a subsequent creativity test. Margaret Boden's research (Chapter 12) centers on conceptual spaces perceived as culturally accepted styles of thinking. She understands creativity to mean the process of moving through such conceptual spaces as one tries to transform one or more dimensions of the space. Rob Kitchin (Chapter 13) exemplifies this theoretical reasoning by highlighting the creative potential of science-fiction literature. According to Barney Warf (Chapter 14), the contingent nature of social reality not only serves as an infinite resource for creativity but also compels a retheoretization of the role that time and space have in the constitution and unfolding of social life. In the final essay of this book (Chapter 15), Stephan Günzel introduces the term "Geophilosophies" to designate fundamental modes of geographical thinking. He also argues that the notion of creative milieus can help researchers reevaluate the origins of geophilosophies in their historical contexts.

As this introduction to the book points out, creative processes on the spatial microscale and the interaction between the environment and the creative individual (or work group) have been studied extensively by psychology and other social sciences. However, less is known about why certain university departments, research units, or scientific cultures have been more successful in producing prominent scientists than others. Even more obscure is the answer to the question of how to explain macroscale spatial disparities of creativity. Why were Florence (fifteenth and sixteenth centuries), Prague (about 1600), Manchester (about 1800), Paris and Vienna (about 1900) such creative places? What cultural, social, economic, and political contexts and what spatial relations enabled Vienna to accomodate between 1890 and 1930 Josef Hoffmann, Hans Klimt, Oskar Kokoschka, Koloman Moser and Egon Schiele in the arts; Alfred Adler and Sigmund Freud in psychoanalysis; Rudolf Carnap, Otto Neurath and Karl Popper in philosophy, the philosophy of science, and mathematics; Ludwig Boltzmann, Philipp Frank and Ernst Mach in physics and philosophy; Julius Wagner-Jauregg, Robert Bárány and Theodor Billroth in medicine; Alban Berg, Johannes Brahms, Anton Bruckner, Josef Matthias Hauer, Gustav Mahler, Arnold Schönberg, Johann Strauss jun., Anton Webern, Hugo Wolf and Alexander Zemlinsky in music; Walter Gropius, Carl Hasenauer, Adolf Loos, Joseph Maria Olbrich and Gottfried Semper and Otto Wagner in architecture; Robert Musil, Arthur Schnitzler and Franz Werfel in literature; Karl Kraus in literary criticism; Friedrich August von Hayek, Carl Menger, Ludwig von Mises, and Joseph Schumpeter in economics; Hans Kelsen in legal doctrine; and many other eminent scholars in other disciplines (for details see Beller, 1993; Brix, 2003; Hanák, 1993; Janik, 1986)? How are the regional systems of knowledge production (Rheinberger, 2003) and the regional conditions of excellence defined? Why did other world cities of comparable size not boast such creative minds?

How can one open the black box and avoid the tautology that someone produces creative ideas or products because he or she is a creative person working in an environment conducive to creativity (Choi, 2004, p. 187). Ambrose (2006),

Gardner (1988), and Thiessen (1998) argue that insights from multiple disciplines are necessary in order to understand the intricate complexities of creativity, prevent intellectual stagnation, and avoid dogmatic insularity in creativity studies. The preexisting knowledge of an expert or a single scientific discipline can become a corset that stifles novel ideas so that thinking leads only to the production of tried-and-trusted, correct answers (Cropley, 2006, p. 402). We editors hope that the co-presence of different and even contradictory approaches and provocative questions in one book will encourage readers either to question some of their beloved paradigms and scientific worldviews or to clarify their assumptions and elaborate their models in increasing detail.

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