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Tensions in Creative Products

Using the Value Square to Model Functional Creativity



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Abstract

The standard definition of creativity is based on a tension between originality and effectiveness. The paper explores how this tension pervades the functional creativity of creative products. To achieve this, the so called value square (“Wertequadrat”) developed by Helwig (1967) and Schulz von Thun (1998) is used. The value square balances a value with its countervalue. The author identifies two tensions – the tension concerning style and novelty and the tension concerning resolution and novelty – which both represent the tension between effectiveness and originality of the standard definition. Furthermore a tension within effectiveness is identified – a tension concerning style and resolution. The implications of these tensions on product design are discussed and as a conclusion a dilemma of customer insight is developed.



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1 Introduction

*“Anything that won’t sell, I don’t want to invent.
Its sale is proof of utility, and utility is success.”*

Thomas Alva Edison (cited in Tidd & Bessant 2009, p. 20), inventor

Surveys of renowned consultancies such as Arthur D. Little, the Boston Consulting Group, McKinsey, PricewaterhouseCoopers (PwC) and Strategy& (formerly Booz & Co.) continuously and consistently propose a positive relationship between a company’s innovations and its performance. Innovative companies typically generate more sales from new products than weak innovators and have a higher chance to produce successful breakthrough innovations, but do not necessarily spend more on research and development (R&D) activities. Innovative products are said to lead to higher revenue growth rates, higher EBIT and higher customer satisfaction (see e.g. Arthur D. Little 2010, Chan, Musso & Shankar 2008, Jaruzelski, Staack & Goehle 2014, Jaruzelski, Staack, & Schwartz 2015, PwC 2013a, PwC 2013b, Ringel, Taylor & Zablitz 2015, Wagner et al. 2014). This is also reflected in the measures companies use to assess their innovation activities. The main measures are revenue growth, customer satisfaction and percentage of sales from new products according to a McKinsey survey (Chan, Musso & Shankar 2008, p. 5).

Innovation is typically defined as an invention or creative product and its commercialization (Deckert 2012, p. 6). So product innovations are based on creative products. The standard definition of creativity contains a tension of originality and effectiveness (Runco & Jaeger 2012, p. 92). This phenomenon can also be termed the originality-effectiveness duality of creativity (Deckert 2016, p. 2). Product creativity is usually defined in a sociocultural way and deals with “products judged to be novel and appropriate by the relevant social group” (Sawyer 2012, p. 11). Concerning the novelty of a product other, stricter definitions include aspects such as heuristic task, unusualness or unexpectedness of the solution and sometimes even inconceivableness of the solution. This means that creative products often lead to surprise or even fascination and open up new perspectives and possibilities (Amabile 1996, p. 35, Boden 1992, p. 30). Runco (2014, p. 401) gives an overview of seven definitions of creativity by creativity scholars which all include a product. Most of these definitions include the tension between originality and effectiveness as proposed by the standard definition.



For creative products in a company context Cropley & Cropley (2010, p. 301) propose the term “functional creativity”: Functional Creativity is a quality leading to “novel products that serve some useful social purpose” (Cropley, Kaufman & Cropley 2011, p. 16). These products are typically “engineered artifacts or manufactured consumer goods”. Thus, the focus of functional creativity is more on the side of effectiveness: Creative products have to fulfill a specific customer need to be successful. But nonetheless functional creativity contains the same general paradox between originality and effectiveness as individual creativity (Deckert 2015, p. 2) and corporate creativity (Deckert 2016, p. 2).

The goal of the paper is to show how the tension of the standard definition permeates the characteristics of creative products. The focus of this paper is on functional creativity and, thus, manufactured products. To achieve this goal, firstly, the basic tensions of creative products are worked out by defining creative products, describing product characteristics and attributes and showing the impact of product packaging. After that the method of the value square is described. In the following chapter the value square is used to model and analyze the basic tensions of creative products. Finally, in the conclusion the key findings are summarized and research limitations are discussed. The paper ends with a final dilemma of customer insight.



2 Creative Products

*„Today no manufacturer, from General Motors to the Little Lulu Novelty Company, would think of putting a product on the market without benefit of a designer.”
Raymond Loewy (1951, p. 205), industrial designer*

The term “product” is often not defined or, if it is defined, it is only described in a teleological way. The Merriam-Webster Dictionary (2016) defines a product as “something that is made or grown to be sold or used” and “something that is the result of a process”. In accordance with that the Cambridge Dictionaries Online (2016) define a product as “something that is made to be sold, usually something that is produced by an industrial process or, less commonly, something that is grown or obtained through farming”. Aside from the tautology that a product is something that is produced these definitions just contain the economic aspect that a product is to be sold.

In contrast Low (1982, p. 23) defines a product as an “idea in a form with a demand”. The idea determines the function and relations of the product, so the product is the expression of the idea in a certain form. The form of the idea is usually determined by the manufacturing process, but form also covers the configuration of services and business models. The criterion demand means that a product has to fulfill a customer need to be sold, i.e. that there are people who are willing to pay for the product (Low 2008, p. 88 ff.). In line with this definition it can be argued that a creative product is a product where at least one of the three criteria is considered new (see fig. 1). Thus, a product with a new underlying idea can be seen as a product innovation, an existing product in a new form as a process innovation and a product with a new demand as a position innovation to use the terms by Tidd & Bessant (2009, p. 21 ff.).

Products sold by companies can be divided into B2B-products (business-to-business) resp. industrial goods and B2C-products (business-to-consumer) resp. consumer or final goods. B2B-products are sold from one company to another while B2C-products are sold from companies to individuals or consumers (Kreutzer, Rumler & Wille-Baumkauff 2015, p. 13, Circle Research 2016, Springer Gabler Verlag 2016a, Springer Gabler Verlag 2016b). Furthermore products can be divided into durables and consumables. Consumables are used to create other products (e.g. primary material) or are destroyed during use (e.g. food) while durables are used over a longer period of time (e.g. machinery, cars) (Springer Gabler Verlag 2016c, Springer Gabler Verlag 2016d). Durables and consumables exist in B2B and B2C industries. Consumables in a B2B environment can be termed Limited Engagement Business Goods (LEBG) and in a B2C environment Fast Moving Consumer Goods (FMCG). Typically B2B-products,



especially durables, are more complex, are linked to services and have markets with fewer buyers (Circle Research 2016).

Figure 1: Types of Creative Products

		Idea	Form	Demand
Existing Product		old	old	old
Creative Product with regard to...	Product Innovation	<i>new</i>	old or new	old or new
	Process Innovation	old	<i>new</i>	old or new
	Position Innovation	old	old	<i>new</i>

Source: own illustration based on the product definition of Low (1982, p. 23) and the innovation types of Tidd & Bessant (2009, p. 21 ff.)

In a company the process to develop a creative product is usually called new product development (NPD), and the early stage of idea generation is called fuzzy frontend of the NDP (Tidd & Bessant 2009, p. 341). The early stages of the NPD primarily deal with idea and form of a product while the later stages deal with the commercialization of the product for a specific market demand.

To find characteristics of creative products, firstly, the product is viewed as a “holon”, i.e. not only as an autonomous “whole”, but also as a component of a bigger unit such as a more complex product or a business model. The first aspect is especially important for B2C-goods while the latter is more important for B2B-goods. After that the criteria of creative product scales used to measure functional creativity are studied. Additionally the perceived product attributes of diffusion theory are analyzed, since they impact the rate of adoption of a product and, hence, its success on the market. Furthermore the impact of sales packaging on product perception is analyzed as it is especially important for B2C-products. This proceeding allows for the identification of the main tensions concerning the creative product.



2.1 Product as a “Holon”

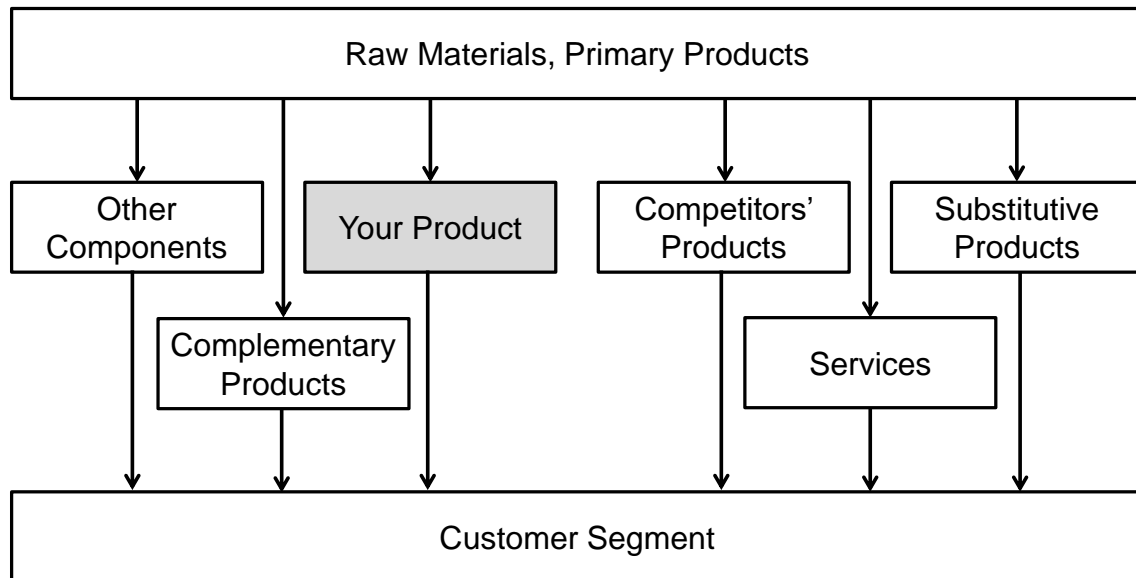
A product can be understood as a “whole”, i.e. a sellable unit in itself. But at the same time it can be seen as a “part” of a hierarchy of a bigger unit, e.g. as a component of a more complex product or of a business model. Koestler (1975, p. 48) proposes for these “nodes in the hierarchic tree which behave partly as wholes and wholly as parts” the term “holon”: “from the Greek *holos* = whole, with the suffix *on* which, as in *proton* or *neutron*, suggests a particle or part”. Originally Koestler (1975, p. 45) uses the term “holon” to describe the hierarchy of living organisms and social organizations including these organisms. But the term can also be used for a creative product as a product can be viewed as an autonomous entity which can be produced and sold separately. But it can also be seen as a dependent entity as it is often a component of a bigger product, a part of a competitive environment and a portion of the value proposition of a certain business model.

In a B2B-environment companies often deliver consumables which are built into other, more complex products or durables which are used e.g. as machinery to manufacture other B2B- or B2C-products. B2B-durables are finished goods consisting of B2B-consumables which are primary materials or semi-finished goods (parts, assemblies or modules). So typically B2B-products are complex consumables or durables linked to services, since these products are in need of explanation and as finished products require repair and maintenance procedures to function over longer periods of time (see chapter 2). This shows that especially B2B-consumables can be viewed as “holons”, since they are often autonomous products (e.g. an engine), but also a component of a more complex semi-finished or finished product (e.g. a car).

A product can also be positioned in the competitive environment. Basically the product can be viewed as one of many competitor products to fulfill a certain need. In this way the threat of substitution can be detected. But it can also be seen as a means to fulfill several customer needs. In this way further applications of a product or a technology might be spotted (Pfeiffer et al. 1997, p. 69 ff.). The competitive environment contains not only competitors’ products but also substitutive products, complementary products and related services. Furthermore technological changes in raw materials, primary products and components are relevant with regard to product innovation activities (Geschka 2005, p. 388 ff.) (see fig. 2).



Figure 2: Competitive Environment of a Product



Source: Geschka (2005, p. 389, own translation)

Furthermore a product can be seen as a part of the value proposition of a business model. “A business model describes the rationale of how an organization creates, delivers and captures value” (Osterwalder & Pigneur 2010, p. 14). Other typical building blocks concerning the value creation of a business model are customer segments, communication and distribution channels, customer relationships and revenue streams (Osterwalder & Pigneur 2010, p. 16 ff.). Conceiving a product in such a way can broaden the view to enable more and most likely more successful innovations than a simple improvement of product performance. Apart from the product offering (product performance and product system) Keeley et al. (2013, p. 16 ff.) identify innovation possibilities concerning configuration (profit model, network, structure and process) and experience (service, channel, brand and customer engagement).

So a creative product usually encompasses a tension between a self-assertive tendency of a “whole” and an integrative tendency of a “part”. The self-assertive tendency results from the fact that a product – even a semi-finished good – can be seen as a complete sellable unit underlying all value creation processes including new product development. It can be improved and developed more or less independently and new product features can be added. The integrative tendency results from the fact that a product – even a finished good – is part of a bigger unit. It has to be compatible to existing standards, competitive circumstances and needs resulting from the business model and must be adapted carefully to fit into the bigger unit. So the self-assertive tendency represents the novelty side of creativity, and the integrative tendency supports the effectiveness side.



2.2 Creative Product Scales

Creativity metrics can be classified into metrics for persons/personality, for products and for groups of ideas (Oman et al. 2013, p. 69 ff.). The creative process and its methods are usually measured through the outcomes generated, i.e. through metrics of products or groups of ideas, since many related activities in creativity are difficult to observe (Henessey & Amabile 2010, p. 572 f., Shah, Vargas-Hernandez & Smith 2003, p. 115 ff.). Furthermore it can be argued that “The creative *product* is not simply the conclusion of a process of creativity; it is the *embodiment* of that creativity” (Cropley & Kaufman 2012, p.120).

To measure creativity in a product usually the Consensual Assessment Technique (CAT) is used. The CAT is based on the assumption that “a product or response is creative to the extent that appropriate observers independently agree it is creative” (Amabile 1996, p. 33). The assessment of expert judges helps to avoid the criterion problem, i.e. the problem which criteria constitute creativity in a product. It has been shown that the CAT seems to be a reliable assessment method but brings with it a set of other related problems, e.g. the question of how to define and find an “appropriate observer” (Plucker & Makel 2010, p. 58 ff.).

A number of assessment methods try to measure creative products through a set of criteria which supposedly constitute creativity with regard to a product. In an overview of creativity tests for products Cropley (2000, p. 77) finds the following measured facets of products: originality, relevance, usefulness, complexity, understandability, pleasingness, elegance/well-craftedness and germinality. Newer overviews of metrics to measure creative products are given in Kudrowitz & Wallace (2013, p. 124) and Oman et al. (2013, p. 69).

The paper at hand focusses on what Cropley & Cropley (2010, p. 301) call “functional creativity”. The main scales to measure functional creativity of products according to Cropley (2015, p. 76 ff.) are the Creative Product Inventory (CPI) by Taylor (1975), the Creative Product Analysis Matrix (CPAM) by Besemer (2013) and the Creative Solution Diagnosis Scale (CSDS) by Cropley, Kaufman & Cropley (2011).

The Creative Product Inventory (CPI) by Taylor (1975, p. 313 ff.) uses seven product criteria to evaluate the product itself and the effects the product has on the field, on the problem and on society. The criteria are in order of importance (Taylor 1975, p. 314 ff.):

- Generation (“degree to which a product initiates activity of oneself and others as an effect of the product”),
- Reformulation (“extent to which the product introduces significant change or modification in oneself and others”),



- Originality (“degree of the product’s usefulness, uncommonness, or statistical infrequency”),
- Relevancy (“extent to which the product satisfactorily provides a solution to a problem”),
- Hedonics (“valence or degree of attractiveness the product commands”),
- Complexity (“degree of range, depth, scope or intricacy of the information contained in the product”) and
- Condensation (“degree to which the product simplifies, unifies, and integrates”).

The Creative Product Analysis Matrix (CPAM) is a three-dimensional model for the evaluation of creativity in products. The CPAM includes the following criteria (Besemer 2013, p. 59 ff.):

- Novelty is the “degree of newness in a product” with regard to the product itself, but also to the materials, processes or concepts in a product. The characteristics of Novelty are surprise and originality.
- Resolution is the “degree to which the product fits or meets the needs of the problematic situation” and determines “how well the product works, functions, or does what it is supposed to do”. The product should be logical, useful, valuable and understandable.
- Style (formerly “Elaboration & Synthesis”) is the “degree to which the product combines unlike elements into a refined, developed, coherent whole, statement or unit”. According to this criterion a product should be organic, well-crafted and elegant.

From the CPAM the Creative Product Semantic Scale (CPSS) was developed which includes 55 attribute pairs to evaluate creative products (O’Quin & Besemer 2006, p. 36).

The Creative Solution Diagnosis Scale (CSDS) started as a catalogue of 30 indicators categorized into the four criteria Relevance & Effectiveness, Novelty, Elegance and Genesis. Novelty was subdivided into Problematization, Existing Knowledge and New Knowledge; Elegance was subdivided into Internal Elegance and External Elegance (Cropley & Cropley 2005). Through several tests and statistical analyses the 30-Item-CSDS was condensed into a 24-Item-Revised CSDS; six items were found to be redundant. The Revised CSDS includes the five criteria Relevance & Effectiveness, Problematization, Propulsion (formerly “New Knowledge”), Elegance and Genesis. (Cropley & Cropley 2008, Cropley & Kaufman 2012, Cropley & Kaufman 2013, Cropley, Kaufman & Cropley 2011).

The criteria of the CSDS can be described as follows:

- The criterion “Relevance & Effectiveness” captures in how far the “Solution displays knowledge of existing facts and satisfies the requirement in the problem statement” (Cropley & Kaufman 2012, p. 124).



- The criterion “Novelty” is divided into the two criteria Propulsion and Problematization. Propulsion involves the “generation of novelty” (Cropley, Kaufman & Cropley 2011, p. 24) and is characterized by the factors of the Propulsion Model by Sternberg, Kaufman & Pretz (2004). Problematization shows the “recognition of weaknesses in what exists” (Cropley, Kaufman & Cropley 2011, p. 24 f.)
- The criterion “Elegance” includes internal elegance (“Solution is well worked out and hangs together”) and external elegance (“Solution strikes observer as beautiful”) (Cropley & Kaufman 2012, p. 125).
- The criterion Genesis shows in how far “Ideas in the solution go beyond the immediate situation” (Cropley & Kaufman 2012, p. 125).

Other researchers use similar structures albeit their scales might differ considerably, e.g. Horn & Salvendy (2009, p. 234) use parameters for Novelty, Importance and Affect. Additionally to the needs of the user of the product the practicality in production can be included. So Kudrowith & Wallace (2013, p. 135) use the criteria Novel, Useful and Feasible.

Figure 3: Comparison of Creative Product Scales

Creative Product Inventory (CPI)	Creative Product Analysis Matrix (CPAM)	Creative Solution Diagnosis Scale (CSDS)
Generation	Novelty (surprising & original)	Genesis
Reformulation		Novelty (Problematization & Propulsion)
Originality		
Relevance	Resolution (logical, useful, valuable & understandable)	Relevance & Effectiveness
Complexity		
Condensation	Style (organic, well-crafted & elegant)	Elegance (Internal Elegance & External Elegance)
Hedonics		

Source: own illustration based on Besemer (2013), Cropley (2015), Cropley, Kaufman & Cropley (2011), O’Quin & Besemer (2006), Taylor (1975)

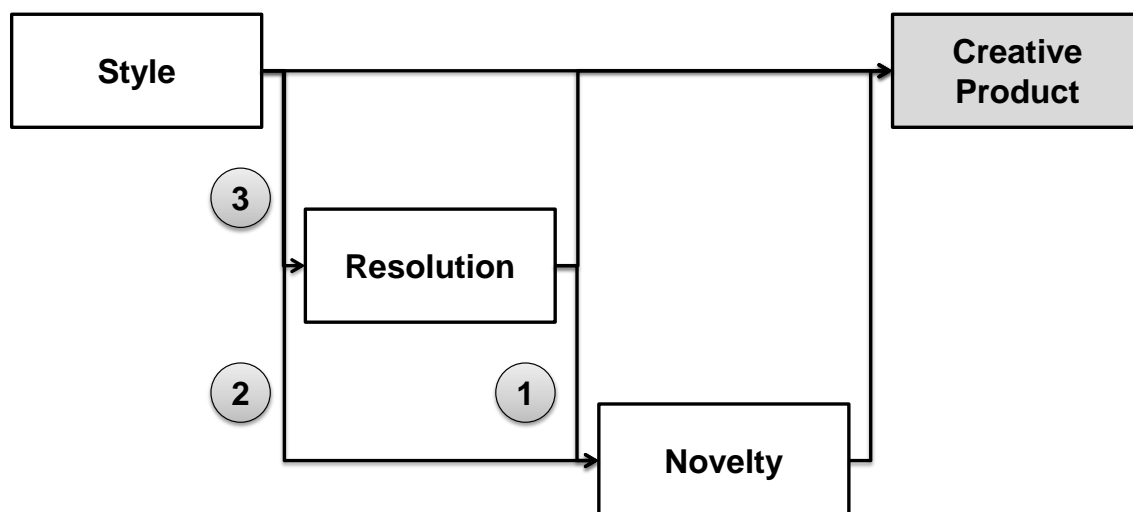


The three models show considerable overlap in their criteria (see fig. 3). First of all, all three models include a criterion or several criteria representing the novelty side of creativity. About her literature research concerning creative products Besemer (2013, p. 59) writes: “When evaluating a work of art or a new product on the market, the first question critics ask seems to be ‘How new is it?’”. In the CPI Novelty is divided into Generation (initiation of new activities), Reformulation (initiation of change) and Originality. The CSDS distinguishes between Genesis (going beyond the immediate situation), Problematization (perception of weaknesses of existing options) and Propulsion (novelty of the solution).

Furthermore all three models contain criteria representing the effectiveness-side of creativity. These criteria characterize the functionality of the product, i.e. how well a product fulfils a need or solves a problem. In the CPAM effectiveness is represented by Resolution (logical, useful, valuable, understandable) and in the CSDS by Relevance & Effectiveness. The CPI distinguishes between Relevance (providing a solution) and Complexity (extent of embedded information).

What is surprising is that all three models contain a third criterion which deals with the aesthetic appeal of a product. The CPAM calls this criterion Style (organic, well-crafted, elegant) and the CSDS refers to it as Elegance (internal and external elegance). In the CPI this criterion can be generated by combining Condensation (simplification, unification, integration) and Hedonics (attractiveness). This would add another component to the two components originality and effectiveness of the standard definition of creativity. But it could also be argued that the effectiveness-side of creativity is split into the two components resolution and style.

Figure 4: Relationship of Product Characteristics



Source: own illustration based on Besemer (2013, p. 47)



Besemer (2013, p. 47) writes that the criterion Style influences the other two criteria. Thus, it is possible to add Novelty through style elements, and style can also improve the perceived resolution of a product. The paper at hand argues that through an increased resolution the criterion novelty might also be positively affected. This would at least be in line with the definition of incremental innovation: a cost or performance improvement of an existing product (Leifer et al., 2010, p. 4ff.). The relationships are displayed in fig. 4. This would indicate that we have three possible points where tensions can occur: (1) resolution – novelty, (2) style – novelty and (3) style – resolution. The first two deal with the tension between effectiveness and originality in the standard definition of creativity; the third one would indicate a tension within effectiveness.

2.3 Perceived Product Attributes Determining the Rate of Adoption

The perceived attributes of an innovation are one of five variables determining the diffusion or rate of adoption of an innovation in a given market. According to the renowned expert in the field of diffusion theory Everett Rogers (2003, p. 222) the perceived attributes which influence the rate of adoption are relative advantage, compatibility, complexity, trialability and observability. Several diffusion models from the 1980s on include perceived product attributes (Mahajan, Muller & Bass 1990, p. 3). Apart from the attributes of Rogers other attributes which are studied in several publications are ease of operation, image, cost, riskiness, visibility, voluntariness, result demonstrability and social approval (Kapoor, Dwivedi & Williams 2014b, p. 330). It is important to note that the product attributes are not based on the rating of experts, but on the perception by potential adopters (Rogers 2003, p. 223).

Relative Advantage is “the degree to which an innovation is perceived as being better than the idea it supersedes” and is seen as the most important attribute (Rogers 2003, p. 229). It can include economic factors such as cost-benefit-relations, time savings and effort savings. But it can also mean status aspects such as prestige or value (Lund 1974, p. 28, Rogers 2003, p. 230). Compatibility is “the degree to which an innovation is perceived as consistent with existing values, past experience, and needs of potential adopters” (Rogers 2003, p. 240). This includes sociocultural values and beliefs, previously introduced ideas and adopter needs. Compatibility can also be categorized into technological compatibility, socio-demographic compatibility and cultural compatibility with regard to intercultural innovation. Technological compatibility would include previous experiences and habits, but also technological infrastructure and supply e.g for maintenance and repair. Socio-demographic compatibility contains demographic aspects such as living conditions and socio-economic aspects such as incomes. Cultural compatibility would include values and beliefs, but also local tastes and preferences as well as language and symbols (Deckert 2014, Deckert, Köhler & Scherer 2014, p. 95).



Complexity is “the degree to which an innovation is perceived as relatively difficult to understand and use” (Rogers 2003, p. 257) and has a negative relation to the rate of adoption. The positive value of a product would be simplicity. This includes understandability as well as usability of a product. Trialability is “the degree to which an innovation may be experimented with on a limited basis” (Rogers 2003, p. 258) and is important to earlier adopters. Observability is “the degree which the results of an innovation are visible to others” (Rogers 2003, p. 258) and is important to later adopters.

In a meta-analysis of 2,073 publications Kapoor, Dwivedi & Williams (2014a) observe that relative advantage, compatibility and complexity show a statistically significant correlation to adoption. Trialability and observability are found to be statistically insignificant.

2.4 Impact of Packaging

Packaging is very important as a marketing tool in the consumer goods industry, especially for consumables such as Fast Moving Consumer Goods (FMCG). Therefore packaging development leads to opportunities in new product development (NPD) (Simms & Trott 2010, p. 398). For this reason packaging is sometimes called the “Silent Salesman” (“stiller Verkäufer”) in Germany.

According to ISO 21067 (2015) packaging can be defined as a “unit which serves a packaging function such as the containment, protection, handling, delivery, storage, transport and presentation of goods”. In the German packaging law three packaging types are distinguished: Transport packaging facilitates the transport processes and operations. Secondary packaging is an additional packaging which does not serve a purpose for transport or the end customer but is sometimes necessary for wholesale or retail. Finally, sales packaging is the sales unit containing the product for the end user (Livingstone & Sparks 1994, p. 16). For consumable final products sales packaging is especially important as it is the contact point with the consumer.

In his dissertation Simms (2012, p. 101 ff.) analyzes eleven models describing functions of sales packaging from a marketing perspective. From this analysis he summarizes the key roles of packaging. These include protection & containment, environmental impacts & ethical implications, identification & marketing communication, user convenience & market appeal, cost and innovation. In the field of logistics and supply chain management additionally the functions of transport, storage and handling are usually emphasized (see e.g. Grant 2012, p. 22 f., Schulte 2012, p. 480, ten Hompel, Schmidt & Nagel 2007, p. 7). But these functions can also be subsumed under protection & containment and are more relevant for transport packaging.

The packaging functions can also add to the perception of creativity in a product, especially in B2C-products or consumer goods. It can be assumed that innovation and



environmental impacts & ethical implications can add directly to the perception of novelty. Furthermore it might be assumed that protection & containment, identification & market communication and user convenience & market appeal add to the perceived resolution of a product while user convenience & market appeal might also enhance the perception of style. But these relations are only assumptions at the moment and need further clarification through further research.



3 The Value Square

*“It is a familiar and significant saying that a problem well put is half-solved.”
John Dewey (1998, p. 173), philosopher*

From the standard definition of creativity with its tension of originality and effectiveness it can be deduced that creativity falls under the too-much-of-a-good-thing effect (TMGT effect) (Pierce & Aguinis 2011, p. 313). The TMGT effect supposes that “beneficial antecedents (e.g. predictor variables) reach inflection points after which their relations with desired out-comes (i.e., criterion variables) cease to be linear and positive. Exceeding these inflection points is always undesirable because it leads either to waste (no additional benefit) or, worse, to undesirable outcomes (e.g., decreased individual or organizational performance)” (Pierce & Aguinis, 2011, p. 315). This view is also supported by the “creativity and innovation maximization fallacy” proposed by Anderson, Potocnik & Zhou (2014, p. 1319) which erroneously supposes that “all creativity and innovation is good; and the more, the better”.

A graphic method to position a positive value in relation to a positive countervalue and, thus, take the TMGT effect into consideration, is the so called value square (“Wertequadrat”). The value square was originally developed by Helwig (1967) to describe the dialectical structures of different characters. It has further been used to describe tensions in the intervention of communication (Schulz von Thun 1998), in organizational knowledge management (Romhardt 2000), in individual creativity (Deckert 2015) and in corporate creativity (Deckert 2016). The central idea of the value square is that there can be too much of a positive value. For that reason every positive value has to be balanced with a positive countervalue.

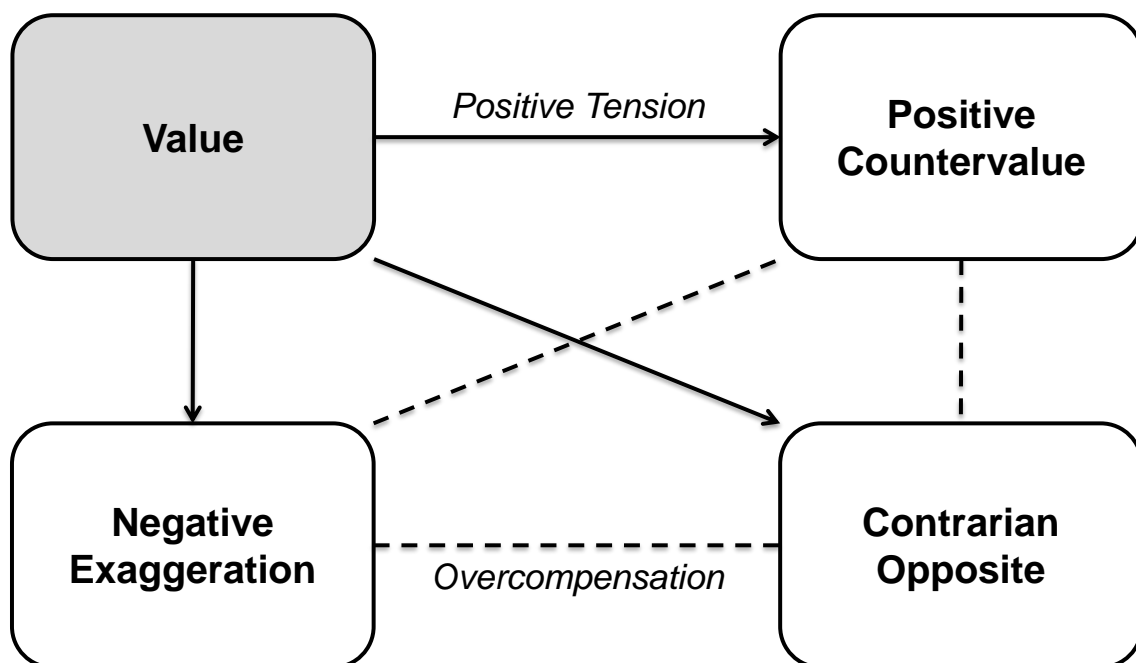
Although the value square can be traced conclusively back in Western philosophical history (Schulz von Thun 2015), it also contains traces of the yinyang concept of early Chinese philosophy. Schulz von Thun (1998, p. 40, own translation) writes that “in the value square the notion of an optimum ledger 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 yinyang concept is a complex philosophical construct involving more than mere contraction and opposition. It also includes the relations of interdependence, mutual inclusion, interaction or resonance, complementarity and mutual support as well as change and transformation (Wang 2012, p. 7 ff.).

The value square can be displayed graphically through a rectangle with the positive values on the upper line and corresponding negative exaggerations of these values on



the lower line (see fig. 5). To construct the value square one typically starts with a positive value on the upper left corner (e.g. frugality) and tries to find an equilibrating positive countervalue for the upper right corner (e.g. generosity). Only a dynamic balance of these two values leads to well-balanced actions. Then one searches for the negative exaggeration of the value (e.g. avarice) and the contrarian opposite (e.g. prodigality) which is at the same time the negative exaggeration of the countervalue. The negative exaggerations are put in the corners below the positive values (Helwig 1967, Schulz von Thun 1998). The value square can also be understood as a development square (“Entwicklungsquadrat”) as it helps to choose a developmental path depending on the current position. This path typically leads from a negative exaggeration (e.g. avarice) along the diagonal to the opposite positive value on the upper line (e.g. generosity), but not along the vertical line which would result in overcompensation, i.e. the negative exaggeration of the countervalue (e.g. prodigality) (Schulz von Thun 1998, p. 47).

Figure 5: Value Square



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



4 Tensions of Creative Products

*"People are very open-minded about new things –
as long as they're exactly like the old ones."
Charles F. Kettering (cited in Loewy 1951, p. 327), inventor*

The tensions of creative products all reflect a basic tension between a self-assertive tendency of a “whole” and an integrative tendency of a “part”. As a “whole” a product can be seen as an autonomous entity which can be separately improved and advanced. As a “part” it should conform to the requirements of the bigger unit, i.e. the final product, the competitive environment or the business model of the company, and therefore should conform to certain visual and functional standards.

The main tensions can be distinguished according to the three criteria of the CPAM by Besemer (2013): a tension of style and novelty, a tension of resolution and novelty and a tension of style and resolution. While the first two tensions reflect the underlying tension of originality and effectiveness of the standard definition of creativity, the last tension can be interpreted as a tension within effectiveness itself. This last tension has, of course, radiating effects on novelty, since both, resolution and style, influence the perception of novelty of a product. Additionally links to the perceived attributes impacting the rate of adoption according to Rogers (2003) can be observed. The first two tensions are linked to compatibility and relative advantage, while the last tension is linked to complexity and relative advantage.

4.1 Tension Concerning Style and Novelty

Although novelty is part of about every creative product scale, it can be observed that adopters often prefer products which only show a certain extent of novelty. As Besemer (2013, p. 50) writes: “We may notice that consumers are often happier with products that are similar to things they have seen before”.

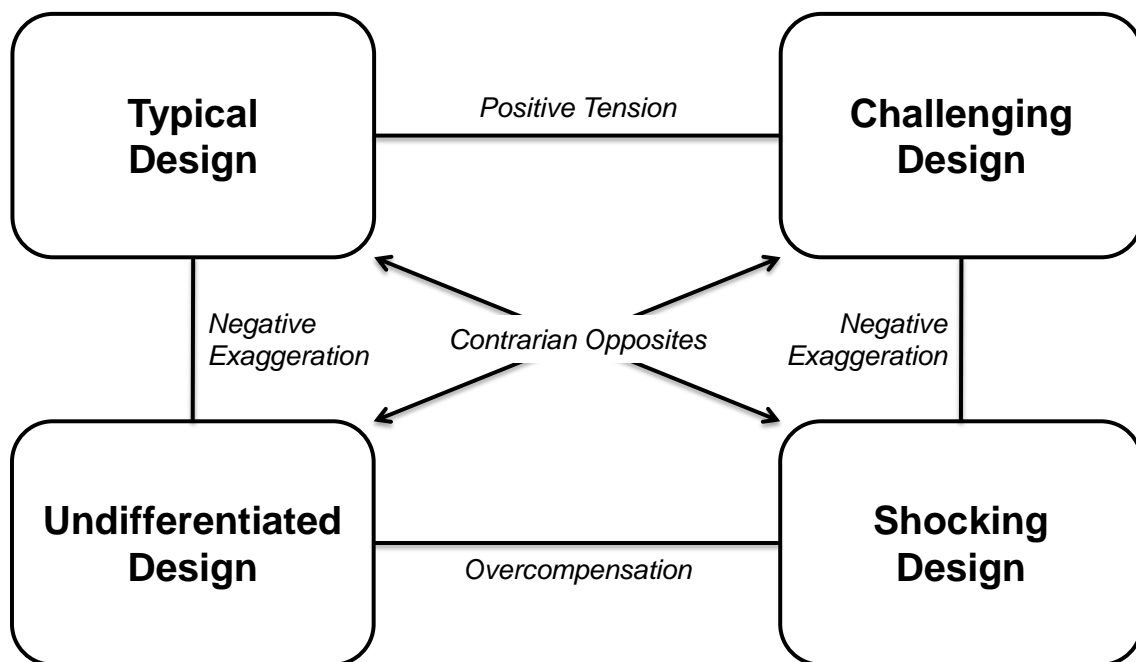
In design studies usually the concept of typicality is used. Typicality can be defined as “the degree to which an object represents a category” and can be measured by “prototype distortion” or “goodness of example” ratings (Hung & Chen 2012, p. 82). In their design studies Hekkert, Snelders & van Wieringen (2003, p. 111) find that typicality and novelty both have an effect on aesthetic preferences of consumer products but that they suppress each other’s effect: “[...] people prefer novel designs as long as the novelty does not affect typicality [...]”. The industrial designer Raymond Loewy (1951, p. 326) coined the acronym MAYA for this tension which means “More Advanced, Yet



Acceptable”. If a design is too far away from the established norm, it reaches what Loewy calls the “shock-zone” of the consumer and design acceptance is lost.

Thus, a good product design both comforts and challenges the product user (Besemer 2013, p. 104 ff.). Typicality gives the customer comfort, since the customer is reassured of the basic product functionality. But too much typicality leads to an undifferentiated design of a commodity product and would not foster the perception of product innovation. For that reason typicality of a product has to be balanced with challenging design elements to give the customer the impression of purchasing a creative product with new product features (see fig. 6). But too many challenging elements would impact the perception of a product as a typical example of its class and would result in an unacceptable or shocking design.

Figure 6: Tension Concerning Style and Novelty



Source: own illustration

The tension between typical design and challenging design suggests that there is a curvilinear relationship between typicality/novelty and aesthetic preference. In his classic research Berlyne (1974, p. 42) proposed an inverted U-shaped curve between typicality/novelty and aesthetic appreciation. Hung & Chen (2012, p. 81) could replicate Berlyne’s hypothesis for the design of chairs using the three fundamental dimensions of product semantics – trendiness, complexity and emotion – as measurement. Their findings show an inverted U-shaped curve between novelty and aesthetic perception. Similarly Blijlevens et al. (2012, p. 53) find an inverted U-shaped curve between typicality and aesthetic perception of consumer durables. This shows the tension between

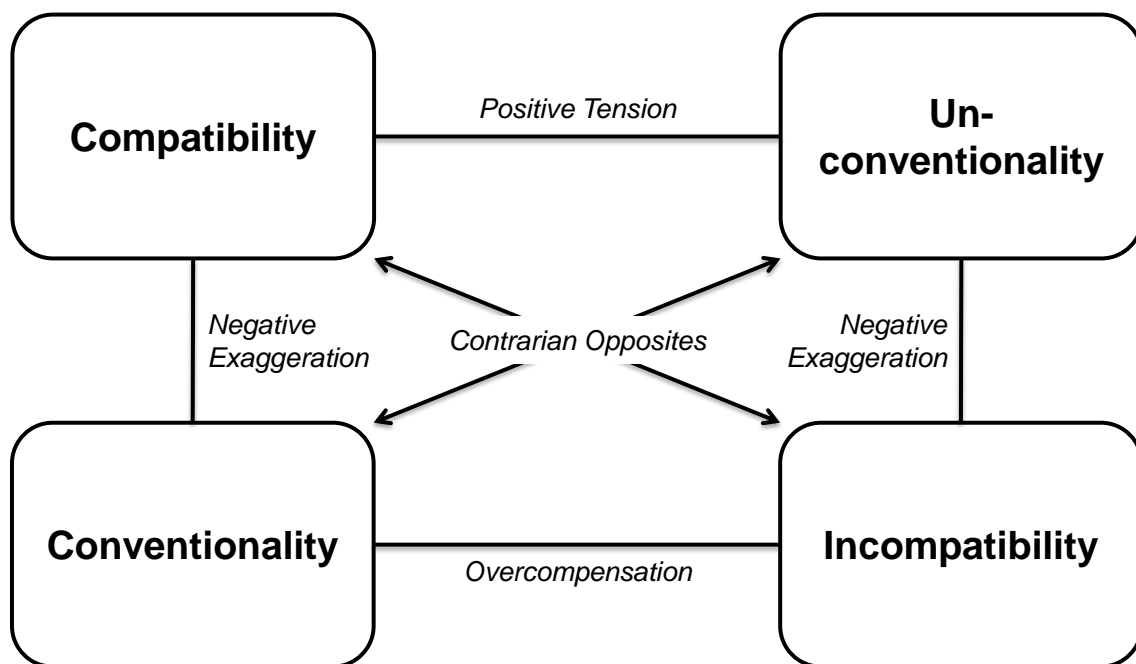


typicality or typical design on the one side and novelty or challenging design on the other side.

4.2 Tension Concerning Resolution and Novelty

There is not only a tension concerning style respectively a product's design and novelty, but also concerning resolution respectively a product's functionality and novelty. This tension can be described by a dilemma between compatibility and unconventionality (see fig. 7). Relative advantage of a product – as defined by Rogers (2003, p. 229) – is based on new functionality or features of a product which are often based on new technologies. Thus, relative advantage results from a certain degree of unconventionality of the product, and runs the risk of incompatibility concerning existing technological, socio-demographic or cultural conditions. In contrast a product which is totally compatible with existing conditions is probably a conventional product with no or only minor relative advantages to existing products it is supposed to supersede.

Figure 7: Tension Concerning Resolution and Novelty



Source: own illustration

Gourville (2005, p. 3, 2006, p. 100 ff.) suggests that many innovations fail because they demand a behavior change from potential users. Behavior change is seen as a loss and due to the “status quo bias” these losses are overestimated by the potential adopters. Developers, on the other hand, overestimate the product's advantages and underestimate the losses for customers. Gourville calls this phenomenon the “curse of innovation” (Gourville 2005, p. 3) and estimates that there is a mismatch of nine to one



between what developers believe and what customers perceive (Gourville 2006, p. 103). That indicates that the relative advantage of a new product should be high in comparison to the behavior change such a product demands.

Apart from product attributes the acceptance of novelty in a product also depends on the innovativeness or the preference for novelty of the individual. “Neophiles” prefer novel products, while “neophobes” stay with familiar products (Besemer 2013, p. 67). In the beginning of a new product especially the adopter category of early adopters is important. Early adopters are the first to grasp the potential benefits of a new product and hope to gain windfall profits by adopting it (Moore 1999, p. 12, Rogers 2003, p. 283 ff.). So early adopters can be termed “neophiles” as they tend to tolerate more unconventionality in the tension of fig. 7, if they feel the new product serves their purposes.

Since early adopters are well established in their social system they often serve as opinion leaders to later adopters. Later adopter categories such as early majority, late majority or laggards tend to be more on the side of compatibility since they prefer well-established or familiar solutions (Rogers 2003, p. 283 ff.). Since the balance from neophilia to neophobia shifts, as one moves along the adopter categories from early adopters to laggards, compatibility becomes more and more important. Moore (1999, p. 16 ff.) even sees gaps between the adopter categories which a new solution has to overcome. For high-tech products he sees the widest gap between early adopters and early majority which he calls “the chasm”.

The preference of compatibility of late adopter categories can lead to so called “standard wars” especially with regard to information and communication technologies. Standard wars are “battles for market dominance between incompatible technologies” (Shapiro & Varian 1999, p. 8). Winning a standard war is not necessarily or exclusively based on technological superiority. Other firm-level factors such as complementary assets or installed base and environmental level factors such as regulation or characteristics of the technological field also play a role at various points in the standards war (Suarez 2004, p. 275 ff.).

Standards wars or industrial evolution can lead to a “dominant design”. „A dominant design of a product class is, by definition, the one that wins the allegiance of the marketplace, the one that competitors and innovators must adhere to if they hope to command significant market following” (Utterback, 1996, p. 24). In doing so the dominant design implicitly fixes the basic product features and performance and, thus, reduces the necessary decisions in product design. But the dominant design needn’t necessarily be the design with the highest performance; it is the variant which satisfies most of the market needs in a “good enough”-way. A dominant design is a landmark in the development of an industry and marks the end of the “fluid phase” in which many companies experiment with different technological options of product design for largely un-



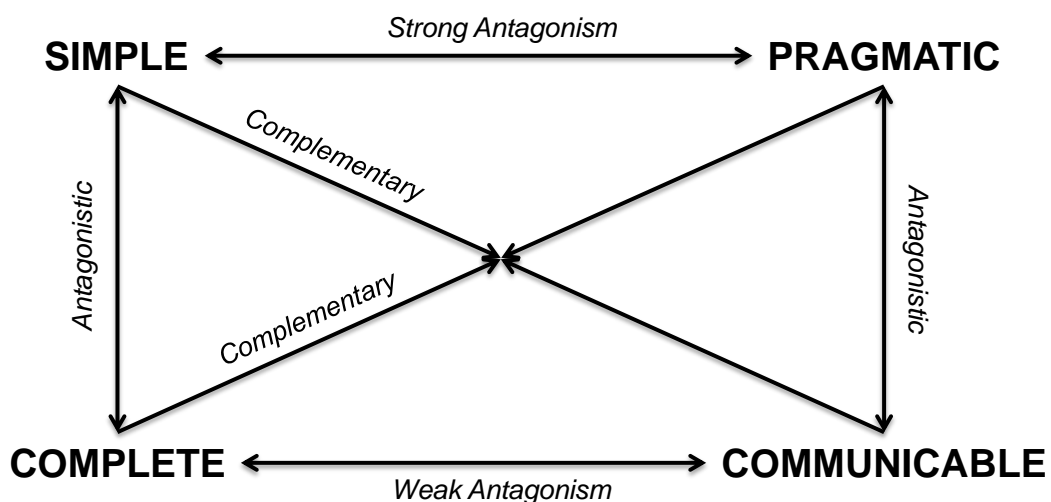
known or fuzzy market needs (Utterback 1996, p. 25 ff.). Thus a dominant design defines the level of compatibility which creative products need to incorporate to be accepted.

Compatibility is especially challenging for companies in intercultural innovation, i.e. when they develop products for unfamiliar cultural regions. This can lead to diverse irritations in potential adopters concerning technological, socio-demographic or cultural compatibility (Deckert, Köhler & Scherer 2014, p. 95) and can mean arduous efforts by the companies to find the right balance between compatibility and relative advantage (see e.g. the cases described in Lafley & Charan (2008, p. 33 ff.)).

4.3 Tension Concerning Style and Resolution

According to Low (1982, p. 148 ff., 2008, p. 80 ff.) the basic organizational dilemma has the four criteria simple, complete, pragmatic and communicable (see fig. 8). A product should be simple to use to reduce cost. At the same time it should be complete in the sense that it should cover all necessary functions. Furthermore the product should do the job it is supposed to do, i.e. it should be pragmatic. Additionally it should be communicable which means “easy to understand” and not overly complex. The criteria at opposite corners (vertically and horizontally) form antagonisms or are in conflict with each other. The criteria at diagonal corners are complementary.

Figure 8: Basic Organizational Dilemma According to Albert Low



Source: Low (1982, p.149)

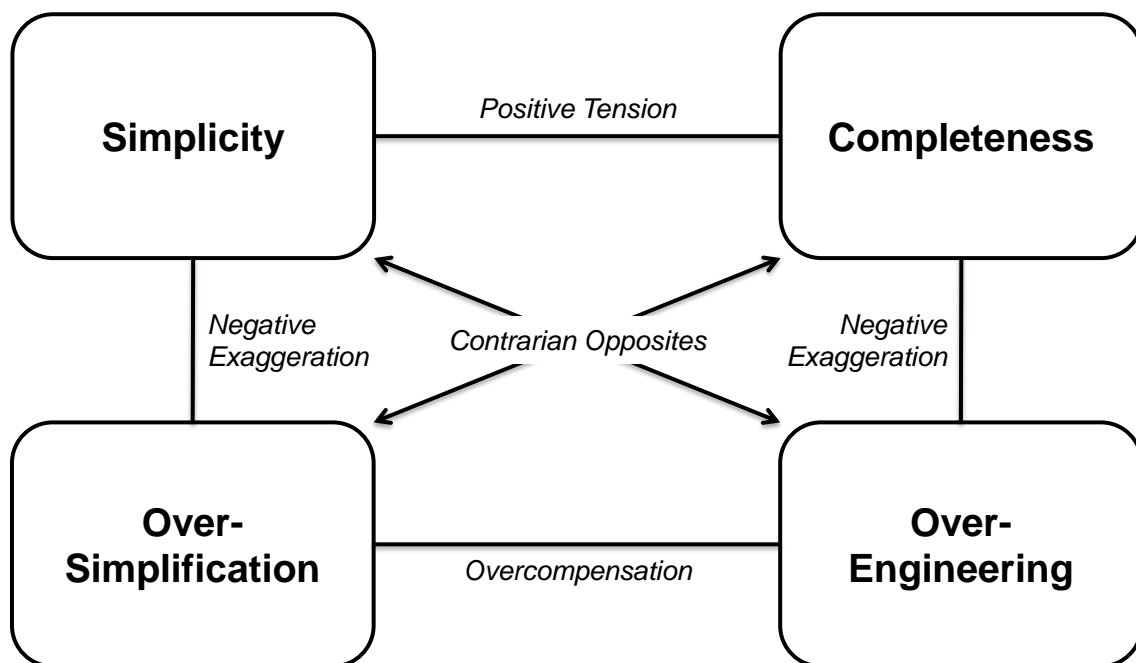
If we translate this dilemma into the value square we can construct a tension between simplicity and completeness (see fig. 9). Simplicity in this case means both easy to use and easy to understand, i.e. the negative form of Rogers’ (2003) complexity, and represents Besemer’s (2013) criterion style. Completeness in this case means that the



product offers all necessary functions and fulfills the customers' requirements. Thus, it covers Low's (2008, p. 81) criteria "complete" and "pragmatic" and represents the product's resolution according to Besemer (2013).

As in Low's (2008) dilemma simplicity is in conflict with completeness. Both values need to be balanced. If simplicity is carried too far oversimplification might occur. Oversimplification is the negative exaggeration of simplicity. As de Bono (1999, p. 71) puts it: "Oversimplification means that you have simplified the matter too much and have left out important aspects of it. The oversimplification is not wrong, but it is inadequate because it is incomplete".

Figure 9: Tension Concerning Style and Resolution



Source: Own illustration

Oversimplification can also be called under-engineering. Under-engineering occurs when the needs and expectations of the customers are not covered by the performance and the features of the product. If the product performance covers the expectations customer satisfaction sets in. If the product performance exceeds the expectations of the customer, but is still within the customers' needs, the product can generate excitement in the customer. But if the product performance is increased further, at a certain point over-engineering might occur. In over-engineering product performance or features are beyond the needs of a customer, but only add to the complexity of use and understanding (Boutellier, Schuh & Seghezzi 1997, p. 53). Christensen (2011, p. 212) calls this phenomenon "performance oversupply".



Simplicity usually means that a company can save production cost as not so many product features have to be manufactured. But it doesn't mean that the product is easy to develop. On the contrary "Simplicity is easy to use but can be hard to design" (De Bono 1999, p. 4). Dimensions of simplicity might affect different aspects of the product including e.g. production, use, maintenance, operation and repair (de Bono 1999, p. 183).

To achieve the necessary completeness while simultaneously creating a simple product one should adhere to the principle: "Simplicity to the front, complexity in the background" (Deckert 2014, p. 8). This means one should strive for a simple and intuitive user interface of the product while complex procedures or algorithms operate in the background. Examples of this principle are the Google search tool with its simple website and its powerful search engine in the background or the Apple iPod with its simple style providing high usability, yet comprehensive functionality operating in the background.

Simplicity can have several positive effects on a product. Firstly, the product is easier to understand and easier to use. This can diminish the "curse of innovation" according to Gourville (2005, p. 3) and can lead to a more widespread adoption. Increased user-friendliness can also lead to new customer segments: people for which the old product was too complex. Thus, Anthony (2012, p. 104) suggests that companies should also "compete against nonconsumption". Through simplicity in design the product's reliability and robustness can be increased. Fewer mistakes and accidents in operating the product occur. Simplicity also offers the possibility of frugal innovation, i.e. development of a low-cost product variant for developing markets by stripping off all "unnecessary" and costly product features. Finally Mukherjee & Hoyer (2001, p. 462) show that novel product attributes only show a positive effect for low-complexity products. For high-complexity products they might cause resistances and even "technophobia" in the potential customers.



5 Conclusion

“Last year one million quarter-inch drill bits were sold – not because people wanted quarter-inch drills, but because they wanted quarter-inch holes.”
Leo E. McGivena (cited in Levitt 1974, p. 8), advertiser

In the paper at hand the value square was used to display, describe and analyze the tensions of creative products with a focus on functional creativity as defined by Cropley & Cropley (2010, p. 301). In doing so the too-much-of-a-good-thing effect (TMGT effect) (Pierce & Aguinis, 2011) is assumed for the characteristics of creative products and the “creativity and innovation maximization fallacy” (Anderson, Potocnik & Zhou, 2014, p. 1319) is avoided.

From the tension of originality and effectiveness in the standard definition of creativity by Runco & Jager (2012, p. 92) a general tension between self-assertive and integrative tendency is developed when the product is viewed as a “holon” as defined by Koestler (1975, p. 45). Furthermore related tensions underlying the characteristics of creative products are analyzed. To describe the characteristics of creative products the Creative Product Analysis Matrix (CPAM) developed by Besemer (2013, p. 198) is used. The following tensions are proposed with regard to the CPAM:

- Style – Novelty: Typical Design and Challenging Design
- Resolution – Novelty: Compatibility and Unconventionality
- Style – Resolution: Simplicity and Completeness

The tensions concerning style and novelty and concerning resolution and novelty represent the tension between originality and effectiveness of the standard definition of creativity. This finding is in line with the tensions observed for individual creativity (Deckert 2015) and corporate creativity (Deckert 2016). But additionally a tension within effectiveness is identified – the tension concerning style and resolution.

The paper frequently refers to the product attributes which determine the rate of adoption as defined by Rogers (2003, p. 229 ff.). Product attributes such as relative advantage or compatibility are multi-faceted or “umbrella” terms and can mean different things to different people under different circumstances. This necessarily means that some of the observed results are on a rather abstract level. Further research might break down these terms into finer categories and where appropriate measurable parameters for different industries, product classes and adopter categories.

A typical design defining a product class or a dominant design determining the level of compatibility can be in place only for existing product classes. So the described effects



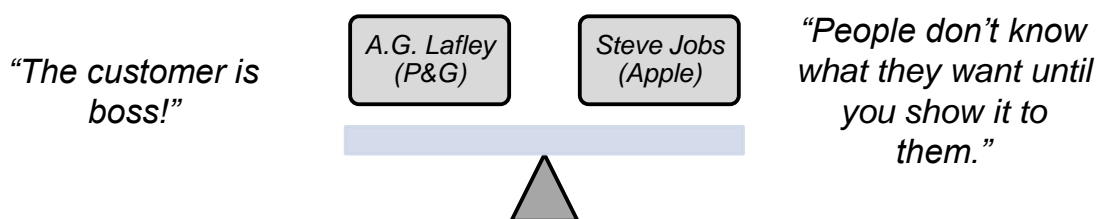
mainly affect the further development of existing products respectively incremental innovation. The question arises how typicality or compatibility can be determined for radical innovation of new product categories. These discontinuities lead to a fluid phase according to Utterback (1996, p. 25) in which a dominant design has not yet been determined. How a new dominant design or the typicality of a new product occurs offers many opportunities for further research.

The research in this paper is limited to the product and its impact on the potential user. Other impacts such as the impact on the field or outside the field are neglected (see e.g. Taylor 1975, p. 315). Also the impact of the creative product on the production process and aspects of feasibility weren't included. This could lead to the identification of further tensions. With regard to the production process a tension between cost and quality could be proposed with implications for the generic competitive strategies according to Porter (1998, p. 43). Furthermore a tension of standardization and personalization of products could be analyzed with implications on supply chain strategy and design such as mass customization and postponement (Chopra & Meindl 2013, p. 351 ff., Pine II 1999, p. 171 ff., Simchi-Levi, Kaminsky & Simchi-Levi 2007, p. 345 ff.).

The questions of originality and effectiveness of creative products, of course, encompasses the question of customer needs. And this raises the question of how to gain customer insight. Broadly speaking there are two approaches to this problem. One can be linked to Procter & Gamble's A.G. Lafley, the other one to the late Steve Jobs of Apple (see fig. 10).

A.G. Lafley states that "the customer is boss" (Lafley & Charan 2008, p. 33). This means that "the consumer must be at the center of the innovation process from beginning to end" (Lafley & Charan 2008, p. 4) with a lot of activities in market research and consumer-testing of prototypes. The "customer is boss"-mindset demands that developers spend time with customers and actively seek their feedback to gain a full understanding of their needs and wishes (Anthony 2012, p. 94 ff.).

Figure 10: Dilemma of Customer Insight



Source: Own illustration

In an interview with BusinessWeek Steve Jobs said: "We have a lot of customers, and we have a lot of research into our installed base. We also watch industry trends pretty



carefully. But in the end, for something this complicated, it's really hard to design products by focus groups. A lot of times, *people don't know what they want until you show it to them*" (BusinessWeek 1998, italics added). This shows that the "customer is boss"-mindset has its limits. First of all there are latent needs that the customer might not be able to articulate. Then there are maybe some forms of hidden needs which the customer doesn't even know because he doesn't know the technological possibilities. So companies might be led astray by listening too closely to customer demands. This is especially so for disruptive technologies according to Christensen (2011, p. xviii) which underperform mainstream products according to the established performance criterion but deliver a totally new value proposition instead. The whole issue raises the question of how to get customer insight if the customers themselves don't always know their needs and wishes.

This seeming paradox captures the essence of the tensions permeating creative products and reminds one of a Zen koan – those paradoxical riddles defying conventional logic which a Zen-student is supposed to "solve" or better wrestle with on his way to enlightenment (Bottini 2002, p. 179 ff.). The koan of creative products is something that product designers and managers have to wrestle with on a daily basis. It can be posed as follows: How can the customer be boss, if people don't know what they want until you show it to them?



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