Value Chain Management
COLOGNE BUSINESS SCHOOL

Carsten Deckert

Tensions in Creativity

Using the Value Square to Model Individual Creativity

WORKING PAPER Nr.2
2015

CBS Working Paper Series, ISSN 2195-6618

Editor: Cologne Business School

E-Mail: wps@cbs.de

Cologne Business School
Hardefuststr. 1
50677 Cologne, Germany

T: 0800 580 80 90 (Free of charge from German landlines and mobile phones)
F: +49 (221) 93 18 09 30

info@cbs.de
www.cbs.de

Abstract

The definition of individual creativity is based on a tension between novelty on the one side and usefulness respectively appropriateness on the other side. The paper explores how this tension pervades the stage and componential theories of creativity. To achieve this, the so called value square ("Wertequadrat") developed by Helwig (1967) and Schulz von Thun (1998) is used which balances a value with its countervalue to analyze creativity. The author identifies tensions of action and inaction, expertise and mindfulness, precision and ambiguity as well as immersion and detachment permeating the creative process and the components of creativity. As a conclusion a morphological box for creativity is presented which allows one to show which combination of characteristics of the tensions support different stages of creativity. Furthermore implications for development and time management are discussed.

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Carsten Deckert

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1. Introduction

"There are two kinds of people in the world, an old joke goes:
those who believe that everything can be divided into two categories –
and the rest of you."
(Pink 2006, p. 25)

Today creativity respectively creative problem-solving is seen as one of the core skills of the 21st century (Bodell 2014, p. 27, P21 2015, Pink 2006, Puccio, Mance & Murdock 2011, p. 3 ff.). The Partnership for 21st Century Learning (P21 2015), a coalition founded by the U.S. Department of Education and leading U.S. companies, includes creativity together with critical thinking, communication and collaboration into the set of skills "that separate students who are prepared for increasingly complex life and work environments in the 21st century, and those who are not".

Creativity of a person usually is defined as "the generation of a product that is judged to be novel and also to be appropriate, useful, or valuable by a suitably knowledgeable social group" (Sawyer 2012, p. 8). Amabile (1996, p. 35) gives a somewhat stricter definition by adding to the above definition that the underlying task should be "heuristic rather than algorithmic." This means that the creative approach is not a strictly linear way to reach the solution, but characterized by trial and error, tentative assumptions and learning loops so that the path to the solution cannot at first be programmed as an algorithm. Boden (1992, p. 30-31) adds that the novelty of creativity is not only grounded in its sheer newness as represented by the unexpectedness of the creative idea, but also in opening up new possibilities which where unthinkable before – at least for outstanding achievements in creativity: "Our surprise at the creative idea recognizes that the world has turned out differently not just from the way we thought it *would*, but even from the way we thought it *could*".

So creativity is typically defined as an idea or solution which is both novel and potentially useful (Hennessey & Amabile 2010). This definition shows that to be accepted as "creative" by others – typically experts in a field – the output of creativity must fulfill two opposing sets of criteria: On the one hand creativity must lead to novelty, unexpectedness

or the opening up of new possibilities. On the other hand the creative result should be appropriate and useful which means that it should be to some extent grounded on existing knowledge and mustn't be too far afield. So the new idea can either be based on the knowledge of a specific domain a person is working in (e.g. classical music) whose rules a person has to learn, internalize and adhere to if they want to be creative in this domain (Csikszentmihalyi 1997, p. 36). It can also be linked to the phenomenon of *zeitgeist* which Boring (1971, cited by Runco 2014, p. 209) defines as "the total body of knowledge and opinion available at any time to a person living within a given culture". So the widely accepted definition of creativity is based on a tension between new and useful or appropriate.

Creativity seems to be full of contradictions and paradoxes which derive from this tension between novelty and usefulness and lead to dilemmas and tensions for people during the creative endeavor. Ray & Myers (1988, p. 137) write that "True creativity seems full of paradox. It simultaneously involves analysis and intuition, order and disorder, judgment and nonjudgment, and […] fullness and emptiness, thinking and nonthinking". Kao (1997, p. 32) compares creativity to improvisation in jazz music and concludes: "In jazz – and in business – the improvisional style derives its power from the way it juxtaposes certain vital human tensions, or paradoxes". Some of the examples for tensions given by him include the established and the new, the need for form and a drive for openness, critical norms and standards and the need for experimentation, responsiveness and individual expressiveness as well as expertise and freshness. And Runco (1996, p. 20) states that in creativity a balance must be found between "experience and naiveté" as well as between "maturity and immaturity, the rational and nonrational, play and serious work, the divergent and evaluative, the personal and social, and the subjective and objective".

All this suggests that creativity is not about either-or-decisions to maximize certain qualities while neglecting or suppressing others. But instead it is rather about achieving a balance combining certain sets of quality. Current research mainly focusses on single qualities in the creative endeavor as will be shown in chapter 2. These linear findings – as valuable as they might be for certain problem descriptions – neglect in some way the fundamental tension underlying creativity. This paper proposes to model creativity with a method which reflects the inherent paradoxes. For this reason the author chose to use

the value square developed by Helwig (1967) – a method to pair values with its counter-values – to analyze stage theories (the creative process) and componential theories of individual creativity and uncover the underlying tensions of pairs of qualities.

To achieve this goal the second chapter describes existing stage theories which describe the creative process and componential theories which describe the essential qualities of creativity without fixing a sequential order. In chapter 3 the method of the value square is described in more detail. With these prerequisites first the underlying tension of the creative process is analyzed and interpreted based on the creative process as proposed by Wallas (1926 cited in Sawyer 2012) in chapter 4. After that the tensions of the components of creativity are described in chapter 5. The components analysed in this paper are taken from the componential theory of creativity by Amabile (1996, 1997, 2010, 2012), but results from other sources will also be included. Finally a conclusion is drawn in chapter 6 which uses a morphological box to display the main findings.

2. Stage and Componential Theories of Creativity

Kozbelt, Beghetto & Runco (2010) classify the theories of creativity and propose ten different categories. The category “Stage and Componential Process Theories” includes theories which either deal with “the creative process in terms of stages, which can be sequential or recursive, or underlying componential cognitive processes”. So this category contains two kinds of theories: stage theories which describe the creative process and componential theories which deal with the qualities (e.g. personality traits, thinking skills and affects) conducive to creativity.

Stage Theories of Creativity

Process models which describe different stages of creativity have been the interest of researchers since the beginning of academic creativity research. Early overviews concerning stage theories can be found e.g. in Guilford (1959) and Peiser (1976, p. 42). A more recent overview of widely used process models is given by Sawyer (2012, p. 89) which is depicted in figure 1.

Already in 1926 Wallas (1926 cited in Sawyer 2012) presented a five-stage process containing the stages preparation, incubation, insight, verification and elaboration. Among the process models Sawyer (2012) analyzed are the models of different creativity schools respectively academic approaches (e.g. CPS = Creative Problem Solving, UK QCA = Qualifications and Curriculum Authority, IDEAL cycle, Possibility Thinking), eminent creativity scholars (e.g. Robert Sternberg, Michael D. Mumford) and industry experts (e.g. Synectics by Arthur D. Little, IDEO model by Tom Kelley (2001)). Based on this comparison Sawyer proposes his own eight-stage process by adding to Wallas’ model a stage at the beginning to “find the problem” and by splitting the preparation stage into “acquire the knowledge” and “gather related information” and the insight stage into “generate ideas” and “combine ideas”.

Figure 1: Selected Stage Theories of Creativity

Wallas	Sawyer	CPS	IDEAL cycle	Sternberg	Possibility Thinking	UK QCA	Synectics	Mumford Group	IDEO
	Find the problem	Framing problems	Identify problems, define goals	Redefine problems	Posing questions	Questioning and challenging		Problem finding	
Preparation	Acquire the knowledge	Exploring data	Learn	Know the domain			Groundwork	Information gathering	
	Gather related information		Look		Immersion	Envisaging what might be	Immersion		Observation
Incubation	Incubation	Construct-ing oppor-tunities	Explore possible strategies	Take time off	Play	Keeping options open		Concept search	
Insight	Generate ideas	Generating ideas		Generate ideas	Being imaginative	Exploring ideas	Divergent exploration	Idea generation	Brain-storming
	Combine ideas	Developing solutions		Cross-fertilize ideas		Making connections and seeing relation-ships		Conceptual combination	
Verification	Select the best ideas			Judging ideas		Reflecting critically on ideas	Selection	Idea evaluation	
Elaboration	Externalize ideas	Building acceptance	Act and anticipate outcomes	Sell the idea, persevere	Self-determi-nation		Articulation of solution, develop-ment and trans-formation, implemen-tation	Implemen-tation planning and action monitoring	Rapid prototyping, refining implemen-tation

Source: Sawyer 2012, p. 89

In this paper the process model of Wallas is chosen for further analysis because it is the classic process model on which a lot of scientific work is based. Newer process models are often variations of Wallas' model (Runco 2014, p. 186, Runco & Pagnani 2011, p. 66). As can be seen from figure 1 other process models sometimes either split phases (e.g. "Insight" into "Create ideas" and "Combine ideas") or add certain phases if necessary for the undertaken research (e.g. the phase "Find the problem" which is of course only needed in situations when no problem is presented to the individual, but the individual has to find her own problem). Furthermore the process model of Wallas is descriptive rather than prescriptive indicated e.g. by the term "Incubation" where other models use imperatives such as "Take time off" or "Play".

Componential Theories of Creativity

The process models have been criticized for giving the impression that creativity is a one-time linear process (Sawyer 2012). In reality creativity is not a linear process but rather a cycle with mini-insights and experimentation which leads to further problems

which have to be solved by a similar cycle again. Componential theories focus more on the different mechanisms or qualities which contribute to creativity and not so much on the sequence of stages (Kozbelt, Beghetto & Runco 2010, p. 31). This reflects the widespread opinion that “creativity is a complex” (Runco 2014, p. xii) including different skills, personality traits and affects amongst others.

Amabile (1996, p. 83 ff., 1997, p. 42 ff., 2010) proposes a Componential Theory of Individual Creativity including the following three components: Domain-Relevant Skills or Expertise can be seen as the basis for creative work and contains factual knowledge, technical skills and talent. Creativity-Relevant Processes or Creative Thinking includes cognitive styles, heuristics for ideation and work styles conducive to creativity. Creative Thinking builds on the existing knowledge and turns it into new ideas. Finally Task Motivation is the passion for the task and contains attitude and perception of one’s own motivation concerning the task. In later publications Amabile (2012) adds Social Environment as a fourth component.

Runco & Chand (1995) developed a two-tiered componential model. The primary tier contains the key processes of creativity (see figure 2), namely Problem Finding, Ideation and Evaluation, but not necessarily in a sequential order. These three components contain diverse skills conducive to these processes. The second tier contains Knowledge and Motivation. The Knowledge component is divided into Declarative Knowledge (factual information) and Procedural Knowledge (procedures or know-how). Motivation is split into Intrinsic Motivation (meaningful work as incentive for creativity) and Extrinsic Motivation (external incentives, e.g. rewards or punishments, for creativity).

Sternberg & Lubart (1991) develop an Investment Theory of Creativity in which “creative people are ones who are willing and able to metaphorically buy low and sell high in the realm of ideas.” This means that creative people pursue ideas which are generally not held in high esteem because they see the idea’s potential and persevere to get the idea developed and finally accepted. The investment theory distinguishes between six sources of creativity. Five of these sources depend on the individual; the sixth one is a supportive environment. The five individual sources are Knowledge, Intellectual Abilities such as synthetic, analytic and practical-contextual abilities, Thinking Styles such as the legislative style, Personality such as perseverance, risk-taking and tolerance of ambiguity as well as Motivation which should be intrinsic and task-focused. The confluence of

these six sources generates creativity, but creativity is more than the sum of these sources. There are thresholds for some components, partial compensation between components and amplifying relations between certain components (Sternberg 2006, p. 88-89, Sternberg 2012, p. 5-6).

Figure 2: Componential Theories of Creativity

<table>
<tr><th>Amabile</th><th>Runco & Chand</th><th>Sternberg & Lubart</th></tr>
<tr><td rowspan="2">Domain-Relevant Skills (Expertise)</td><td>Declarative Knowledge</td><td rowspan="2">Knowledge</td></tr>
<tr><td>Procedural Knowledge</td></tr>
<tr><td rowspan="3">Creativity-Relevant Processes (Creative Thinking)</td><td rowspan="3">Skills in Problem Finding, Ideation and Evaluation</td><td>Intellectual Skills</td></tr>
<tr><td>Thinking Styles</td></tr>
<tr><td>Personality</td></tr>
<tr><td rowspan="2">(Intrinsic) Task Motivation</td><td>Intrinsic Motivation</td><td rowspan="2">Motivation</td></tr>
<tr><td>Extrinsic Motivation</td></tr>
</table>

Source: Own illustration based on Amabile (1996, 1997), Amabile & Tighe (1993), Runco & Chand (1995), Sternberg (2012), Sternberg & Lubart (1991)

The three componential models correspond to each other to a large extent and show considerable overlap (see figure 2). Runco & Chand (1995) split the component Expertise into Declarative and Procedural Knowledge and the Task Motivation into Intrinsic and Extrinsic Motivation. Furthermore their Skills in Problem Finding, Ideation and Evaluation correspond to Amabile's component of Creative Thinking. If one compares the Investment Theory of Sternberg & Lubart (1991) to the Componential Theory of Amabile (1996) Knowledge corresponds to Domain-Relevant Skills and Motivation to Task Motivation. Creativity-Relevant Processes are divided into Intellectual Skills, Thinking Styles and Personality (Amabile & Tighe 1993). For the sake of simplicity the paper at hand will

stick to the three components Expertise, Creative Thinking and Task Motivation. Environmental influences will be neglected, since this paper focuses on the components influenced by the individual.

An analysis by Long (2014) of creativity studies published in major creativity journals between 2003 and 2012 shows that the main research methodology is quantitative, such as experiments and psychometric methodology. Qualitative methodology such as case studies or self-study was only used in 13 % of all empirical studies. As valuable as quantitative methodology is to establish the importance of certain components for creativity it can be criticized that especially for a subject such as creativity a more balanced approach is preferable. Furthermore quantitative research usually gives mainly linear answers or answers in an either-or-fashion, if a component (e.g. personality trait or cognitive style) is conducive to creativity or (seemingly) not. This research is under the assumption that variables which correlate with creativity should be maximized which Anderson, Potocnik & Zhou (2014, p. 1319 ff.) call the “creativity maximization fallacy”. Since the focus of creativity research is often on the ideation stage and neglects other processes such as preparation and verification, some traits and styles are emphasized, e.g. divergent thinking or openness, while the importance of others might be downplayed, e.g. convergent thinking (Cropley 2006, p. 391, Runco & Chand 1995, p. 257). Maximizing these traits and skills is, of course, not reasonable and will in all likelihood not lead to more creativity as defined in chapter 1 as a tension between novelty and usefulness. In this case a combination with quantitative methodology such as meta-analysis can provide a broader picture. This is not to say that qualitative methods are useless, inadequate or inferior, but that the current focus on these methods should be counterbalanced by a more mixed approach. In this paper the value square described in the next chapter is used to analyze the current research regarding inherent tensions accompanying creativity.

3. The Value Square

A method to describe and analyze tensions of values is the so called value square. The value square ("Wertequadrat") was developed by Helwig (1967) with the aim of describing different characters. It was also used by Schulz von Thun (1998) and Romhardt (2000) to show dialectical structures in the intervention into communication and into organizational knowledge. The main idea of the value square is that each positive value not only has a negative exaggeration but also a positive complementary countervalue. The values can be understood as dialectical opposites which complement each other and, thus, have to be balanced. A failure to balance a value results in a negative exaggeration of this value (Helwig 1967, p. 65 ff., Schulz von Thun 1998, p. 38 ff.). Schulz von Thun (1998, p. 40, own translation) writes that "in the value square the notion of an optimum ledger has been abandoned and replaced by the notion of a dynamic balance […]. The notion of a yin-yang-relation of the upper values is also appropriate: They permeate each other, and each contains already a trace element of its opposite pole."

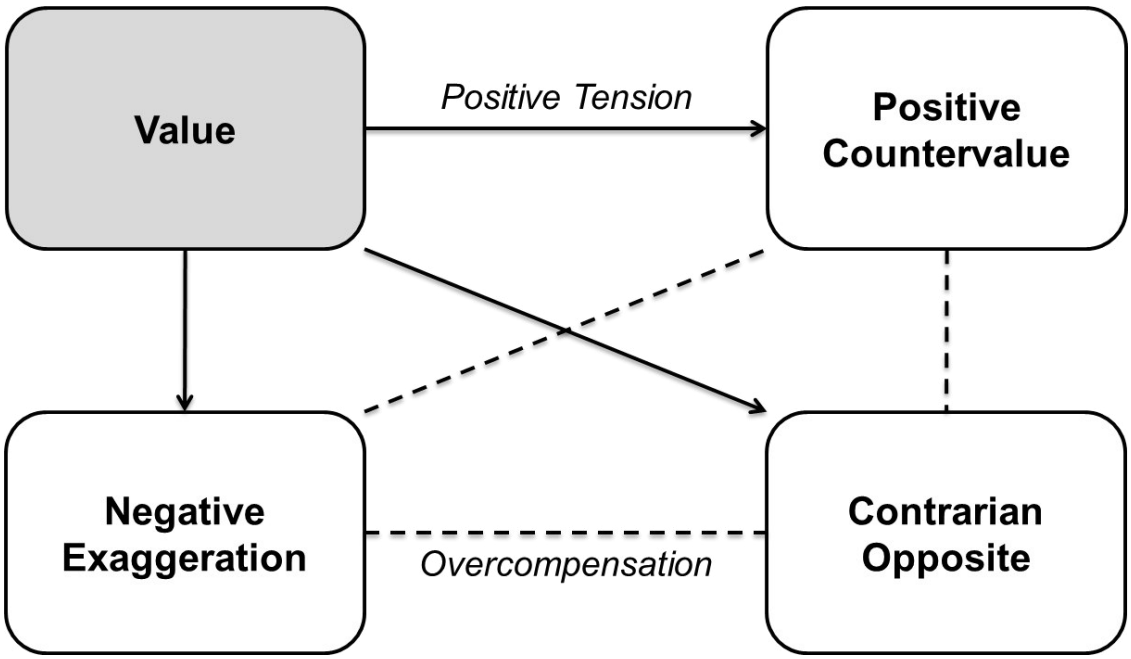
The value square is thus based on the yinyang concept of early Chinese philosophy. In this concept yin and yang are more than a mere dualistic reflection of independent pairs of opposites. Rather this concept includes a rich and complex relationship between the two elements. Wang (2012, S. 7-12) describes the following six forms to characterize the "multiplicity of relations" which is contained in the concept:

- *Contradiction and opposition:* The basis of the yinyang concept is the distinction of apparent differences or contrastive pairs so that yin and yang form polar opposites.
- *Interdependence:* Despite the opposition there is a mutual dependence between yin and yang because the one cannot exist without the other, i.e. one element automatically sets or defines its opposite.
- *Mutual inclusion:* Since there is interdependence between yin and yang, yin includes aspects of yang to a certain degree and vice versa. That means that "yin cannot be adequately characterized without also taking account of yang".
- *Interaction or resonance*: Since yin and yang depend on each other and mutually include each other, one element influences and forms the other element.

- *Complementarity and mutual support:* Based on the descriptions of yin and yang so far, one element possesses what the other one lacks. So it is often appropriate to complement one with the other to achieve a certain balance of characteristics.
- *Change and transformation:* The balance of yin and yang is not a static one but takes on the form of a dynamic balance. One element is continually transformed into the other in a perpetual cycle or spiral.

The value square is constructed as follows (see fig. 3): The upper line shows the positive tension of the two values which together constitute the desired dynamic balance. Typically one starts with a positive value in the upper left field and constructs the corresponding positive countervalue on the upper right of the square which balances the effects of the positive value. The vertical line from the positive value downwards leads to the negative exaggeration of this value. The diagonal leads to the contrarian opposite which is the negative exaggeration of the countervalue. The lower line shows the overcompensation of the negative values when one goes from one extreme of negative exaggeration to the other extreme (Helwig 1967, Schulz von Thun 1998).

Figure 3: Value Square



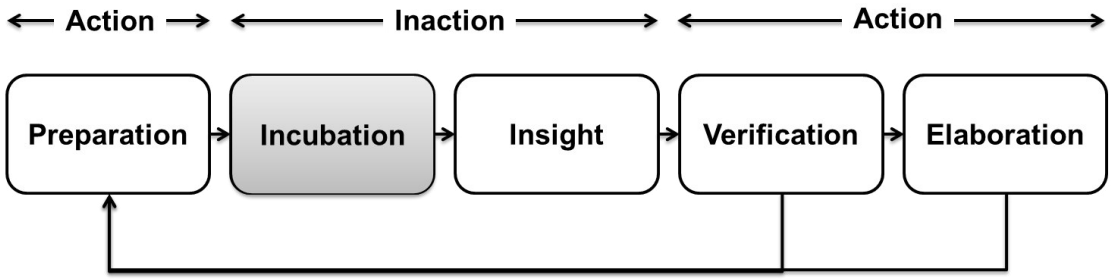
Source: Schulz von Thun 1998, p.41 (own translation)

The value square not only offers the possibility to describe dialectical structures, but also the possibility for improvement, e.g. in choosing a contrarian opposite as a developmental goal when in a position of negative exaggeration without falling into the trap of overcompensation. So the value square can also be seen as a development square ("Entwicklungsquadrat") which helps to choose a developmental path depending on the current position. A developmental path, thus, typically leads from a negative exaggeration along the diagonal to the opposite positive value on the upper line (Schulz von Thun 1998, p. 47).

4. The Creative Process

Typically individual creativity is described as a process model with several more or less distinct stages. As already described above Wallas (1926 cited in Sawyer 2012) proposed a five-stage process containing the stages preparation, incubation, insight, verification and elaboration (see figure 4). The creative process of Wallas, thus, contains stages related to action such a preparation as well as verification and elaboration. But it also includes a stage which can be seen a phase of inaction: the incubation stage. Eight of the ten process models analyzed by Sawyer (2012, p. 89) contain a kind of incubation stage including Sawyer's own model (see figure 1).

Figure 4: The Creative Process According to Wallas



Source: Own illustration based on Wallace 1926 as cited in Sawyer 2012

Incubation can be described as "an unguided unconscious process" (Sawyer 2012, p. 97) from which the creative idea derives. According to Csikszentmihalyi (1997, p. 98) incubation is often seen as "the most creative part of the entire process". It happens after preparation and precedes the insight. The unconscious process of incubation typically takes place when one stops working on the related problem, i.e. during idle time or work on an unrelated task. However incubation only occurs if it is preceded by conscious work in the preparation stage, and the usefulness of the idea is only established if incubation is followed by conscious work in the verification and elaboration stages.

A graphic description of incubation is given by the mathematician Henri Poincaré who could not solve a tricky mathematical problem until he got away from his desk and went on an excursion: "Just at this time I left Caen, where I was then living, to go on a geological excursion under the auspices of the school of mines. The changes of travel made me forget my mathematical work. Having reached Coutances, we entered an omnibus to go some place or other. At the moment when I put my foot on the step the idea came

to me, without anything in my former thought seeming to have paved the way for it […]. I did not verify the idea; I should not have had time, as, upon taking my seat in the omnibus, I went on with a conversation already commenced, but I felt a perfect certainty. On my return to Caen, for conscience´ sake I verified the result at my leisure." (quoted in Ghiselin 1985, p. 26).

Meta-analyses on experiments concerning the incubation effect show that although those experiments sometimes give contradictory results incubation seems to be an existing but complex effect. The appearance and strength of the effect depends on a set of circumstances of the situation in which creativity is supposed to take place. Some of the suspected variables which have an influence on incubation are the nature of the problem or task at hand, the length of the preparation period, the timing and length of the incubation period, the nature of the incubation task and individual differences of the creative person's knowledge and skills (Kaplan & Davidson 1988, p. 42, Sio & Ormerod 2009, p. 107).

So there seems to be experimental evidence which supports the incubation effect although it is not at all clear how it works since incubation is very hard to test under laboratory conditions. Although there are still many open questions concerning incubation the following mechanisms seem to be at work according to the current status of psychological experiments (Sawyer 2012, p. 97 ff.):

Rest: Working on a problem which requires a creative solution is mentally demanding and exhausting. Thus the mind needs some idle time to relax and recover. The physicist Freeman Dyson describes the importance of rest in creative activities as follows: "I am fooling around not doing anything, which probably means that this is a creative period, although of course you don´t know until afterward. I think that it is very important to be idle." (quoted in Csikszentmihalyi 1997, p. 98).

Selective Forgetting: Problems which require creative solutions often contain implicit clues which fix the mind to an incorrect or unfavorable solution. Incubation loosens the attachment of the mind to this solution and, thus, makes way for the exploration of other, more fruitful approaches. Koestler (1967, p. 104) says that the "act of discovery has a disruptive and a constructive aspect. It must disrupt rigid patterns of mental organization to achieve the new synthesis." Later on he also argues: "To acquire a new habit is easy, because one main function of the nervous system is to act as a habit-forming machine;

to break out of a habit is an almost heroic feat of mind or character. The prerequisite of originality is the art of forgetting, at the proper moment, what we know." (Koestler 1967, p. 190).

Spreading Activation and Opportunistic Assimilation: Creativity consists of the combination of ideas from different fields. Incubation allows the mind to gradually activate the necessary concepts in its network for combination ("Spreading Activation"). Furthermore it allows for the possibility to randomly encounter a stimulus in one's everyday activities which leads to a new combination ("Opportunistic Assimilation"). In science this effect of "Opportunistic Assimilation" has also been termed "Serendipity" – the combination of a fortunate accidental experience and sagacity to get a creative idea. The term was originally coined by the British author Horace Walepole in the 18th century after the fairytale *The Travels and Adventures of the Three Princes of Serendip*. Serendipity is claimed to be a significant source of discovery by many scientists, amongst them some Nobel laureates (Merton & Barber 2006).

Incubation may also be related to the phenomenon of "mind wandering" – the thoughts drift away from the task at hand to something unrelated, an action comparable to daydreaming – with the hypothesis of Sawyer (2012, p. 86) "mind wandering serves to provide us with moments of 'mini-insights' that contribute to creative thought" waiting to be tested. Ernst (2011, p. 89, own translation) emphasizes the importance of daydreaming for creativity: "Without imaginative excursions however, without inner simulation of other states and conditions we would remain the slaves of the here and now. Concentration is good and important and in many tricky situations it's imperative. But without its "opposite", without phases in which the brain is occupied with itself – in phases, thus, in which we daydream, fantasize, imagine –, we would be no good problem solvers in the long run." It is not enough though to just daydream. It is also necessary to be aware of these phases and to "exploit" them for the purpose of creative problem-solving as many inventors and creators do according to Ernst.

The creative process is typically not finished with the generation of one creative idea in the insight stage. Verification and elaboration of the work is an essential part of the creative process, and loops and recursions back to the preparation and ideation stages are often necessary. For this reason a current book on creativity is called "Zig Zag" (Sawyer 2013). Further ideas sometimes emerge while people are working on a topic in a playful

manner. This is reflected in a theory called “action theory” which has led to a shift of research focus from contemplation to action (Sawyer 2012, p. 87-88). Some process models give an imperative for action such as “Explore possible strategies” or “Play” in the incubation stage (see figure 1) and some approaches such as the creative process of the US-American company IDEO (Kelley 2001) leave out any form of contemplation or incubation altogether. So on the one hand action seems to be an important element of the creative process. On the other hand contemplation seems to be still a vital part in creative work as is manifested in the incubation stage.

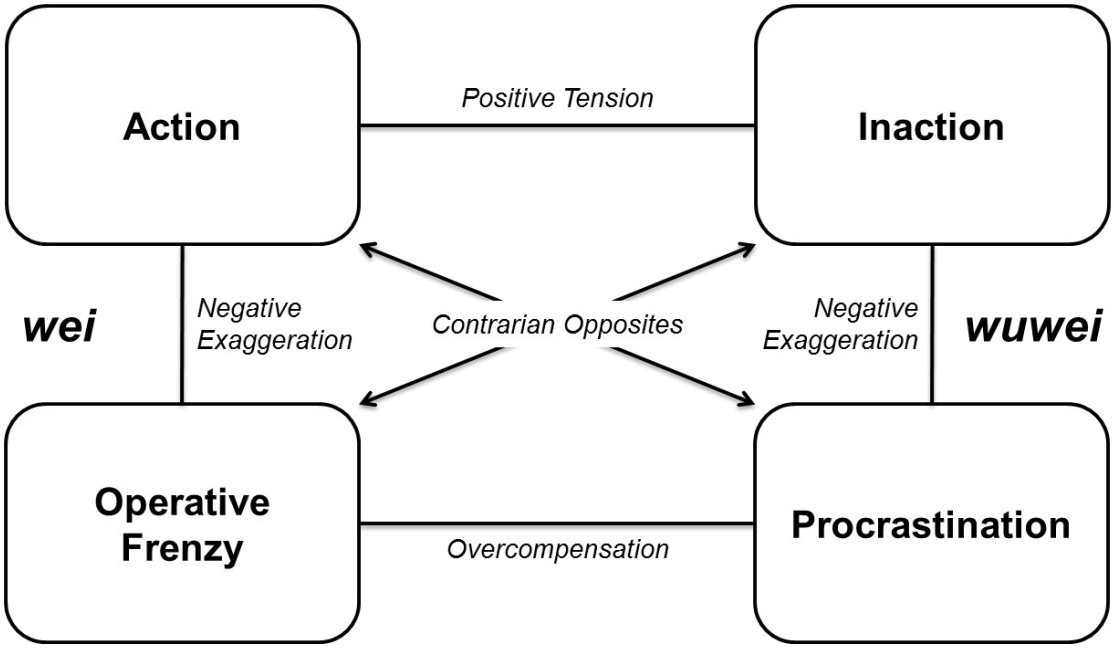
4.1. Tension Concerning the Creative Process

The value square of the creative process of individuals can be constructed as a positive tension of action and inaction respectively “letting things happen”. While action is needed to find problems, seek information, try out ideas and implement solutions, inaction is needed as incubation where the mind can rest, selectively forget false clues, activate other regions of its network and generate new connections by opportunistic assimilation. When action is not balanced it can lead to operative frenzy where new insights cannot be formed due to day-to-day stress and contemplation is seen as unproductive. When inaction is exaggerated it turns into procrastination where problems are not proactively searched or not adequately prepared or the verification and elaboration of new ideas is postponed indefinitely. So the developmental path of a workaholic with no time for creativity would be a forced period of rest for incubation, while the path for a lazy or indecisive person would be prototyping and trying out some of her “provisional” ideas to move forward with them and possibly improve them (Deckert & Scherer 2013, p. 12, Deckert & Scherer 2014, p.109).

The tensions concerning the creative process can be linked to the Daoist concept of *wuwei* (Deckert & Scherer 2013, Deckert & Scherer 2014). According to Cooper (1973, p. 73) *wuwei* “is the doctrine of inaction or non-action, but only a superficial outlook interprets it as laissez-faire, in the sense of indifference, for the Daoist is not indifferent, but should be totally committed to life. If any translation should be attempted, possibly ‘non-interference’ or ‘letting-go’ is the best.” *Wuwei* is a concept that is usually contrasted with *wei* which is intentional or deliberate action. While deliberate action in this context

has the connotation of forcing developments in an unnatural direction, *wuwei* is seen as the ability to let things develop in their natural way and adjust to circumstances adequately as well as seemingly effortlessly and spontaneously. So *wuwei* is not to be confused with "doing nothing", as can be seen from the quote above, or with mindless, automatic reflexes but involves complex cognitive and bodily elements such as tacit knowledge and intuition ("embodied mind"). It is simply put the ability to make the right or natural choice and take the right or natural action at the right time (Slingerland 2003, p. 7 ff.). Hence *wuwei* is sometimes described in a way which shows a large overlap to the concept of incubation. E.g. Cooper (1973, p. 73-74) writes about *wuwei*: "Problems are solved (which, literally, means 'loosened') when tensions are eased and one is able to understand the true nature of a thing, hence 'sleeping on it', or the sudden flash of intuition which comes when the rational mind ceases its activity and a spontaneous recognition of reality occurs."

Figure 5: Tension Concerning the Creative Process



Source: Deckert & Scherer 2013, p.13

In total individual creativity can be described as a concept in which *wei* and *wuwei* alternate, i.e. a balance of action and inaction is achieved where active and passive periods are balanced, and also as a controlled loss of control because no-one can know in advance which creative ideas our minds come up with or if anything sensible emerges at

all. Kelley (2011, p. 86) explains this phenomenon as follows: „There is a Zen-like force here at play: The less you strive to control ideas and insist on credit for those that are yours, the more good ideas you're likely to have – and see implemented."

4.2. Culture of Looking Busy

A work environment in which contemplation is viewed as unproductive people are incentivized to make the impression of operating at full capacity and start to do things simply for the sake of doing things to keep up the appearance of being productive. This kind of setting can be called a "Culture of Looking Busy" (Deckert & Scherer 2013). This is a view which in Western societies seems to have prevailed to a large extent. Claxton (2000, p. 4) writes: "The individuals and societies of the West have rather lost touch with the value of contemplation. Only active thinking is regarded as productive. Sitting gazing absently at your office wall or out of the classroom window is not of value. Yet many of those whom our society admires as icons of creativity and wisdom have spent much of their time doing nothing."

One reason for this could be that labor and time are viewed a resources in Western societies. This metaphor reflects the work ethic and central importance of labor and time in Western cultures and shows a purpose-driven understanding of work. When one views the economic success of some of these societies such a view seems to have its advantages. But it also seems to have its downsides: "The RESOURCE metaphors for labor and time hide all sorts of possible conceptions of labor and time that exist in other cultures and in some sub-cultures of our own society: the idea that work can be play, that inactivity can be productive, that much of what we classify as LABOR serves either no clear purpose or no worthwhile purpose" (Lakoff & Johnson 2003, p. 67).

Sawyer (2013, p. 114) claims that an organizational culture that acts according to the motto "always make sure you look busy" probably does not provide a creative work environment. He advises people in such a situation to search for a retreat for incubation: a nearby café or a bench in the park – or maybe even a new job. Claxton & Lucas (2008, p. 128) call a style of managing innovations in which there is no time for contemplation

and people hastily and prematurely go for the nearest solution “Ready Fire Aim” (a reversal of the original firing order). They give the advice to “Allow yourself time to think and reflect”.

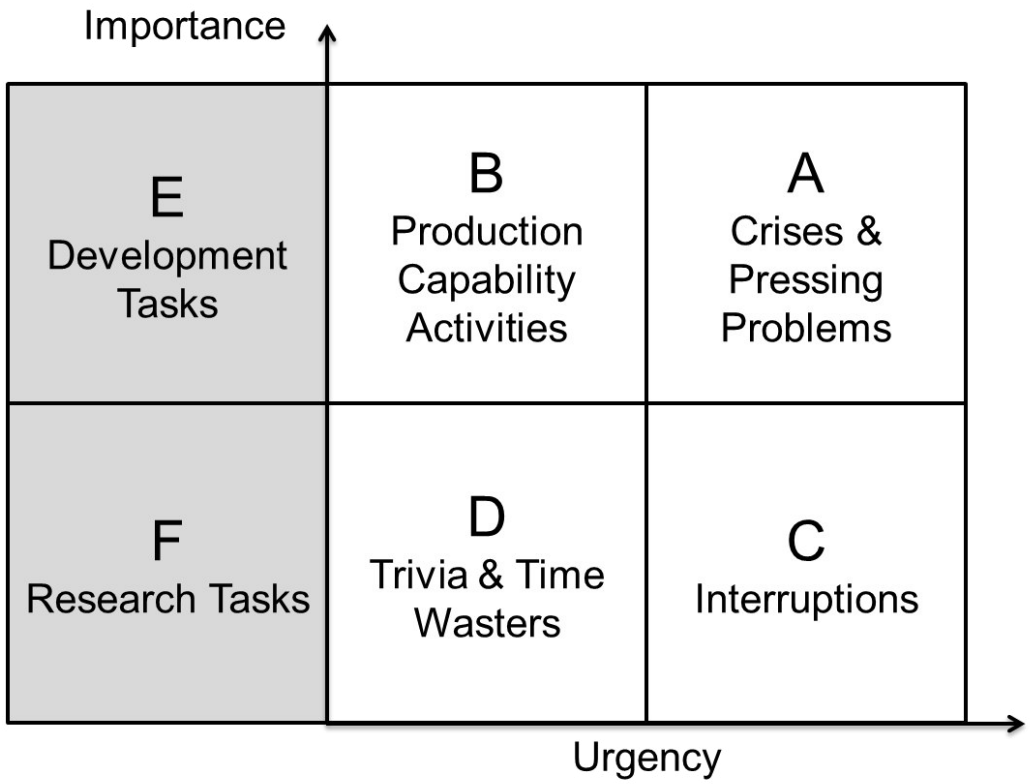
Makridakis, Hogarth & Gaba (2010, p. 155) see a general tension or trade-off between efficiency and innovation in companies. To gain efficiency companies implement control mechanisms. This increases the stress for employees and leaves them nearly no time for contemplation and incubation. They call this phenomenon the “paradox of control” in a company.

All this of course has serious implications for time management. The typical approach here is to categorize tasks according to importance and urgency. This creates a matrix with four categories of tasks (see figure 6, white fields). Tasks which are urgent and important have to be addressed immediately. Those are the pressing problems and crises. Urgent tasks which are unimportant are the visible interruptions which fill a normal workday such as telephone calls. Important tasks which are not urgent are preventive activities with long-term effects. To take on these tasks requires a certain amount of proactivity. Then there are the trivia and time wasters which are neither important nor urgent, but sometimes fun to do (Covey 2004, p. 149 ff.).

Covey (2004, p. 150 ff.) prioritizes importance over urgency and urges his readers to move to Quadrant B calling it the “heart of effective personal management”. These are activities which enhance the personal “Production Capabilities”, i.e. the effectiveness of one’s work. But Meyer (2011, p. 200 ff.) convincingly shows that this in all likelihood will not increase time for creativity. The reason for this is that time management usually deals with tasks which are already there. But contemplation and creativity often deal with tasks which are up-to-now not even known.

So Meyer (2011, p. 202-203) supplements the classical matrix of time management with two further categories (see figure 6, grey fields). Development tasks (Quadrant E) is time for idea generation for existing problems which can lead to solutions for tasks in quadrant A or B. Research tasks (Quadrant F) are activities to get new inspiration and time for contemplation which are not related to current problems or other tasks. Time for development and research tasks has to be blocked in advance and preferably spend away from the workplace.

Figure 6: Implications for Time Management



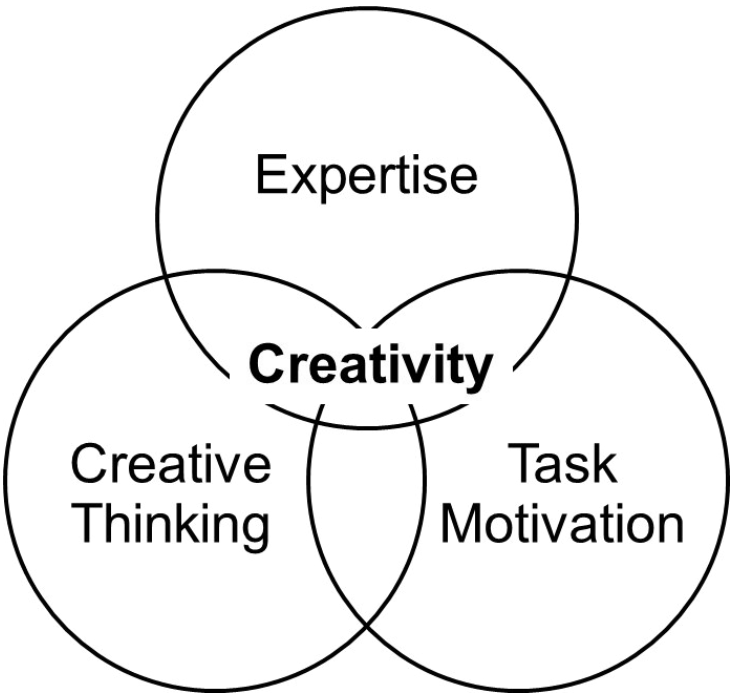
Source: Own illustration based on Covey 2004, p. 151 and Meyer 2011, p. 202

5. The Components of Creativity

As described above the Components Model of Creativity by Amabile distinguishes between the three components Expertise, Creative Thinking and Task Motivation necessary for creativity (see figure 7). Amabile (1996, 1997) defines the three components as follows:

- Expertise respectively Domain-Relevant Skills comprise "the individual's complete set of response possibilities from which the new response is to be synthesized, and information against which the new response is to be judged" (Amabile 1996, p. 85).
- Creative Thinking respectively Creativity-Relevant Processes are skills which determine "the extent to which his [the individual's] product or response will surpass previous products or responses in the domain" (Amabile 1996, p. 87-88).
- Task Motivation "determines the extent to which he [an individual] will fully engage his expertise and creative thinking skills in the service of creative performance" (Amabile 1997, p. 44).

Figure 7: Components Model of Creativity by Amabile



Source: Amabile 1997, p. 43

The model of Amabile will be used as a guiding structure for the tensions, and findings of Amabile will be included in the description of the components. But additionally the findings of other sources will be used to complement Amabile's views and give a more varied picture of the contents of the three components.

5.1. Tension Concerning Expertise

For many researchers knowledge is a key component of creativity (Anderson, Potocnik & Zhou 2014, p. 1305, Scott 1999, p. 119 ff.). Knowledge can be defined as "the representation of the real or imagined reality in a tangible carrier medium which is based on data and information in the real world. […] Knowledge is the foundation for competent action […]" (Deckert 2002, p. 23, own translation). Knowledge incorporates aspects which can be communicated and explicitly codified while it also includes aspects of tacit knowing which cannot be communicated so that "one can know more than one can tell" (Polanyi 1983, p. 8).

Amabile (1996, p. 85 ff.) distinguishes between knowledge about the domain, technical skills required and special domain-relevant talent. Factual knowledge which Runco & Chand (1995, p. 246) call declarative knowledge includes information, principles, scripts and criteria of a domain. Technical skills include necessary techniques of the domain (e.g. laboratory techniques) while talent refers to outstanding skills for which an individual seems to have a natural aptitude (e.g. mental imagery). Runco & Chand (1995, p. 246) subsume these two elements under procedural knowledge or know-how.

Many researchers claim that it takes approximately ten years of dedicated work in a field to gain expertise and achieve an expert status. This is called the "10-year-rule" (Cropley 2006, p. 395, Sternberg 1999, p. 87). As Sternberg (2012, p. 5) observes: "One can't move beyond where a field is if one doesn't know where it is."

But knowledge can also lead to an expert getting stuck in habits and routines. Sternberg (2012, p. 5) refers to this as "a closed and entrenched perspective, resulting in a person's not moving beyond the way in which he or she has seen problems in the past". Knowledge can lead to fixation or being in a "mental rut" which can be defined as "the inability to switch from an inappropriate solution approach to a more productive one"

(Smith, Paradice & Smith 2000, p. 113). Fixation is revealed in the uncritical and mechanized use of solutions which worked in the past, the inability to break a category and use objects in an unfamiliar way to solve a problem as well as the inability to deviate from common knowledge and understanding (structured imagination).

Boden (1996, p. 80) observes that "Human experts used to thinking – painting, composing, doing chemistry – in a certain way may be unable to capitalize fully on their own mental resources, because certain habits of thought cannot be overcome. A heuristic that cannot be dropped, or even postponed, may be very useful in normal circumstances. But when normal […] thinking, within different conceptual space, is required the frozen heuristic can prevent it".

Scott (1999, p. 120 ff.) mentions three aspects of knowledge which influence creativity: The knowledge volume needs to be high in the addressed domain, but content also needs to come from a wide array of domains. Additionally the way knowledge is structured affects the way it is used in creative tasks. Amabile (1996, p. 87) sees it as important that an expert's knowledge is organized according to general principles and approaches instead of retrieving automatic responses. According to her there is also some evidence that creativity can be enhanced by being exposed to a wide array of information in one's domain as well as information from different other domains. Smith, Paradice & Smith (2000, p. 115) count knowledge of other domains for combination and analogy-making – together with knowledge about the domains and creative techniques – among the prerequisites for creativity.

So the layman's notion that too much knowledge is bad for creativity is not true. More knowledge in an adequately structured way and with the appropriate approaches should lead to increases in creativity. Yet, knowledge only represents the "appropriate and useful" side of the general tension of creativity representing the established knowledge of a domain and the current zeitgeist. So knowledge or expertise needs to be balanced with a quality which takes account of the mentioned facts. Runco (1996, 19) states that the "individual needs to benefit from experience, but at the same time avoid relying on it".

Hence, for the component Expertise in creativity the author proposes a tension between expert knowledge necessary to solve a task and mindfulness (see figure 8). Mindfulness is defined as "the awareness that arises by paying attention on purpose, in the present

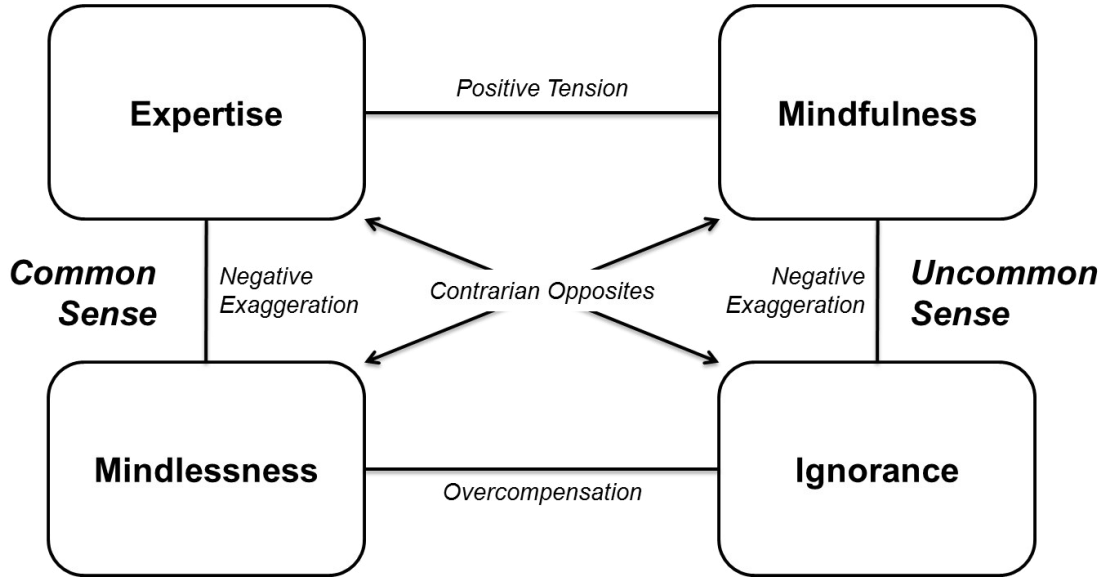
moment, and nonjudgmentally" (Kabat-Zinn 2013, p. xxxv). Components of mindfulness are

- a certain mode of being (such as receptive observation and awareness, active control of attention, prevention of "auto-pilot"-mode, being in the presence),
- certain attitudes towards experiences (such as acceptance, non-judging, non-conceptual thinking, beginner's mind),
- certain techniques (such as concentration and focus, non-conceptual labelling) and
- certain targets (such as inner calm and clarity, self-regulation, facilitation of new experiences)

(Weiss, Harrer & Dietz 2010, p. 20 ff.). According to Langer (2014, p. 63 ff.) mindfulness contains the ability to create new categories, openness for new information, the ability to take on new perspectives, the ability to change contexts and a process orientation rather than result orientation.

Thus mindfulness has a strong influence on how a person perceives new facts, especially facts which are contradictory to existing knowledge, as well as on the way a person classifies and categorizes information and structures knowledge. Without mindfulness expertise degenerates into mindlessness where routines are followed through automatically without critical evaluation. This is typically called "auto-pilot"-mode in the mindfulness literature (see e.g. Weiss, Harrer & Dietz 2010, p. 48). But without expertise as we have seen creativity in a domain is not possible since the individual will be in a state of ignorance concerning the domain and ideation in this field will be at best useless and at worst inappropriate and ridiculous. So the tension between novelty and appropriateness respectively usefulness can be seen as a tension between common sense and uncommon sense.

Figure 8: Tension Concerning Expertise



Source: Own illustration

The tension can be seen as a variant of Piaget´s (2003, p. 53 ff.) concept of "assimilation" and "accommodation". Assimilation means the integration of new behavioral elements into existing cognitive structures. Contrary to that accommodation is the modification of existing cognitive structures caused by new elements. According to Piaget each individual needs to keep a balance between these two mechanisms to facilitate cognitive adaption. While assimilation guarantees continuity of structures and integration of new elements into these structures, accommodation is necessary for variation and development of structures.

The tension is reflected in a few other concepts in the literature about creativity: Runco (1996, p. 12 ff.) sees discretion defined as "mindful choice" as one of the key elements of creativity as it ensures useful originality. Klein (2014, p. 120) distinguishes between "Lack of Experience" which inhibits insights and "Experience" which fosters insights. But he adds: "Experience isn't just about having the necessary knowledge. Experience is about how we use our knowledge to tune our attention" (Klein 2014, p. 126). So for Klein the definition of experience includes not only expertise but also mindfulness and openness to new information.

Maslow (2000, p. 197) calls a similar attitude as mindfulness "Taoist receptivity" and Kao (1997, p. 46) calls it "beginner´s mind" in reminisce of the Zen master S. Suzuki (2011,

p. 1) who wrote: “In the beginner’s mind there are many possibilities, but in the expert’s mind there are only few”. Mindfulness can also be linked to what Ray & Myers (1988, p. 39 ff.) call “Voice of Judgement (VOJ)” which sometimes has to be suppressed to enable a mindful approach.

5.2. Tension Concerning Creative Thinking

Knowledge is a necessary but not a sufficient condition for creativity. Additionally a person needs certain skills in creative thinking which work on the existing knowledge and turn it into new ideas and solutions. According to Amabile (1997, p. 43) Creative Thinking includes “a cognitive style favourable to taking new perspectives on problems, an application of techniques (or “heuristics”) for the exploration of new cognitive pathways, and a working style conducive to persistent, energetic pursuit of one´s work”. A cognitive style conducive to creativity comprises several features for breaking perceptual, cognitive or performance sets or scripts as well as features for open and wide categories and suspended judgment. Creative heuristics are general rules for approaching or addressing problems, such as “Try something counterintuitive”. Finally a work style conducive to creativity includes certain affective skills such as concentration, selective forgetting, persistence and high level of productivity as well as personality traits such as self-discipline, perseverance, independence of judgment, autonomy, tolerance for ambiguity and risk-taking (Amabile 1996, p. 87 ff.).

The transformation of knowledge into new ideas can be roughly classified into the two groups of creativity as combination and creativity as analogy-making (Runco & Chand 1995, p. 250 ff., Sawyer 2012, p. 114 ff.):

Creativity as Combination: Creativity can be described as the combination or recombination of mental categories. Koestler (1967, p. 35) named this mechanism “Bisociation”: “I have coined the term `bisociation´ in order to make a distinction between routine skills of thinking on a single `plane´, as it were, and the creative act which […] always operates on more than one plane. The former may be called single-minded, the latter a double-minded, transitory state of unstable equilibrium where the balance of both emotion and thought is disturbed.”

Usually combinations of categories which are far apart concerning their content are supposed to be the most creative ones. For example the mathematician Henri Poincaré observed: “Among chosen combinations the most fertile will often be those formed of elements drawn from domains which are far apart. Not that I mean as sufficing for invention the bringing together of objects as disparate as possible; most combinations so formed would be entirely sterile. But certain among them, very rare, are the most fruitful of all.” (quoted in Ghiselin 1985, p. 26). This phenomenon can be termed “cross-fertilization” between different disciplines or fields (Sawyer 2012, p. 115) and the “intersection” where concepts from different domains are combined through low associative barriers (Johannson 2006, p.16 ff.). For this to happen a person needs not only a profound knowledge in one domain but knowledge in many diverse contexts and the ability to shift the perspective (Deckert 2004, p. 11).

Creativity as Analogy-Making: The term analogy can be defined as “a comparison between two objects, or systems of objects, that highlights respects in which they are thought to be similar” (Bartha 2013). For Hofstadter & Sander (2013) analogy-making and category-making are synonymous. They describe how new ideas emerge through analogy-making by subdividing categories and by abstracting categories. On the one hand categories can be broken down into ever finer categories and sub-categories to generate finely woven mesh of more and more cases to better distinguish concepts. On the other hand categories can be broadened through abstraction to include more cases and to see different commonalities between concepts. They conclude that there is “a tension between the desire to make finer distinctions that cover very few cases and the desire to make broader categories that cover many more cases” (Hofstadter & Sander 2013, p. 84). This idiosyncratic way of categorizing can be described by the term “category width” (Runco & Chand 1995, p. 258). Hofstadter & Sander (2013) show that analogies can involve word and phrase categories or categories without words (invisible analogies), are used in everyday life (naïve analogies), sometimes as explanatory caricature analogies, as well as in scientific discoveries and can range from very simple analogies to complex conceptual blends as described by Faulconnier & Turner (2002).

Combination of concepts and analogy-making can be traced to the concept of “cognitive fluidity”. This special feature developed in the early human mind and allowed man to combine ideas and knowledge from different specialized intelligences which seems to be missing in earlier predecessors of mankind (Mithen 2003, p. 76).

Neither combinations nor analogies are made without rules or constraints. It is just that creative combinations and analogies break, bend or replace certain rules while leaving others intact. Boden (1996, p. 82) concludes her discussion on creative freedom with the finding that "to drop all current constraints and refrain from providing new ones is to invite not creativity, but confusion". The question is which rules and constraints to break and which to leave in place. This, of course, invites mistakes and wild speculations which can be seen as the downside of both combination of domains far apart (see the quote above by Poincaré about sterile combinations) as well as analogies through category broadening. But errors seem to be the price to pay for creativity. Johnson (2011, p. 142) calls this tension the "signal-to-noise-ratio" and writes that "noise-free environments tend to be too sterile and predictable in their output". For this reason Schulz (2010, p. 328) notes that "Our capacity to err is inseparable from our imagination".

Klein (2014, p. 120) distinguishes between the position "Gripped by Flawed Beliefs" where no insight occurs and the position "Escaped the Fixation on Flawed Beliefs" which can lead to new insights. But he cautions the reader: "There's no simple solution here. [...] Tenaciously clinging to a belief despite contrary evidence can be a mistake, but so can prematurely discarding a belief at the first encounter with contrary evidence" (Klein 2014, p. 124).

Typically creative thinking is described as an interplay of two different thinking styles: convergent thinking and divergent thinking. Scott (1999, p. 119) defines Divergent Thinking as "Thinking that seeks to generate multiple (more than one) appropriate and adequate alternative responses to a single stimulus" while he defines Convergent Thinking as "Thinking that narrows the available responses with the goal of identifying or selecting the single "best" response to a stimulus". Divergent thinking is typically linked to ideation and idea search and convergent thinking to evaluation. But it can be argued that both types of thinking are involved in all the stages of the creative process albeit divergent thinking has a bigger contribution to ideation and convergent thinking to evaluation (Cropley 2006, p. 398, Geschka & Latelme 2005, p. 312 ff., Puccio, Mance & Murdock 2011, p. 56). Creativity techniques are typically based on the distinction of divergent and convergent thinking skills whereby the focus of many techniques usually is on divergent thinking. E.g. brainstorming separates ideation from evaluation and goes for a high number of divergent ideas without criticism in the first step, before ideas are evaluated, prioritized and selected in the second step (Geschka & Zirm 2011, p. 372 ff.).

Divergent and convergent thinking can be described as “umbrella labels” (Runco 2008, p. 94). According to Puccio, Mance & Murdock (2011, p. 60) divergent thinking includes the following skills:

- Fluency: “getting a large number of ideas or responses”
- Flexibility: “getting variety in kinds or categories of ideas or responses”
- Elaboration: “adding to or developing existing ideas or responses”
- Originality: “getting new, novel or different ideas or responses”

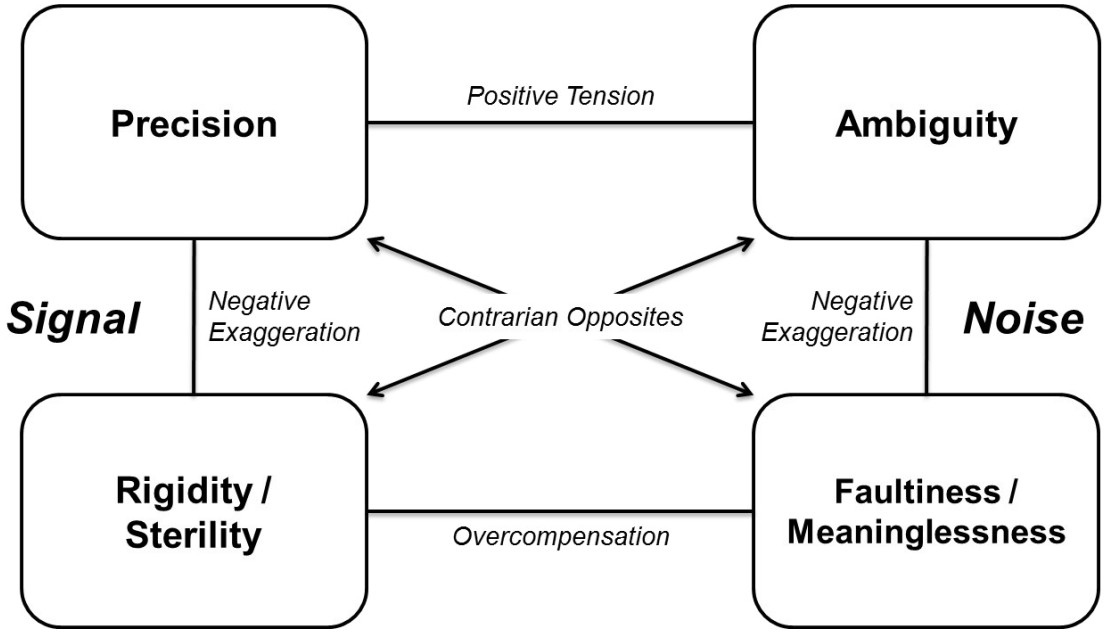
Convergent thinking includes skills to cope with large amounts of ideas or responses such as screening, sorting and prioritizing as well as skills for supporting and developing novelty in the evaluation process (Puccio, Mance & Murdock 2011, p. 61-62).

Divergent thinking is seen as a key element of creative thinking. For this reason many tests for creative thinking focus exclusively or mainly on divergent thinking tasks to forecast creative potential albeit what they are really testing is ideation and originality (Acar & Runco 2012, p. 116 ff.). This goes so far that creative thinking is sometimes equated with divergent thinking which, of course, invites criticism (Cropley 2006, p. 391, Runco 2008, p. 93). Divergent thinking can also be linked to lateral thinking by de Bono (1990) with its central premise of insight restructuring though the generation of alternatives and the challenging of assumptions. It is also linked to the concept of “playful reasoning” where “The playful reasoning style likes to juggle ideas and imagine hypothetical scenarios” (Klein 2014, p. 129). The two thinking styles can also be seen in the concepts of “concentrated attention” and “diffused attention” by Claxton (2000, p. 130 ff.).

Considering all these concepts the author proposes a tension between the need for precision and the tolerance of ambiguity for creative thinking (see figure 9). Without a certain precision ideas would be faulty or meaningless, but without a tolerance for ambiguity precision degenerates into rigidity or sterility. Creative combinations with elements from different domains have the potential to be creative in that they are at least novel. But they also have a high probability of a lack in appropriateness and usefulness (see quote by Poincaré above). The same can be seen for analogy-making. Broadening categories can lead to new insights. But categories which are too broad lead to wild speculations and increase the chance of meaninglessness. Divergent thinking needs tolerance for ambiguity to discover new alternatives, but convergent thinking needs precision to boil the generated ideas down to the one solution to be implemented. The tension can also

be seen as a balance between signal and noise as described by Johnson (2011, p. 142, see quote above).

Figure 9: Tension Concerning Creativity Skills



Source: Own illustration

5.3 Tension Concerning Task Motivation

The mathematician Polya (1988, p. 207) writes the following about problem-solving: “The open secret of real success is to throw your whole personality into your problem”. So knowledge and creative thinking are still not enough for creative performance. The third component in all analyzed componential models is motivation. Motivation can be based on the task at hand which means doing something for its own sake (intrinsic motivation). Or it can be based on external incentives, i.e. the expectation of a reward or the avoidance of punishment (extrinsic motivation).

In her many experiments Amabile (1996, p. 107) has examined the “Intrinsic Motivation Hypothesis of Creativity”: “the intrinsically motivated state is conducive to creativity, whereas the extrinsically motivated state is detrimental”. According to her intrinsic motivation is conducive to creativity in most cases. Rewards are only conducive to creativity

when they are less salient than intrinsic aspects of motivation and when they are given in accordance with performance. Overall her findings show: “There is a consistent positive relationship between expressed interest in an activity and actual creativity of performance” (Amabile 1996, p. 171).

Amabile’s findings are in accordance with the findings of Csikszentmihalyi (1997) concerning the creative personality. In his study of video-taped interviews of ninety-one exceptionally creative individuals Csikszentmihalyi (1997) found out that although these creative persons differ in many ways they have one thing in common: They all love what they are doing and are not driven by the hope for fame or the promise of money. Csikszentmihalyi (1997, p. 110) called this experience the flow in creativity: “This optimal experience I have called flow, because many of the respondents described the feeling when things were going well as an almost automatic, effortless, yet highly focused state of consciousness”. The flow in creativity and other activities is achieved when the task at hand has clear goals, provides immediate feedback, requires a balance between challenges and skills and can be done under exclusion of distractions. The flow in creativity leads to a merging of action and awareness, the forgetting of self, time and surroundings and is generally seen as an autotelic activity meaning an activity which provides joy for its own sake.

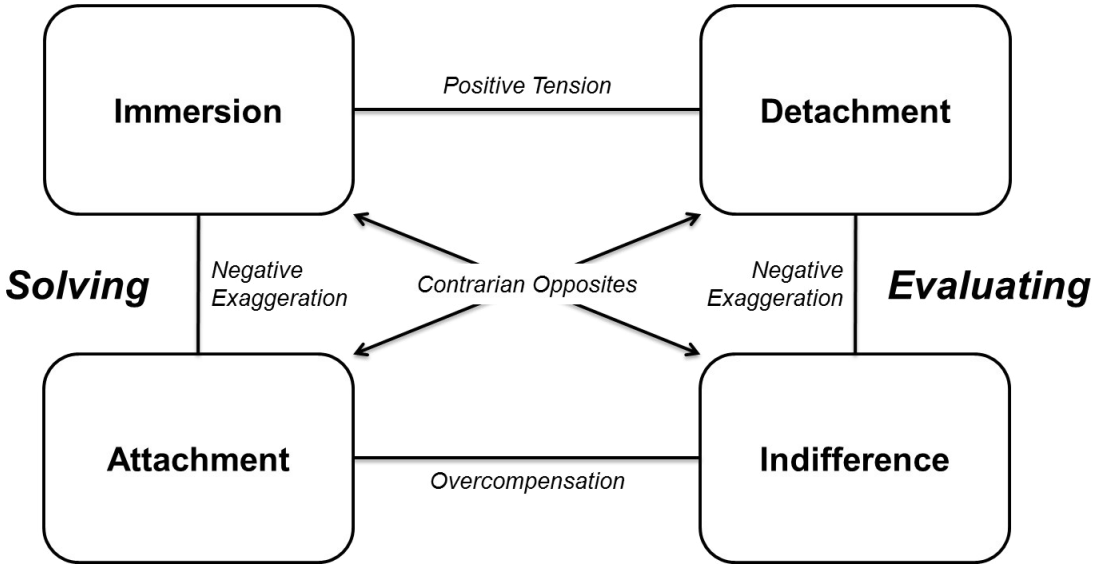
Hennessey (2010, p. 353 ff.), however, in her overview about the creativity-motivation connection observes that there is still a debate between different parties. One side argues that extrinsic motivation has a detrimental effect on creativity only under rare circumstances. The other side opts for Amabile’s hypothesis and sees mainly intrinsic motivation as conducive to creativity. Different contradictory results may be explained by differences in reward types, in measurement and operationalization of creativity, in creative tasks and in the training of the participating individuals. Runco & Chand (1995, p. 260) include Intrinsic Motivation as well as Extrinsic Motivation into their componential model.

The German INNCH-study (2014, p. 63 ff.), a qualitative study based on 20 interviews with creative people in art and science/technology, finds that, although there is a strong urge to create new possibilities (“Drängen des Andersmöglichen”) in creative people, there is also a tension between immersion and detachment (“Eintauchen und Distanz”). Immersion is necessary to fully understand the problem and to gain new perspectives

and views on the problem. It is described as a kind of trance where the ego dissolves and the problem becomes the driving force. Detachment is important to distance oneself from the task and gain back the faculty of judgment for a critical evaluation.

The question of immersion and detachment is also addressed in the method of empathic design. Empathic design seeks to get closer to the potential product user by immersing oneself into the user's world and understanding his needs. Thus, the empathic design process has stages of immersion and connection where the designer enters the user's sphere, interacts with him and tries to fully understand his feelings (affective component) and his perspective (cognitive component). Afterwards there is a stage of detachment in which the designer steps back from the user's world and disconnects from the user emotionally. He becomes the designer again and tries to include the user's perspective into his work (Kouprie & Sleeswijk Visser 2009, p. 437 ff., Sleeswijk Visser 2009,p. 187 ff., Alkaya, Sleeswijk Visser & de Lille 2012, p. 2 ff.).

Figure 10: Tension Concerning Task Motivation



Source: Own illustration

For Task Motivation a tension between immersion and detachment is proposed by the author (see figure 10). A high intrinsic motivation leads to immersion into a problem and all its facets to find a way to solve it. Hence, immersion is a necessary component which represents the novelty aspect of creativity. But it can also lead to attachment to problems which are unsolvable or unimportant, perspectives on the problem which are unsuitable

for its solution and solutions which will not work. Here detachment leads to the necessary “step back” to gain a certain objectivity to evaluate ideas. Hence, detachment represents the usefulness or appropriateness aspect of creativity. But too much detachment would lead to indifference which will negatively affect the creative performance as is shown in the research on intrinsic task motivation (e.g. Amabile 1996).

6. Conclusion

"Man is an embodied paradox,
a bundle of contradictions."
Charles Colton (cited in Mithen 2003, p. 130)

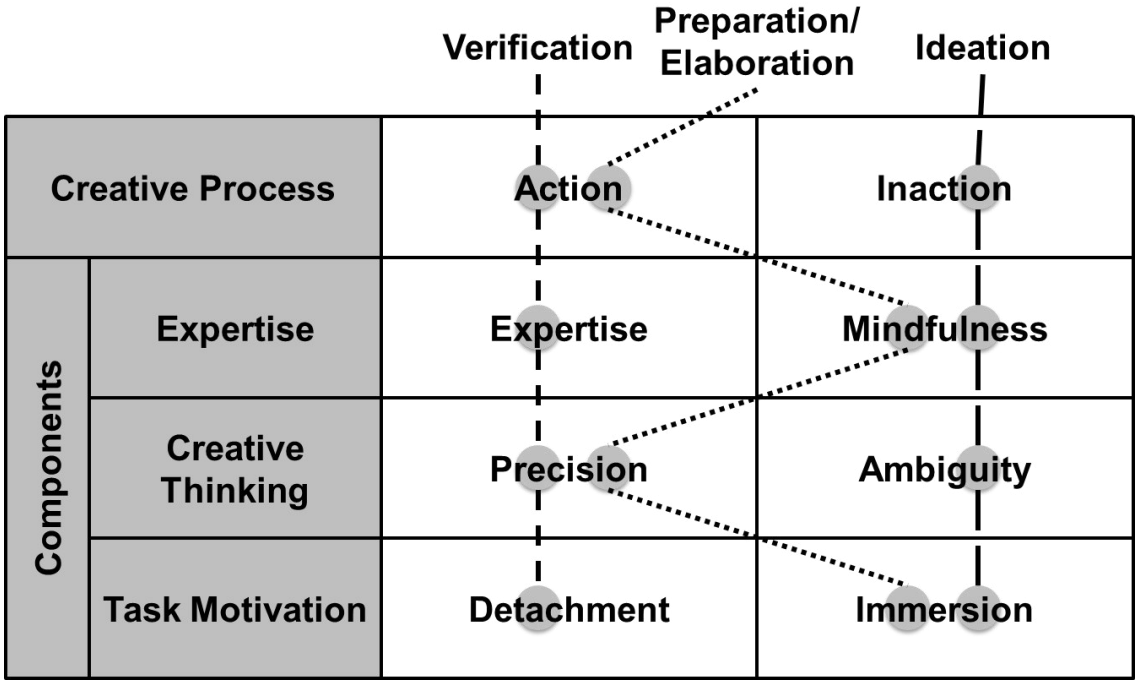
The paper shows that the value square is a useful tool to display, describe and analyze the qualities of the process and the components of individual creativity conducive to creativity. In this way the author hopes to gain a deeper understanding of the underling factors which shape the creative behavior. It is in line with Runco's (2014, p. 415) finding that "Many of the factors that contribute to creativity require optimization" and not maximization.

Starting from the tension of novelty and usefulness/appropriateness in the definition of creativity the author identifies related tensions underlying the stage and componential theories of creativity. For the creative process the author identifies a tension between Action in the stages of preparation, verification and elaboration and Inaction (in the sense of *wuwei*, "letting things happen" or "not-forcing") in the stage of incubation. For the three components of the componential theory according to Amabile (1996, 1997) he proposes the following tensions:

- Expertise: Expertise and Mindfulness
- Creative Thinking: (Need for) Precision and (Tolerance of) Ambiguity
- Task Motivation: Immersion and Detachment

Figure 11 shows a morphological box of the described tensions. Considering the main stages of creativity Preparation, Ideation (as Incubation and Insight), Verification and Elaboration one can identify different paths or combinations through the different tensions in the morphological box.

Figure 11: Morphological Box of Creativity



Source: Own illustration

The Ideation stage as the typical stage of creativity is on the right side of the morphological box as a new insight needs inaction in the form of incubation, mindfulness to be open for new information, ambiguity to find new combinations or analogies and immersion into the problem to find solutions. By contrast in the Verification stage one needs action as one tests one's idea, expertise to evaluate the results, precision to find the "best" solution and detachment to enable "objective" judgment. The stages Preparation and Elaboration contain a mix of the two extreme paths of Ideation and Verification. In these two stages one takes action as one actively searches for information on the problem or receives feedback to improve and fine-tune the idea. One needs to be mindful to be open to new and maybe contradictory or even unexpected information and to take on different perspectives during both preparation and elaboration. But one needs to be precise to accurately prepare the problem or improve the chosen solution. Finally one needs to be immersed in the problem or the solution to have the necessary persistence to tackle the problem or work out the solution in all its details.

This is of course a very coarse-grained picture of the tensions, and the description above does not mean that the pendulum fully swings to the one or the other direction. It should

just demonstrate that there is a certain dominance in the different processes which skips the balance to the one or the other side. But in accord with the yinyang-philosophy as described in chapter 2 is has to be stated that each process of creativity is also permeated and supported by the other side.

It should be noted that the author does not claim to have described all aspects of individual creativity, but at least pointed at the most prominent ones in scientific literature. Further research is necessary to validate und complement these factors. Another limitation is that there are still some overlaps between the categories. So e.g. mindfulness in its full definition also affects creative thinking and task motivation. But the author hopes to at least have pointed in a possible research direction to better take the tensions of creativity into account. It should also be noted that the approach is strictly limited to individual creativity and that neither impacts of the social environment nor of the work environment in corporations have been included – not even the impact of the social environment on creativity as in the models of Amabile (2012) and Sternberg & Lubart (1991) – as the author exclusively focused on the individual.

One positive aspect of this approach is that it can be used to provide suggestions for development for individuals for each stage in the creative process. So persons who are active and precise need to learn to use contemplation, incubation and ambiguity in the ideation stage. The implications for personal time management described in chapter 4.2 show how the need for incubation can be included as development tasks and research tasks in the matrix of importance and urgency. Of course, all this will not guarantee success in being creative. As Klein (2014, p. 129) observes: “There are, of course, many instances in which people rooted out all shaky beliefs; worked hard to develop expertise; had an active persisting attitude; speculated like crazy; and still got nowhere”. But at least success should be more probable.

Including all the personality traits, skills and affects in one person to fulfill the different requirements of tensions in creativity seems to call for a super-human being or the proverbial Renaissance man. So one solution could be to team up with other persons who complement one’s own weaknesses or to build heterogeneous multidisciplinary teams in a corporation to combine the strengths of different employees. Another solution could be to pick the right creativity technique in the respective stage to support the creative endeavor or to take some of the – maybe sometimes unusual – measures to foster or

strengthen certain qualities, such as to take a walk in the park to facilitate incubation or to take on mindfulness-based meditation practices to increase mindfulness. Further research will have to clarify what works for whom under what circumstances.

This paper advocates the acknowledgement of and further research on the tensions in creativity which derive from the basic tension of novelty versus usefulness respectively appropriateness inherent in the definition of creativity. Furthermore it calls for a research methodology which takes the tensions in the creative process and the different components into account. Finally the author hopes that new insights, methods and tools for the improvement of creativity can be gained from this approach as has been indicated by the implications on time management (see chapter 4.2). Because as Slingerland (2014, p. 196) writes: “Paradoxes are not something that you *solve*, they are something that you learn how to live with”.

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Author

Prof. Dr. Carsten Deckert is Professor of Logistics and Supply Chain Management, member of the senate and head of the research cluster Value Chain Management at Cologne Business School (CBS) where he is also responsible for the lectures in Technology and Innovation Management (TIM). He acquired practical experience amongst others as a partner and member of the management team at Deckert Management Consultants GmbH in Düsseldorf and as a member of the Executive Board of Deutsche Aktionsgemeinschaft Bildung-Erfindung-Innovation (DABEI) e.V., a German non-profit organization fostering education, invention and innovation.

Contact

Prof. Dr. Carsten Deckert
Cologne Business School (CBS)
Hardefuststr. 1
50677 Cologne
Phone: +49 (0) 221 931809-661
Fax: +49 (0) 221 931809-61
E-Mail: c.deckert(at)cbs.de