

Suwala, Lech

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On Creativity: From conceptual ideas towards a systemic understanding

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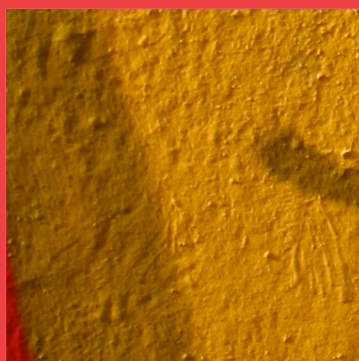
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Kunnskapsverket | *Knowledge Works*
C/O HIL, Postboks 952, 2604 Lillehammer
www.kunnskapsverket.org
kontakt@kunnskapsverket.org

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On creativity:

From conceptual ideas
towards a systemic
understanding

LECH SUWALA

Geography Department, Humboldt-Universität, Berlin

lech.suwala@geo.hu-berlin.de

Introduction

Creativity has replaced raw materials or natural harbors as the decisive fountainhead of economic growth. In this emerging creative age, successful regions must develop, attract and preserve high-skilled and creative people who generate innovations and stimulate economic growth by means of entrepreneurship (Gertler et al., 2002: ii). In other words, Creativity is en vogue. In particular, in the last two decades or so, the concept of creativity has experienced a tremendous interest, a widespread popularity and became a highly influential topic in science, business and politics.

With regard to science, the opening address of the then President of the American Association of Psychologists J.P. Guilford at the 1950 annual conference can be considered as the birth hour of modern creativity research (Guilford, 1950). This ‘creativity wave’ primarily swashed into different sub-disciplines of psychology during the 1960s and 1970s; later into geography in general and economic geography in particular. The process was accompanied by a remarkable increase in the number of scientific papers dealing with this phenomenon in its title (Urban, 2004: 5). Although introduced by G. Törnqvist as early as 1983 (Törnqvist, 1983), the notion of ‘creativity’ became popular in economic geography not until the last 15 years by means of the seminal contributions by Allen Scott ‘The Cultural Economy of Cities’ (Scott, 2000), Charles Landry ‘The Creative City’ (Landry, 2000) and last but not least Richard Florida ‘The Rise of the Creative Class’ (Florida, 2002).

In business, “creativity... is now (considered) the decisive source of competitive advantage” (Florida, 2002:5) and the main driver for economic growth in advanced and knowledge-based economies (e.g. Santagata 2004: 77, Potts 2007:8). Some researchers even claim that the society is experiencing a substantial paradigm shift as a whole resulting from the rise of the so-called creative class. This shift is comparable to a formation crisis analogous to what happened during the transformation towards the agro-culturalization, industrialization or a service society (Florida, 2002: 56). Not surprisingly, this upheaval is characterized as ‘the creative age’ (Florida, 2002), a ‘cultural-cognitive capitalism’ (Scott, 2010) or ‘expressive revolution’ (O’Connor et al. 2010).

By now, this trend also found its way into politics. The latter is evidenced in the wake of a broad awareness towards creativity recognizable at different jurisdictions and spatial scales of administrative authorities. Within the European Union for example, a transition can be monitored starting in the 1960s from merely intra-sectoral science-, technology-, and innovation-based policies towards trans-sectoral creativity policies (Borrás 2003, Suwala 2010) underlined by a recent ‘European Year of Creativity and Innovation’ in 2009 or institutionalized thereafter through different events like ‘The European Day for Artistic Creativity’ since 2013.

This adjustment underlines the fact that creativity possesses manifold facets and fields of application within the arts /culture, science, technology and the economy. Moreover,

creativity can be apprehended as the forge, which provides the gateway for a successful implementation of ideas in all above-mentioned fields.

But which circumstances make ‘creativity’ so exciting for geographers? And which research gaps can be identified? First of all, it should be examined if creativity is always something positive and desirable as suggested by various influential books (e.g. Landry 2000, Florida 2002) and research reports (e.g. UN 2008). In 1986, the Nigerian novelist and Nobel laureate Wole Soyinka alluded the equivocal nature of ‘creativity’ in his honorary speech. Building upon Central African mythology, he introduced the Yoruban God Ogun as the main keeper of creativity. This principal figure symbolizes both The ‘Creator God’ and the ‘Destroyer God’ at the same time (Soyinka 1987). Austrian Economist Joseph Schumpeter heralded an equivalent principle almost half a century earlier with regard to the logic of capitalist production. His seminal contribution emphasizes ‘creative destruction’ as a process which ‘incessantly revolutionizes the internal economic structure, incessantly destroys the old structure and incessantly creates a novel one’ (Schumpeter, 1950:137). Therefore, creativity always engenders winners and losers (Cropley et al. 2010). Studies in economic geography about cultural and creative industries provide a good example for this observation. Creativity can encourage both a desirable transformation of and economic redevelopment in old-industrial cities (e.g. Scott 2000, Florida 2002) as well as gentrification, segregation resulting in a new economic polarization among the population (e.g. Peck 2005, Krätke 2011). In summary, it can be stated that creativity encompasses – like other related phenomena (e.g. innovation) – an ambivalent character (Howkins 2001, DeFillippi et al. 2007).

The ‘creativity hype’ has nurtured both manifold insights by dint of academic studies, research reports and policy papers as well as an array of serious shortcomings concerning the academic understanding of ‘creativity’. With particular regard to human and economic geography, an inflationary and unwitting utilization of the term ‘creativity’ has prevented an extensive debate and revealed four main deficiencies about: (1) the nature of creativity, (2) the process of creativity, (3) allocation of meaning (to) creativity as well as (4) the general relationship between creativity and space. This paper primarily deals mainly with the first deficiency; namely the nature of creativity with a distinct focus on creativity in the arts and sciences which constitute the fundament of new phenomena like the so-called cultural and creative industries and academic entrepreneurship. In what follows, these types of creativity will be denoted as artistic creativity (creation) or scientific creativity (discovery). Hereby, a lack of both a substantial definition of creativity (external borderline) as well as a differentiation of particular types of creativity (internal borderlines) can be identified (Suwala, 2014). Only in very few cases in economically oriented spatial sciences, a systemic analysis of the nature of creativity (e.g. Meusburger 2009) or an explicit awareness of different types of creativity was acknowledged (Florida 2002, Krätke 2011). Influx of knowledge from interdisciplinary studies – usually a strength of economic geography – is surprisingly scarce here. Only few interconnections between economic geographers and psychologist are visible in this domain (Törnqvist 1983, 2004, 2011; Florida 2002, Scott, 2010); vice versa (between psychologist

and economic geography) citations or even mutual anthologies are very rare (Runco 2007 S.172, Meusburger et al. 2009). At the same time, specific types of creativity (innovation, entrepreneurship) are studied at length. Is it little affinity of psychology – the mother of modern creativity research – and especially economic geography that makes overlapping literature so marginal? Or are psychological approaches not yet representable in economic geography, like were sociological ones three decades ago? Is the primary focus on the inner life of individuals not compatible to the current paradigm of a highly networked and collective world? In this realm, these and many other questions stayed largely unexplored in economic geography and regional science.

Therefore, the paper elaborates on the ‘myth’ of creativity first, before dealing with origins and properties of the term. The third section sheds some light on definitions of creativity in general, here the framework of a multidimensional understanding and a holistic view of creativity will be developed, allowing to distinguish between the peculiarities of creativity types where in particular creativity in the arts and sciences will be contrasted against well-known properties of technological (innovation) and economic creativity (entrepreneurship). Hereby, a systemic definition of creativity is proposed and discussed in the concluding section. In detail, the paper attempts to tackle the following questions: What is creativity? How can creativity be defined? Which components shall be integrated? Who or what is creative? Who or what is non-/not-creative? Is it a nerd, an inventor, a scientist, an entrepreneur or an artist? Or even everyone? A particular work- or problem-solving process? The problem itself? Its environment (e.g. atmosphere, particular settings or places)? Or rather the product as a result of the problem-solving process? Do various types of creativity exist? How does ‘creativity’ relate to discoveries, inventions, or innovations?

These questions and the resulting fuzziness is a logical consequence taking into account that “creativity is an extraordinary difficult word that means many different things to different people” (Scott, 2010: 119). This inconsiderate fascination towards ‘creativity’ conveys a superficial, tentative and arbitrary interpretation of the term mostly carrying the semblance of singularity (Sonnenburg, 2007). In economic geography – just like in everyday language often the concept of ‘creativity’ remains unquestioned resulting in false connotations, persistent stereotypes and perpetual myths. Hereby, ‘creativity’ is frequently used as a hollow headline, catchphrase, slogan or buzzword (e.g. Markusen, 2006: 1938). For example, Krätke accentuates that “uncritical and superficial notions (...) currently dominate the creative cities debate” (Krätke, 2011: 2). The following conceptual ambiguity of the term escalates either in a confusing variety or in earmarking instrumentalization by individuals, communities, enterprises, city and/or regions. Therefore, many urban promotion agencies advertise having a creative class and a creative environment or creative industries within a creative city. Everyone defines creativity in its own way. What is left are nothing but word capsules, where ‘creativity’ is described and defined by creativity (Suwala, 2014). Overall, creativity remains a black box, where studies are consecrated on causes and conditions, respectively effects and consequences of the phenomenon rather than its very nature (Kirchberg, 2010: 24).

The myth of ‘creativity’ – the onerous way from the genius to a mundane capability

The term ‘creativity’ has its etymological origin in the Latin word of ‘creare’ signifying the act to originate, to initiate, to father, to beget, to bear, to accomplish or to fabricate. This very act has been liaised to creative wisdom, abilities or faculty as well as creative thinking and the creative mind (Stockhammer 1983). This embodiment was initially drawn from theology as Lawson puts it in his *Theo-politica* “In Creation, we have God and his Creativity (as Occam and Bacon expresse it) and the thing created” (Lawson 1659, viii, 39) and refers to the ‘Creator God’ being able to create something out of nothing, out of thin air or from scratch. Not surprising, ‘creativity’ or creative faculty was deprived to humankind for a long time (Tatarkiewicz, 1980:254). From the 17th century on, creativity was for the first time also assigned to outstanding personalities (geniuses) with extraordinary capacities as Ward reflects it in his *History of English dramatic literature* “the spontaneous flow of his (sc. Shakespeare’s) poetic creativity” (Ward, 1875:506). Thereafter, almost two centuries went by until the concept of creativity was detached from related terms like imagination, originality, genius, talent, freedom and individuality (Albert / Runco 1999, 17). Beginning in the period of Enlightenment, a solid foundation for this altered appreciation of creativity was laid through the emancipation from rigid religious beliefs, the rise of bourgeoisie, the institutionalization of science, and debates around Smithian *The Wealth of Nations*, 1776, Malthusian *Essays on Populations*, 1798 or Darwinian *The Origins of Species*, 1859. These upheavals gradually fortified the prevailing opinion of creativity not being a mystic gift. Nevertheless, science primarily focused on studies investigating the genetics of geniuses (f.e. Michaelangelo, Da Vinci) during this time (Galton, 1869; Freund 1958). Even Schumpeter was heavily influenced by this genius theory – assuming two types of species: the ordinary person and the (economically) creative genius (entrepreneur) while bringing forth his idea of Creative Destruction (Schumpeter, 1911). These studies affirmed the assumption, that creativity formed an essential component of intelligence (Terman, 1925; Cox, 1926).

Not until the second half of the 20th century creativity research disentangled from intelligence research. A milestone advocating this distinction marks the speech of the back-then president of the American Psychological Association, J. P. Guilford at the eponymous annual meeting in 1950 (Guilford, 1950); hereafter, a holistic exploration of human creativity followed driven by democratization of society and the broadening of the term towards all humans (Brodbeck, 2006: 247). Voices within this zeitgeist heralded the expiration of the ‘genius epoch’ both in science and in the arts (Matussek 1979, 7). A contemporary understanding of creativity “recognizes the potential for creative achievement in all fields of human activity; and the capacity in the many and not the few” (NACCCE, 1999: 30) and emphasizes “creativity as an essential feature of our life” (Florida, 2002: 30). Creativity is – albeit with different characteristics and types – inherent in all humans (Brodbeck, 1996). Based on this broad understanding a multidimensional conception of

creativity has been established not only taking the creative person, but also the creative problem, the creative process, the creative persuasion, the creative product and last but not least the creative place – also known as the six P's (perspectives) – into account (Runco, 2007).

Contrary to the latter, the term creativity is frequently penetrated with inaccurate associations, persistent stereotypes and daring myths in the current language. Three common clichés will be elaborated in the following. First of all, it will be often claimed that creativity is a gift of the few and cannot be learnt or acquired (cf. the epitomes of Einstein, da Vinci or Goethe as universal geniuses) (Lange-Eichbaum, 1928). In science (esp. engineering), creativity was long considered as a “black art, possessed by some, and not by others” or the “result of individual champions rather than systematic” (Crompton and Crompton, 2000: 1). A second assertion resulted from the fact, that creativity is imagined to be solely required in certain domains, notably in sciences and the arts. Thus, it is hardly surprising that the general category of the ‘creative industries’ encompasses sectors primarily containing artistic or cultural activities. ‘Creatives’ or creative persons are consistently associated with designated professions (e.g. writers, painters, movie makers). In this context, Runco notices an ‘art bias’ in the current language and comprehension (Runco, 2007: 384). Thirdly, it is alleged that creativity is connected to certain personalities and/or spaces. The tenor of contemporary literature argues that specific individual traits (e.g. curiosity, ingenuity, risk taking, autonomy, impartiality, nonconformity etc.) (cf. Landry, 2000: 13; Florida, 2002: 31; Preiser, 2006: 61) or idiosyncratic spatial configurations (e.g. centers, agglomerations, global cities, cluster of creative networks) (cf. Törnqvist, 1990: 109; Scott, 1997: 324) promote creativity. Studies accentuate curious scientists, eccentric artists or even tolerant cities (Florida, 2002: 252, Sonnenburg, 2007: 1). Those claims are not fundamentally wrong – as studies also emphasize smaller towns or disperse networks in peripheral areas as cradles of creativity (van Heur, 2009: 1548; Gibson, 2010: 1; Bell, 2015: 222) – however they illustrate only a restricted view of the term. These generalizations carry the risk of creativity being considered separately from specific contexts and perspectives (e.g. cultural, social or economic). Thereby, a balanced and multi-facted, conception of creativity will be done wrong.

Origins and properties of creativity

Multiple perspectives of the term ‘creativity’ led to a number of manifold personal (e.g. mystic, pragmatic, psychoanalytic, psychometric, cognitive, character-based) and inter-personal (e.g. sociologic among others) approaches (Urban, 2004: 28; Sonnenburg, 2007: 68). Mystic explanatory schemes are primordially personal approaches and underline – as the history of ‘creativity’ suggested – the muse as the fountainhead of inspiration (Tatarkiewicz, 1980; Brodbeck 1996). This view of the Greek philosopher Plato is best exemplified

by the following metaphor: “The creative person was seen as an empty vessel that a divine being would fill with inspiration. The individual would then pour out inspired ideas, forming an otherworldly product” (Sternberg and Lubart, 1999: 5). Pragmatic approaches are practice-oriented and aim to describe creative techniques during thought processes. In particular, the method of ‘lateral thinking’ (De Bono, 1970) had great commercial success. Hereby, different types of reasoning (fact-based, intuitive, critical, generative) were applied in order to penetrate issues from different angles and stimulate creativity. Within psychodynamic approaches creativity sparks from the bipolarity of deliberately experienced reality and unconscious motivation. In this realm, Freud propagated that scientists and artists accomplish creative products (e.g. books, paintings) to reveal unconscious desires (Freud, 1958). Psychometric approaches stress thinking and trouble shooting capacities as the main sources of creativity. Experiments evaluating various skills of testees (e.g. fluency, adaptability, originality, and particularity of responses) have been developed. The idea of divergent thinking – a type of productive thinking where problems are tackled in an open, dispersed, compartmentalized and ludic manner without critical objections to loosen mental barriers – played a significant role (Guilford, 1950; Torrance, 1974). Cognitive approaches deal with intellectual procedures as forges of creativity. Creativity is considered as an exceptional result of an usual intellectual combination (Weisberg, 1993). Character-based approaches highlight personality variables and motivation as repositories of creativity (Amabile, 1983; Simonton, 1984).

Interpersonal approaches elucidate creativity not as an individually induced phenomenon, but as a team-based circumstance from a sociologic perspective. Despite manifold notions like ‘team creativity’, ‘group creativity’ or ‘swarm creativity’, hardly a profound discernment between individual creativity in social context and group creativity has been ascertained (Sonnenburg, 2007: 51). These interpersonal approaches flourished in conjunction with overcoming individualism as a general perspective, the democratization of creativity as a term and the global division of labor from the 1990s onwards. They involve innumerable group configurations, attributes and dynamics while exploring origins of creativity. Hereby, heterogeneous groups lead to a considerably greater creative potential as a general rule, since combination possibilities are heightened. Biographies of group members, however, should not be too diverse. Otherwise, a lack of a common language or significant age differences appear obstructive (Nijstad and Paulus 2003: 328). Socio-economic approaches introduce further variables like collective preferences, cost-benefit considerations, time constraints or various group sizes in order to detect optimal equilibria for collective creativity (Rubenson and Runco, 1995: 233). All interpersonal approaches indicate that the necessary knowledge required to create complex novelties can no longer solely be achieved by individuals and that creativity has its origin on a cooperative level (Sonnenburg, 2007: 69). In summary, “creativity can be expressed in collaborative as well as individual activities, in teamwork, in organisations, in communities and in governments” (NACCCE, 1999: 28). These intellectual capabilities are activated via cognitive and learning processes. “Learning provides important informational and procedural foundations for creative activity” (Scott, 2010: 119).

CONCEPT	PROPERTIES
CREATIVITY	creation of new knowledge by ingenious or random combination of all following elements, and also accepted as such
EXPERTISE	confirmed, highly specialized and customized knowledge base necessary for judgement and evaluation
COMPETENCE	proven and embodied knowledge, either methods-, subject-, or regionally embedded
KNOWLEDGE	Structurally cohesive information, based of a reflection, synthesis or context originating from intuitions, opinions, experience or values
INFORMATION	facts or personalized data with relevance or purpose
DATA	simple, descriptive observation of situations with allocation of meaning

Table 1 Creativity, knowledge, information and cognitive and learning processes (own illustration based on Malecki and Moriset, 2008: 29)

The main objective of creative agency consists of generating novel knowledge by variation of existing knowledge (Krätke, 2011: 13). But how are information, creativity, knowledge and learning processes related to each other?

Table 1 depicts the substantial relationships between those concepts. The cornerstones of existing knowledge are data and information. Transition from data to information only occurs through an allocation meaning or pertinence for an individual or a group. This information may be condensed to knowledge via a systematic subsumption (e.g. synthesis, contextualization, experience). In the wake of a tremendous division of labor in a globalized world, manifold and highly specific knowledge bases were established. In the case, that the knowledgeable agent is able to internalize a specific knowledge base, competence or expertise may arise by dint of cognitive or learning processes or long-lasting experiences. Experts are most likely capable to generate new knowledge or creativity that will be accepted as such. This procedure is, however, anything but linear. Creativity may also emerge accidentally or by a dexterous combination of information (Malecki and Moriset, 2008). The crucial condition is that this novel combination obtains a meaning or will be accepted. In other words, cognitive and learning processes do not necessary lead to creativity (Scott, 2010: 199).

Although the presented personal and interpersonal approaches towards creativity fostered vital insights, this paper follows the ‘confluence approach’ (Sternberg and Lubart, 1999) – a sort of uniting scheme – not only taking the creative person into account, but also integrating manifold further perspectives on creativity. These perspectives align with the mentioned six P’s (problem, person, place, process, product, press) leading to additional variables as sources for creativity. These variables may be best apprehended as aggregated indicators of detail processes and are by far not so straightforward as they might look at first glance. Each indicator unites ‘a bundle of paradoxes’ expressing a contradictory relationship between two extremes that may be ascribed to the ambivalent nature of creativity (Cropley, 1997: 8; De Filippi et al., 2007: 517).

With regard to the creative problem to be solved – the first of the six P’s – it was consistently argued in literature that intrinsic motivation is the impetus per se for creativity. The basic idea is very intuitive: a problem will not be tackled due to external rewards, but due to the nature of the problem (Amabile 1996). In the meantime, however, studies demonstrated also the opposite; external incentives (e.g. fame, honor, awards, remuneration etc.) can equally take a positive effect on creativity as extrinsic motivation (Kasof et al. 2007). The creative person should always be considered in its complexity as ambivalent and contradictory being; intelligence frequently arises together with naivety, empathy with assertiveness (Csikszentmihalyi 1996). In his thirty years panel study, Helson shows that even personality traits like versatility and open-mindedness may be detrimental for the emergence of creativity under certain circumstances (Helson 1999). Hence, a tension between progressive (e.g. preference for a discourse with novelty based on new insights) and adaptive mindsets (e.g. preference for a discourse with novelty based on existing insights) appears to be auspicious for creative individuals (Kirton 1989). Consequently,

explicit characteristics cannot be assigned to creative places (or more precisely spaces), a perspective that is in the limelight of economic geography. The contradictory relationship will be portrayed here through the following pair of values (tolerant – conservative). Florida (2002), for example, emphasizes tolerance in places/ spaces as a crucial context-based condition for the formation of creativity, whereas Helbrecht (2011) underlines the prevailing intolerance of individuals in creative places/ spaces. This tension could be, of course, also revealed by a large variety of further opposite indicators like diversified-monotonous/ isomorphic or variable-stable; we only need to think of the well-examined concepts of diversity (Jacobs 1961) or isomorphism in places/ spaces (DiMaggio / Powell 1983). Moreover, Hautala and Ibert (forthcoming) stress tensions immanent to space (e.g. center-periphery); Suwala showed additional opposite values to analyze peculiarities of creative spaces (e.g. concentration – dispersion, interaction – isolation, perception – agnosia) elsewhere (Suwala, 2014). From the process perspective, a continuum between divergent and convergent thinking / operations is reasonable. While on the one hand divergent operations are early found in psychometric approaches to explain creativity (Guilford, 1950; Torrance, 1974), newer studies were also able to show the formation of creativity bolstered by convergent operations on the other (Crompton, 2006). From the press (the idea of communication) or persuasion perspective (the idea of conviction), it can be suggested to think either of preserving or channeling of creative ideas (Simonton, 1988). To this end, manifold studies have indicated that creativity has to be carefully communicated at the right time (capture the zeitgeist, e.g. within an economic upswing, a receptive political environment or a favoring trend), otherwise it runs the risk of not being accepted and not gather a meaning (Crompton and Crompton, 2008: 360). Amongst others, the following scientist or artist have been partly or entirely misjudged during their lifetime (e.g. Copernicus, Galileo, Kepler, Rembrandt, van Gogh, Chopin) and achieved recognition only posthumous (Csikszentmihalyi, 1999; Preiser, 2006). Creative products have also to satisfy two disparate conditions at the same time as Crompton points out “for a product to be regarded as creative, it must possess not only novelty, but also relevance and effectiveness. In other words, a creative product must be not only original and surprising (novelty); it must also satisfy the need for which it was created” (Crompton, 2006: 393). A balance between novelty and routine (in terms of reliability and effectiveness) is the crucial criteria for the assessment of creative products, or creation in general. This gateway will be examined in depth later in this paper as it has the capacity to integrate most perspectives and is expedient for economic geography.

Definitions of Creativity

Creativity is complex and elusive (e.g. Simonton 1998; Villalba 2008). Depending on the discipline, objective and purpose of the study, “definitions are formulated in terms of a product, such as an invention or discovery; others in terms of a process, a kind of person,

PERSPECTIVE	CONTINUUM OF OPPOSITES	EXAMPLE
PROBLEM	Intrinsic (Amabile, 1996) vs. Extrinsic (Kasof et al. 2007)	Detection of a problem: focus on self-identified & unexpected problems (internal trigger) Approval of a problem: focus on existing problems (external trigger)
PERSON	Progressive (Helson 1999) vs. Adaptive (Kirton 1989)	Autonomous agency: preference for the spontaneous, unconventional and openness Concurring agency: preference for the well-considered, tested and familiar
PLACE	Tolerant (Florida 2002) vs. Conservative (Helbrecht 2011)	Tolerant environment: diversity, uncertainty, variation, risk-taking Conservative environment: intolerance, isomorphism, stability, risk-adverse
PROCESS	Divergent (Guiford 1950) vs. Convergent (Cropley 2006)	Heterogeneous sequences: idiosyncratic, redundant, ramifying, random Homogenous sequences: logic, thorough, purposeful
PRODUCT	Original (Boden 1990) vs. Effective (Runco 2007)	Novel radical, and surprising objects Effective, enhanced and conventional objects
PRESS	Published (Simonton 1984) vs. Preserved (Cropley and Cropley 2008)	Transparent, liberal, exclusive, protective

Table 2 Perspectives on, continuum of opposites and variables influencing creativity (own illustration)

or a set of conditions” (Torrance, 1971: 552). The intricacy of the term may, however, simultaneously be convenient, if and when a closer and more detailed consideration and application results in expanding the epistemological horizon for further analysis (Runco, 2007: 376). The majority of definitions occur via the presented six perspectives.

Whereas the humanities (in particular psychology, sociology) focus on creative personalities or cognitive mechanisms concerning creative processes (problem), engineering and economics place their emphasis on prototypes or creative products as results of collaborative practices. Communication and media studies follow up with the dissemination of creative results (press), spatial sciences traditionally with spatial premises and effects of creative activities (place). All disciplines start basically with an initial problem. These idiosyncratic interrogations can be found in various potential definitions. From a psychologist perspective “creativity is merely a special class of problem-solving activity characterized by novelty, unconventionality, persistence, and difficulty in problem formation” (Newell et al., 1962: 66), while economic geographers contemplate “the constituents of creativity and their interrelations materialize in social macro phenomena called creative environment, milieu, or context” (Meusburger et al., 2009: 3). Economics seem to have reached a general agreement over the last decade that “creativity involves the production of novel, useful products” (Mumford, 2003: 100); media scholars survey creativity as a condition, but also as a warrantor for precious communication that can rigidify long-lasting teams, images, or even trademarks (Negus and Pickering, 2004). Runco even argues that creativity should not be employed as a simple noun without further specification and rather utilized in a context (cf. artistic creativity) or as an adjective (cf. creative product) (Runco, 2007: 378). In fact, creativity as a noun has only entered scientific literature in the 1920s or 1930s (Oakley, 2009: 403). Since then the noun ‘creativity’ will be – regardless of the perspective – associated both in current language and in scientific papers with alteration or creation of ‘novelty’. “The core of definitions of creativity is the production of something new and original” (Landry, 1973: 111). This component has ever since been a fundamental feature within definitions of creativity (Sternberg and Lubart, 1999). ‘Newness’ or more precisely ‘novelty’, however, is subject to certain conditions. Novelty has to be deemed ‘meaningful’ or ‘appropriate’ (Hennessey and Amabile, 1988). “Creativity is the ability to produce work that is both novel (i.e. original, unexpected) and appropriate (i.e. concerning tasks constraints)” (Sternberg and Lubart, 1999: 3). This semantic content only evolves through an allocation of meaning, a constitutive attribute of human creativity (Preiser, 2006); as a result ‘meaningful novelty’ emerges. This definition of creativity ‘as something with meaningful originality’ will be hereafter referred to as creativity in the narrow sense (cf. Moles, 1957: 208).

In contemporary literature a predominantly extended definition of creativity is evident. Alongside the originality or astonishment component, an effectiveness component took root in modern creativity research. The latter is expressed in definitions, where both adjectives like ‘new’, ‘surprising’, ‘unexpected’ and ‘useful’, ‘valuable’ or ‘fit for business purpose’ are enunciated (Joerges 1977, 386).

Bruner, therefore, labels creativity as ‘the generation of effective surprises’ (Bruner, 1962, 4). Firstly, the definition has to involve meaningful novelty (originality); secondly, this meaningful novelty has to be or utilized (effectiveness). A deviation from one of these criteria – e.g. novelty – in terms of a phantasy, blind awkwardness, eccentric and schizophrenic thought or inscrutable rebellious agency results in quasi-creativity (Heinelt, 1974; Feist, 1998). Newness or “the originality may take the form novelty, uniqueness or unusualness, or unconventionality” (Runco, 2007: 379) and has to be distinguished from the conventional use of ‘new’ in the current language. The consequence is that mass-assembled automobiles, for instance, would represent both a new and useful product. These products, however, are not creative, as it is merely new, but not novel. Only the alteration of the mindset or of the assembling process would render a creative car (Tatarkiewicz, 1980: 257).

Consistently, novelty that is impossible to utilize should be referred to as pseudo-creativity (Cattell and Butcher, 1968). Let us invoke another example of a creative product. The latter has to satisfy both criteria novelty and effectiveness. Novelty by itself is not a sufficient condition for creativity, in addition the effectiveness attribute (useful or valuable) has to be complied; otherwise the product is either bizarre or meritless, however, in all respect not creative, solely esthetic (Runco, 2004). Creativity is by no means only attached to tangible goods, but also “the production of original behavior or modes, rules, or objects (...) in order to resolve certain situations” (Sternberg, 2006: 8). Hereby, effectiveness is not merely meant in a pragmatic sense, for intangibles (e.g. behavior or thoughts) it can be judged on purely intellectual or esthetic, however socially negotiated and accepted, criteria that stand the test of ‘usefulness’ (Feist 1998).

The paper predominately complies with this conception of creativity. The only extension is a decomposition of the ‘effectiveness component’ of creativity in two attributes: ‘useful’ and ‘valuable’; the attribute ‘useful’ represents, first and foremost, a societal benefit, which is collective negotiated or endorsed and either of functional, practical, public or charitable nature; the attribute ‘valuable’ corresponds with an economic benefit generated by (monetary) value added or as Krätke puts it “everyone can be creative in one sense or another, but we restrict the term here to creative work that is economically valued” (Krätke, 2011: 12). This distinction is particularly helpful when the main objective is an attempt to investigate upon the very nature of creativity in arts and sciences against other types of creativity. Moreover, the economic attribute of ‘effectiveness’ can be isolated and a clearer line between traditional and contemporary understandings of creativity drawn.

In summary, we obtain three constitutive attributes for creativity: ‘meaningful and original’, ‘useful’ and ‘valuable’. Therefore, ‘creativity can be defined as something with meaningful originality, which is useful and valuable at the same time’. Hereafter, I refer to this definition as creativity in the wider sense. Many scholars share the same view and treat creativity therefore as a composition of something original (new, unusual, novel, unexpected) and also valuable (adaptive, appropriate, useful, fit for business purpose) (e.g. Bailin, 1988; Boden, 1990; Ochse, 1990; Gardner, 1993) .

AUTHORS	ATTRIBUTE 'ORIGINALITY'	ATTRIBUTE 'EFFECTIVENESS'
Amabile 1983	NOVEL	VALUABLE
Ochse 1990	UNEXPECTED	GOOD
Boden 1990	ORIGINAL	VALUABLE
DTI 2005	NEW	FIT FOR BUSINESS PURPOSE
KEA 2009	NEW	USEFUL

Table 3 Constituting elements of creativity (own illustration)

FREQUENCY OF QUERIES	"Artistic..	"Scientific..	"Technological..	"Business..
..Creativity"	474.000	103.000	51.300	26.300
..Discovery"	35.200	1.140.000	25.300	12.300
..Innovation"	172.000	314.000	6.030.000	129.000
..Entrepreneurship"	4.990	8.420	85.500	499.000

Table 4 Frequencies for queries with regard to different types of creativity (own illustration). Query on google.com on 8th November 2015

Types of creativity

“Creativity is possible in all fields of human production“ (Tatarkiewicz, 1980: 54). However, individuals or groups of individuals differ in the manner or allocation of resources, in their domains or motivation to name only a few points of departure while unfolding creativity. The results are manifold types of creativity (Feist, 1998: 291), ‘varieties of creativity’ (Barron and Harrington, 1981: 440) or ‘worlds of creativity’ (Krätke, 2011: 199), which all – and this is of interest in economic geography – can generate a certain economic benefit (effectiveness component).

The various types are not restricted to the arts or culture, but are also subject in endeavors such as science. “It could be argued that while creativity, innovation, and entrepreneurship are related phenomenon, their usage seems to concentrate in different areas of endeavour. The arts tend to use creativity, science tends to prefer innovation, and business is most likely to use the term ‘entrepreneurship’” (Wyszomirski, 2004: 37). Albeit other combinations as ‘artistic innovation’ (Towse, 2003: 6) or ‘business creativity’ (Acheson, 2003: 251) are conceivable, everyday understanding of different types of creativity can be easily checked by frequencies for combined queries by dint of web-based search engines.

The frequencies in table 4 point to the deviating relevance of creativity depending on the domain and the existence of varieties of creativity; therefore it is legitimately to refer to artistic /cultural creativity (creation), scientific creativity (discovery), technological creativity (innovation) and economic creativity (entrepreneurship) as different types of creativity (cf. Nyström, 1995: 67; Florida, 2002: 33). Alongside with the definition of creativity in the wider sense, this distinction has been already undertaken since the 1960s when creativity was defined as ‘Hervorbringen von effektiven Überraschungen’ (origination of effective surprises) implicitly consisting of both an originality component and an effectiveness component. Interestingly, those different types of creativity were additionally distinguished according to the nature of their effectiveness – a similar method can also be also applied towards originality as we will see later – leading to artistic/ cultural creativity as ‘metaphoric effectiveness’, scientific creativity as ‘prediction effectiveness’, technological creativity as ‘mechanical effectiveness’, and economic creativity as ‘monetary effectiveness’ (Bruner, 1962: 4; Joerges, 1977: 383). Even if newer studies support these types of creativity by the same token (Hollandes and van Cruysen, 2009), there is still a lack of clarity between these types (Landry, 2008: XXIX).

The next subsections explore the four carved out types of creativity regarding the varied magnitude within the three constitutive attributes ‘meaningful originality’, ‘useful’ and ‘valuable’ of creativity. Hereby, it is also important to diligently elaborate on technological and economic creativity in order to obtain idiosyncratic features of creativity in the arts and sciences.

At the same time, features of innovation and entrepreneurship are inevitably substantial components of the contemporary understanding of creativity in the arts and sciences, in particular against the background of the rise of cultural and creative industries or the ‘entrepreneurialization’ of scientific institutions.

Technological creativity

Schumpeter (1911) identified technological creativity (and the distinction between invention, innovation and diffusion) as the main driving force for economic prosperity more than a century ago. Invention is the creation of (meaningful) originality – in other words creativity in the narrow sense – and “is without importance to economic analysis” (Schumpeter, 1939: 85). Innovation is the first time application of the invention (useful attribute), diffusion its widespread implementation or first (economic) use (valuable attribute) (Schmookler, 1962; Mansfield, 1968). Interestingly, these connections and the formulation of a sequential model of Schumpeter’s ideas arose in the aftermath (Godin, 2006), he himself sees little dependence of innovation on invention or vice versa; “innovation is possible without anything we should identify as invention and invention does not necessarily induce innovation” (Schumpeter, 1939: 84). A modern holistic view of technological creativity would link invention ((meaningful) originality), innovation (useful) and diffusion (valuable) and treat technological creativity synonymous to innovation with an emphasis on its usefulness. The latter becomes apparent when identifying the very nature of innovation as “the generation, acceptance and implementation of new ideas, processes, products or services” (Thompson, 1965: 2) and their ‘effective application or usefulness’ to the organization (West and Farr, 1990). The very core of innovation is about the application and usefulness of novelty, economic success is important, but not constitutive (Baregheh et al., 2009).

The thin line between invention and creativity in the narrow sense can be approached through the broad formal acceptance of inventions by a community of experts in the form of patents (Huber, 1998). The patent registration requires meaningful novelty, which implies a progress in the respective domain and where an industrial exploitation cannot be ruled out; in other words: ‘patents protect useful ideas’ (Hutton, 2007: 98). Although the attributes ‘originality’ and ‘usefulness’ are mandatory for inventions or patents, the latter grant no guarantee for an application, market launch or market diffusion. For this purpose, innovations are canonical through realization and implementation of inventions inducing technological progress. This progress might result in product, process or organizational innovation (within goods or services) or enhanced business methods and practices. In their definition of an innovation West and Farr state that “(...) the element need not be entirely novel or unfamiliar to members of the group, but it must involve some discernable change or challenge to the status quo” (West and Farr, 1990: 16). Consequently, every innovation

implies different magnitudes of creativity. A common classification scheme in compliance with the degree of effectiveness, for instance, is a distinction between fake, incremental and radical innovations. At the same time, creativity in the narrow sense is contemplated as *sine qua non* and a key driver for innovation (Suwala, 2010: 13).

Economic creativity

A particular species (founder or entrepreneur) is responsible for the value added from innovation. Innovation marks technological progress, Entrepreneurship the value creation thereof (Villaabla, 2008: 24); therefore, economic creativity concerns the attribute 'valueable'. The term 'entrepreneur' descends from Say (1803: 78); he considers the key responsibilities of entrepreneurs in their role as forecasters, experts and risk takers within liberal economic regimes (cf. Hayek, 1945; Schumpeter, 1950; Kirzner, 1973). "Entrepreneurs are those persons (business owners) who seek to generate value through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets" (Schmiemann, 2009: 152). Entrepreneurship can also be expressed as "the visualization and realization of new ideas by insightful individuals, who were able to use information and mobilize resources to implement their visions" (Nystrom, 1995: 67). Amabile explicitly mentions "entrepreneurial creativity" as "the generation and implementation of novel, appropriate ideas to establish a new venture" (Amabile, 1997: 20). All definitions distinguish between the idea (novel, exploration), its realization/ implementation and above all economic utilization (valuable, exploitation). The entrepreneur will be rather accredited for skills with regard to promotion and economic exploitation of novel ideas than for ideas themselves mostly originating from third parties. These skills embrace a potpourri of leadership, organization, marketing, finance, communication and law capabilities (Yusuf, 2007: 2). Similarly as with innovation, which can be distinguished with regard to various degrees of usefulness, also the concept of economic creativity can be classified in latent, nascent, infantile and entrenched entrepreneurship according to the extent of the value added (Sternberg, 2009: 8).

Artistic / cultural creativity

Creativity in the arts, most referred to as 'artistic creativity' (e.g. Amabile, 1983; Simonton, 1984; Runco and Bahleda, 1986; Krätke, 2011) delineates a subset of cultural creativity mirroring the subordinate relationship between the arts and culture. Artistic creativity involves a process, which rests predominantly on practiced values and intrinsic motivation

and is characterized by spontaneous, unexpected, insurgent or chaotic events (Amabile 1983, Simonton 1984). With regard to this features a clear line can be drawn between artistic and technological creativity, whereby “usefulness (...) while it is of central significance for technological creativity, artistic creativity is usually not of instrumental, but of intrinsic value” (Fritsch and Rusakova, 2010: 2). Another distinction can be performed along the mentioned juridical understanding of patents, copyrights and trademarks. Original expressions of artistic creativity with a non-functional character (e.g. the arts, music, literature) are not protected by patents, but by copyrights or trademarks up to 70 years as long as they do not represent ‘commercial activities’ like recordings, radio and TV broadcasting or specified printed materials adopting industrial scales (Hutton, 2007: 114). Artistic creativity can be launched by curiosity anywhere (e.g. home, work, school), is based on ingenuity and reliant on memories and experiences (Glow et. al., 2005); it involves “many interacting factors, including craftsmanship, expression, sensitivity and emotional resonance” (Gongatz and Mondejar, 2005: 11).

Both in current language and in scientific literature, ‘artistic creativity’ is often only referred to as ‘creativity’ as a result of on ‘arts bias’ (Runco, 2007: 384). In this paper, I introduce the term ‘creation’ as synonymous to artistic creativity and as a distinction towards discovery (scientific creativity). The traditional view only rudimentary connects artistic creativity to the attribute ‘useful’, hardly to the attribute ‘valuable’, and rather only to novelty bearing a meaningful, appropriate or intentional appeal. (Anheier and Isar, 2008: 3). “One of the most striking features of artistic creativity (...) is what we might call its immanent purposiveness” (Deutsch, 2002: 227). Hereby, this type of creativity involves “imagination and a capacity to generate original ideas and novel ways of interpreting the world, expressed in text, sound and image” (Throsby, 2010: 15). Moreover, this culture-based creativity is primarily the realization of a vision that results in something new, not necessarily functional (KEA, 2009: 31). ‘Novelty’ plays hereby the crucial role and can – just like innovation according to the different degrees of usefulness – be distinguished in line with various extents of ‘meaningful originality’. Boden for instance, differentiates between psychological creativity (P-creativity) and historical creativity. “If a new idea is novel with respect to the person concerned, we may speak of P-creativity (P for ‘psychological’). If it is also, so far as is known, new with respect to the whole of human history, we may speak of H-creativity (H for ‘history’)” (Boden, 2009: 179). Using a similar template, alternative perspectives classify originality accord to the extent in ‘everyday little C creativity’ and ‘big C creativity breakthroughs’ (cf. Tatarkiewicz, 1980; Gardner, 1993) or in subjective and objective creativity (Stein 1953). In this paper, I suggest – following NACCCE (1999) and Boden (2009) – a modified hierarchy for the extent of artistic creativity: personal, domain/ field-based, historical creativity (P-, F-, H-creativity). Whereas P- and H- creativity correspond to Boden’s concept, F-creativity indicates a novelty for an entire domain or field (e.g. discipline, community, industry). The distinction is also suitable for scientific creativity.

Scientific creativity

Creativity in science also commonly referred to as “scientific creativity, is the production of new and socially effective empirical knowledge” (Joerges, 1977: 383). Hereby, the attributes ‘meaningful originality’ and ‘usefulness’ are relevant. Although scientific creativity is, first and foremost, directed towards the discovery of novelty (e.g. idea, style of thought, objects, species, methods etc.) by a cognitive achievement, a certain societal benefit is equally desirable (e.g. via publication of papers or results, application of basic research etc.). In general, scientific creativity arises from a search (Runco, 2007: 390), where first of all, experiments are carried out, ideas and hypotheses formulated, in a later stage checked and problem-solving suggestions or results communicated (Torrance, 1995: 23). Discovery – no matter if theoretical and empirical – stems from a combination of logic, talent, chance and zeitgeist (Simonton 2004, 4); exploitation or economic benefit are subordinate. Depending on scientific discipline, Amabile contrasts between ‘heuristic’ or ‘subjective’ and ‘algorithmic’ or ‘productive’ formation of scientific creativity. (Amabile, 1983:33). Whereas psychology considers scientific creativity as a heuristic process based on peculiarities on individuals (Csikszentmihalyi, 1999), economics rather appreciate this type of creativity as an algorithmic process as the outcome of collective and productive work (Howkins, 2001). The most striking difference with regard to artistic creativity can be illustrated by means of the very act of creation (Koestler, 1964), since this is the focal point where scientific and artistic creativity draw their existence from. Although the basic logic of the creative act is similar within all types of creativity – even the technological and economic ones, however, to a much lower degree – and evolves through “the perceiving of a situation or idea (...) in two self-consistent but habitually incompatible frames of reference” (Koestler, 1964: 35), it is the mode how these two frames come together (are bisociated) which makes the difference. Whereas with this general process called bisociation scientific discovery depends upon ‘syntheses’, artistic creativity depends either on ‘juxtaposition’ or ‘collision’ of two formerly unconnected experience and thinking patterns (Koestler, 1964). In other words, it is the detection of concealed contexts, association or relationships revealing either an ‘ah ha’- (integration or synthesis), ‘aahh’- (juxtaposition) or ‘haha’-effect (collision) (Birch & Clegg 1996, Suwala 2014)

In this realm, Einstein essentially bisociated ‘energy and matter’ in his renowned formula ($E=mc^2$) by synthesis (Koestler, 1964: 233). Despite the focus on originality, the synthesis creating scientific creativity should also sustain requirements of the attribute ‘usefulness’. This claim holds equally true for the intersubjectivity of empirical methods or results and is related to the public traceability and reproducibility of the discovery. This implicit effectiveness norm can concurrently be treated as a formal requirement for the recognition of the scientific work (Joerges, 1977:386). According to other types of creativity, a certain hierarchy with regard to the extent of meaningful originality or discovery is appropriated. The same distinction as applied to artistic creativity taking a personal, domain/ field-based, and historical creativity (P-, F-,H-creativity) into account is reasonable (Tatarkiewicz, 1980; Boden 1990).

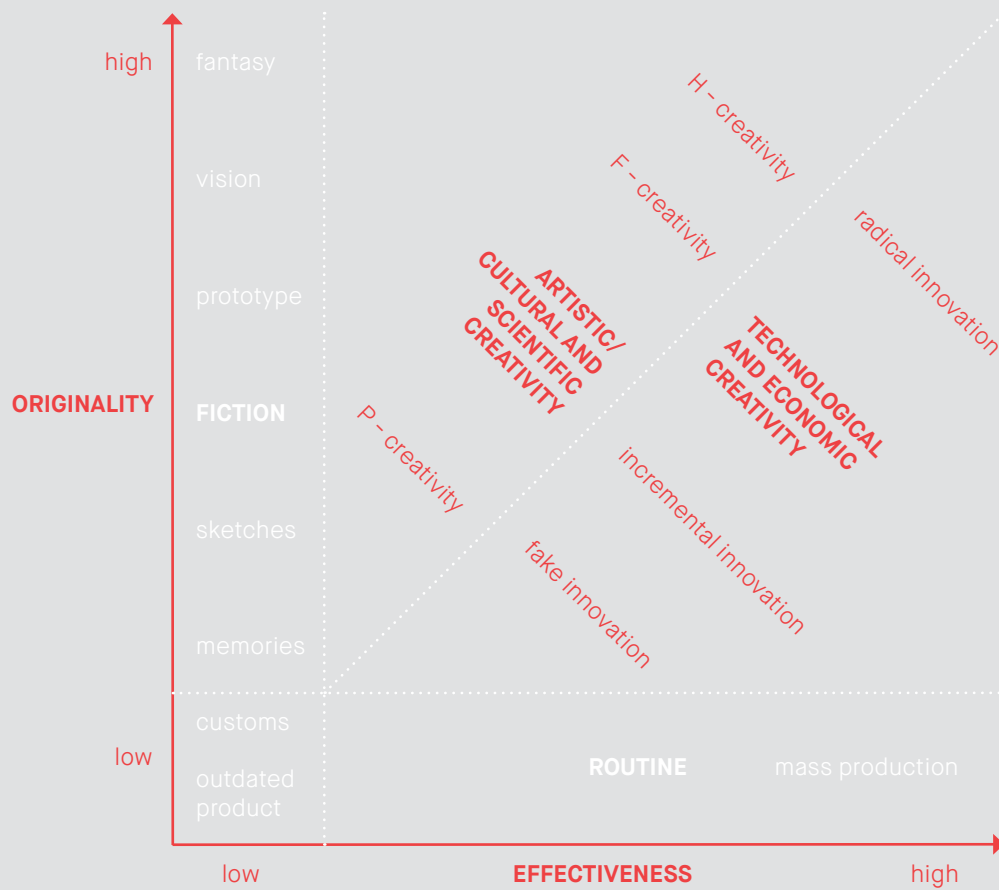


Figure 1 Balance between originality and effectiveness within different types of creativity

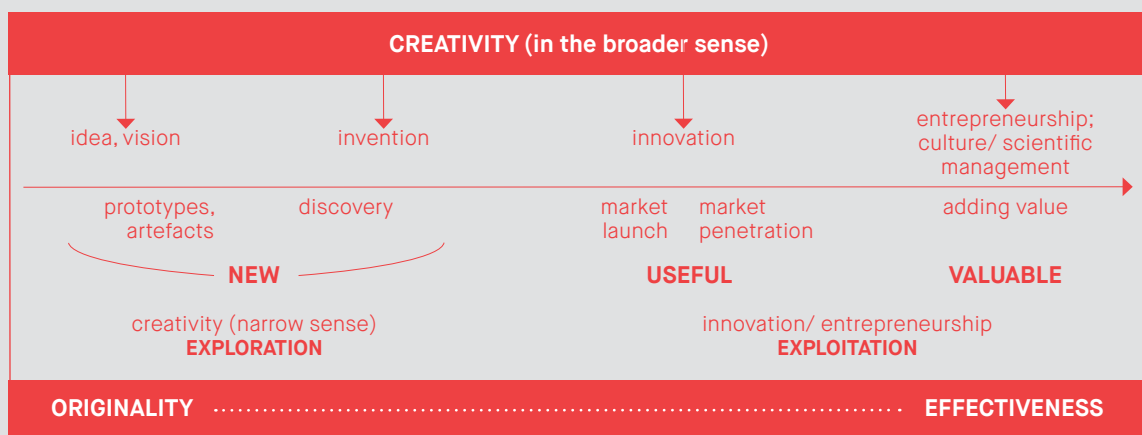


Figure 2 Relationship between constitutive elements and types of creativity

Synopsis and discussion

Figure 1 depicts the relationship between ‘originality’ and ‘effectiveness’ within the four different types of creativity. If we recall the definition of creativity, ‘as something with meaningful originality (originality component), which is useful and valuable at the same time (effectiveness component)’, types of creativity can be distinguished according to their main purpose. Whereas novelty (originality component) plays the crucial role within artistic (creation) and scientific creativity (discovery), practical or societal benefit (useful) and economic benefit (valuable) are paramount for technological (innovation) and respectively economic creativity (entrepreneurship). ‘Useful’ and ‘valuable’ as attributes are subsumed with the effectiveness component. In general, it takes a certain minimum level of both originality and effectiveness shall activities be considered as ‘creative’; is this minimum level not satisfied with regard to originality, we can speak of routine activities; in the absence of a certain amount of effectiveness, we talk about fictitious change, which can be either described as quasi- or pseudo creative. An absent minimum level for both conditions (originality and effectiveness) results either in meaningless, purposeless, and recurrent activities or antiquated or obsolete products. Notwithstanding, routine activities – just as standardized mass production – can undergo high level of economic benefit (effectiveness) without being creative. At the same, quasi- or pseudo creative activities (e.g. phantasy) might be very original. Radical or basis innovations (e.g. steam power, electricity) or historical creativity (e.g. Einstein’s theory of relativity) are characterized by tremendous meaningful originality, societal and economic benefit (effectiveness), however, only when meaning is allocated. On the contrary, personal creativity and fake innovation mostly involve insignificant originality and minor levels of effectiveness. As with any typology discrepancies and exemptions are undoubtedly possible. This illustration clearly draws a line between artistic and scientific creativity as well as technological and economic creativity with regard to originality and effectiveness components surely good for an overview and consistent with the traditional understanding of these creativity types. Admittedly, a transformation in the appreciation of those different types of creativity can be observed in the last two decades or so.

Whereas technological (innovation) and economic creativity (entrepreneurship) were mainly of economic significance in the past, artistic and scientific creativity have awoken hands-on and economic interest in the contemporary world. These developments are the results of two intertwined trends. Firstly, a remarkable convergence between the domains of economic and culture / or the arts led to an often described ‘aestheticization of the economy’ and / or a “commodification of culture“ (Lash and Urry, 1994). Hereby, extensive segments of the economy carry a peculiar cultural or artistic content in their products, whereas art is offered and demanded on competitive markets of capitalist society by commercial stakeholders. Secondly, similar tendencies emerge between the domains science and economy under the heading of ‘mode 2’ of knowledge production (Gibbons et al. 1994). Catchwords like the ‘knowledge or knowledge-based economy’ elucidate the loss of the previous monopoly of institutional knowledge production by universities or govern-

mental research facilities (mode 1). Numerous commercial think tanks enter competition with those traditional institutions, and often supply and demand decides what kind of knowledge will be produced. This competition simultaneously leads to an inevitable reconceptualization of universities and their public remits. The practical implementation and economic realization of basic research findings calls for a 'third mission' of economic development by the entrepreneurial university in addition to research and teaching as well as an appropriate academic knowledge management (Etzkowitz et al., 2000: 313).

Figure 2 illustrates a process-like model of the elaborated types of creativity. Despite its rather linear and mechanistic outline it was shown in detail elsewhere that the process might be reciprocal (Lubart, 2000-01), recursive (Eindhoven and Vinacke, 1952), parallel (Calwelti et al., 1992), interactive (when allocating a meaning) (Reichwald and Piller, 2006), iterative (Cropley & Cropley, 2000), open (Chesbrough 2003), integrative (when considered from a holistic point of view) (Ghiselin, 1952) or intertwined (Hollenders & van Cruysen, 2009) with forward and backward linkages (Kline & Rosenberg, 1986). Irrespectively of this changing conception, creativity is still often connected with meaningful originality and therefore implicitly with the domains of science and the arts or as an input variable for economic valuation in economic geography). This perception corresponds with the initially introduced, more traditional, but still popular definition of creativity in the narrow sense. Without implying a causal relationship, studies still treat creativity as follows: "creativity, it is argued, is a prerequisite for innovation, and innovation is the driver of technological change, which in turn boots economic growth" (Throsby, 2010: 6). The changing perception extend this view toward a more holistic view of creativity in the broader sense as 'as something with meaningful originality (originality component), which is useful and valuable at the same time (effectiveness component)'. Hereby, creativity is "not just something that happens at the beginning of a technology when a new idea is hatched or discovered, but continues throughout the trajectory until the novel idea is completely embedded in the economic and social order and becomes a normalized part of the knowledge base" (Potts, 2007: 11). This broad notion of creativity encompasses creation, discovery, innovation, and entrepreneurship. Taking the example of a publication (scientific creativity), the portrayed process can be illustratively reconstructed. A vision, idea or problem definition is followed by a research design or a discovery – the very essence of scientific creativity – which potentially finds its way in a working paper. However, the individual or the group of individuals must be aware of the novelty themselves.

This working paper might be condensed to a useful publication – the community in the peer review decides here what is useful or not. The publication itself can be expressed as a 'market launch' in the economic sense. A diverse application of the publication as driven by citations would equally lead to a 'market diffusion'. A commercial book or third-party funding that follow from this publication might even point to an economic exploitation accelerated by an efficient 'science management' of academic entrepreneurs (Törnqvist 2011) in a last step. Hereby, often markets select what is 'valuable' or not. Taking the whole process in to account – which can be also applied to any other type of creativity – studies show that a threefold evaluation along different stage gates is conceivable (Csikszentmi-

halyi 1999, Meusburger 2009, Suwala, 2014): (1) by the individual or the group of individuals to verify originality, (2) by community of experts to validate the usefulness and (3) by the market to select what is economically feasible in all three cases against a frame of reference (e.g. culture, context etc.). This conclusion is by no means an agenda for an economization of creativity in the sciences or the arts or an aestheticization of creativity in economics and technology, rather a contemporary comment of the alternating understanding of these types of creativity. As shown in the initial definition of creativity in the narrow sense only the attribute of meaningful originality has to be satisfied in order to consider something as creative. In the realm of artistic creativity, the good old ‘Kunst der Kunst wegen’, ‘l’art pour l’art’ or ‘art for art’s sake’ still holds true after all. To conclude, despite this holistic approach towards creativity presented here, bisociation within the very creative act can happen consciously or unwittingly, might carry both constructive and destructive features and can most importantly not be predicted or rationally planned in advance.

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