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An empirical study on consumers' view of new product creativity

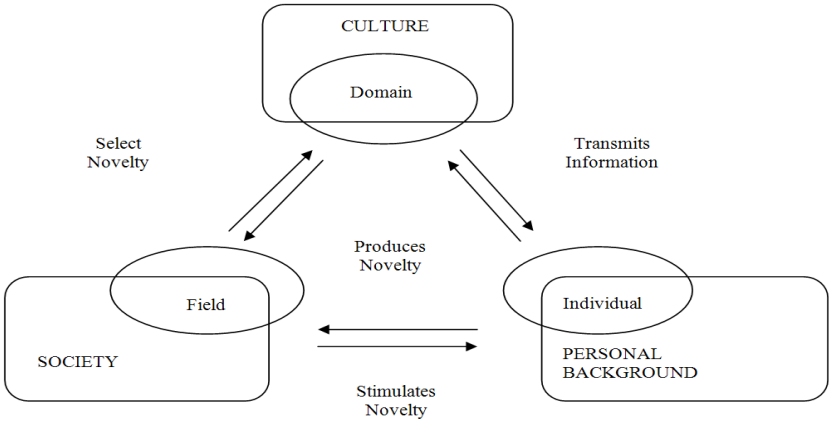
Abstract

As a consequence of strong product competition, most firms must continuously create new products in order to gain differential advantages and to minimize the pressure from imitations, as new ideas are a major source for economic growth (Solow, 1956; Bharadwaj, Clark and Kulviwat, 2005). However, the new product success rate is low. One possible reason is that manager perceived new product creativity (NPC) may not be identical with consumers' perceived NPC. The academic literature has not reported on consumers perceptions on NPC. Through an experimental study, the authors have theorized consumer perceived NPC as a function of novelty, meaningfulness and communicableness, and addressed the importance of these dimensions to new product development.

Keywords: new product creativity, creativity, scale, new product development, new product innovation.

Introduction

From the "systems view of creativity" (Csikszentmihalyi, 1988a; 1999; Weisberg, 2006, p. 62), we know that creativity is generated, objected and executed in three interrelated systems – person systems, social systems and cultural systems. This theory states that an individual obtains information from a culture and transforms it into a meaningful form. If the change of the information is thought to be valuable by the society, it will be incorporated into a domain of the society and thus provide a new starting point for the transformation of the following generations, which makes the transformation dynamic. The actions of these three systems are necessary for creativity to occur.



Source: Taken from Csikszentmihalyi (1999, p. 315).

Fig. 1. Systems view of creativity

More specifically, when a person creates something novel, if the members in the relevant field decide that it is not of interest, then it has no effect in this domain and it is not creative. For instance, when a clothes designer presents novel work to the public, the fashion critics, clothes retailers and consumers who buy high-fashion clothing work as gatekeepers in this field. These people make decisions on whether the new clothes are worthwhile or not. If they do not like it, the designer's clothes will never be worn and the clothes cannot be judged to be creative. Hence, the fashion critics and clothing buyers play a critical role in deciding whether the designed product (i.e., the clothes) is creative or not (Weisberg, 2006, p. 63).

At the same time, this assertion is supported by Amabile (1996a, p. 33). She provided an operational definition of creativity at the product level and provided insignts into the criterion question of creativity in empirical research. According to her, creativity is defined as the following:

"A product or response is creative to the extent that appropriate observers independently agree it is creative. Appropriate observers are those familiar with the domain in which the product was created or the response articulated. Thus, creativity can be regarded as the quality of products or responses judged to be creative by appropriate observers, and it can also be regarded as the process by which something so judged is produced."

Furthermore, she explained that the appropriate observers include or refer to a "formally or

informally organized group of persons that has the ability and expertise to evaluate developments in its own field." In addition, the evaluation should be made by persons who are external to the creative process since self-judgments may disagree with observer's judgments.

Based on these theories, it is summarized that whether a new product is creative or not can be better evaluated by consumers than by internal NPD teams because consumers are more familiar and involved with product use. In most company practice, new product creativity (NPC) is typically evaluated by agreements involving NPD teams and NPD experts. Whether customers also consider these new products to be creative or not rarely enter into this deliberation.

Customers are always the absolute final adopters and judgers of all new products as well as the embedded creativities. Only if the value and performance of new product creativity are accepted by consumers, will creative activities of new products become significant. Therefore, research on new product creativity from the customer perspective is imperative in the context of the new product development process. There are various other reasons that consumer perceived new product creativity is very important for NPD:

1. New product failure rates are very high. A previous researcher (Levitt, 2002, p. 13) indicated that most of the annually introduced 25,000 new products have failed in the US. Specifically, the new product failure rate is from 40% to 75% (Stevens and Burley, 2003). Furthermore, Griffin (1997, p. 433) has reported that only one out of eleven ideas has resulted in new product success on average. In recent years, new product failure rates have not decreased but have expanded in some product categories, although numerous practitioners and researchers place considerate effort into new product failure analysis.
2. New product creativity is tightly related to new product success. Some specific problems with new product failures are related to project lateness, cost overruns, insufficient management support, inadequate market launch effort (Redmond, 1995), or related to escalation behavior in which marketing managers were not successful due to past false premises and decisions (Biyalogorsky et al., 2006). Among all these reasons, the absence of new product innovation is one of the major causal agents (Sethi, Smith and Park, 2001; Cooper, 1996). Therefore, new product creativity is especially important to new product success and to firm survival, especially in a highly competitive environment. As Levitt (2002, p. 13) has noted, exploring creative ideas should be a daily activity in marketing practice.
3. Creativity in the new product development (NPD) process does not always result in competitive advantage and high profit, although new product creativity is an imperative element for new product success. For instance, The Microsoft Windows Vista operating system is the extension of Windows XP and it provides new and improved features over Windows XP, but it is difficult to use and poses some security problems. The performance of this product does not match consumer expectations relative to its promised advantages and benefits. Therefore, some consumers have converted MS Vista back to Windows XP in their computers.
4. The question regarding new product creativity efficiency reaches the point where it cannot be delayed. It is critical to gauge creative ideas and concepts before introducing new products to the market for the purpose of magnifying the new product success rate (Goldenberg and Mazursky, 2002 p. 193). In order to arrive at NPD creativity efficiency, correctly understanding NPD creativity is the first step to arrive at an economical and timely NPD creative process.
5. Some researchers (Burroughs et al., 2011, Im and Workman Jr., 2004; Caroline, 2003) have studied and defined NPD creativity from the managerial perspective. However, mismatches among different interpretations of creativity is one reason that new product can fail.

What is the consumers' view of effective new product creativity at the product level? Can we incorporate consumer perceived NPC into NPD to better assist and satisfy consumers and then lead to sufficient new product profits? The current study attempts to fill the gap and examine the overall assessment of NPC from the consumer's perspective since the consumer is the final judge of NPD creativity and since the NPD failure rate is high.

In sum, the current study explores questions related to whether consumer perceived new product creativity differs from new product team perceived creativity and which product characteristics are most essential to consumer perceived creativity. This study examined creativity on the product level, and not on other elements of the marketing mix, to explore the specific influences of new product design creativity. Thus new product positioning and overall marketing creativity was not examined in this research.

1. Literature review

1.1. The relationship between creativity and innovation. Much of the previous research has used the term "creativity" and "innovation" interchangeably. However, the distinction between creativity and innovation has been recognized and acknowledged by various researchers. Actually viewing creativity as one of the intangible assets of a firm is the first step of innovation (Day, 1994; Amabile, 1988; Bharadwaj and Menon, 2000). Of course, creativity is necessary but not a sufficient ingredient for innovation. More specifically, creativity refers to novel and useful ideas and innovation relates to successful implementation of these creative ideas (Amabile et al., 1996b, p. 1154). At the same time, Sethi, Smith and Park (2001) propose that innovativeness assumes some degree of creativity in the new product ideation and design process. Innovation incorporates "creativity" with "implementation", or incorporates "thinking" with "doing" (Cooper, 2005) or incorporates the development of ideas with the ancillary applications (West, 2002). Therefore, creativity and innovation share various common features but are also distinct from each other. This study is creativity-focused only.

1.2. New product creativity and its measures. Considering the wide domain of the literature on creativity (as indicated in Table 1, Appendix), both theoretical and empirical, much of the research has focused on the construct of cognitive development. Research on new product creativity is relatively moderate although many investigators have conducted some inquiry into business creativity based on organization levels, team levels, project levels and individual levels.

For example, previous studies have discussed how people develop creative ability and thus are in a position to influence organizational innovations (Amabile, 1988; Woodman et al., 1993; Yuan et al., 2005); how a team's communication and management pattern determines the amount of creativity possessed by a team (Leenders at al., 2003); how creativity is involved in marketing and product programs or problem solutions (Andrews and Smith., 1996; Atuahene-Gima and Wei, 2011); and how an employee's creative ability is impacted by various work and non-work environmental factors (Madjar et al., 2002);

The moderate discussions on new product creativity are all focused on the creativity application of the internal members of new product development, none of the discussions is related to outsiders or new product users. For instance: how a team intuition affects the team members' creative ability on new products (Dayan and Benedetto, 2011); how creativity in cross-functional teams improves new product development innovativeness and accelerates time to market (Bunduchi, 2009); and how managers' knowledge acquisition, dissemination and innovation effect new product creativity (Yang and Rui, 2009).

Based on the diversity of definitions and conceptions, the measurement of creativity has been assessed in a variety of ways in divergent research contexts. According to Simonton (2002, p.191), the assessment of creativity leads to a lack of consensus because it can manifest itself either from the mental process aspect, from a personal ability aspect, or from the result of a product's performance aspect. For example, Lubart (1994) has identified eight methods to measure creativity at the individual level. Meanwhile, Im (2004) evaluated NPC by using dimensions of novelty and meaningfulness (including usefulness and appropriateness) from the manager's perspective at a product level. Caroline (2003) gauged NPC at an aggregate level in terms of NPD managers' perceptions. Moreover, Fillis and McAuley (2000) have argued that creativity measurement was situation dependent although creativity appeared as a universal construct.

Based on a comprehensive summary of the extant research on NPC measures, a six-dimensions measure is suggested by Horn and Salvendy (2006) in terms of the functionality of consumer products from consumer visual perspectives at the product level. Although the authors agree with the validity of the above measures, the existing gauges of NPC may not be appropriate for use in an overall consumer perceived NPC context. Consumer identified assessment of NPC at the aggregate level has not been reported in any academic discipline to date.

Furthermore, it appears that consumer perceived NPC is not identical to manager perceived NPC. As indicated by Im (2004), a study has reported that the correlation between managers' and consumers' perceived NPC was 0.49. Further, Lubart (1994) has indicated that people with different backgrounds might weight novelty and appropriateness divergently and judge the levels of creativity in a manner that possesses only moderate similarity. Therefore, there may exist significant mis-matches or discrepancies between the manager's and the consumer's perceptions of effective new product creativity.

It is also very possible that mangers may distort the tone state of NPC. For example, one extant study has reported that decision makers in marketing sometimes experience belief inertia distortion if they do not sufficiently adjust prior beliefs when they make evaluative decisions (Biyalogorsky et al., 2006, p.109).

In order to evaluate and ensure new product success, consumer overall assessment of NPC should be taken fully into account. Drucker (1954, p. 39) has reported that the whole business in marketing is seen from the perspective of final results, that is, from the point of view of consumers. Therefore, an overall measure of NPC or domain-general measure of NPC from the consumer's perspective is indispensable.

Current NPC inquiry suffers some problems with surprising regularity: (1) vague or interchangable use of the concepts of "new product innovation" and "new product creativity"; (2) inconsistencies between the NPC concept and the NPC measure which were utilized. That is, it failed to measure new product creativity but assessed new product innovation by using a product or a picture of a product as a stimulus, and this erroneously brought the implementation of creativity into play (i.e., Besemer and O'Quin, 1989); (3) put some subjective human factors into the measurement of the objective product idea itself (i.e. the subjective factor of arousal); (4) replaced consumers' perceptions with managers' perceptions of NPC.

Formally, consumer perceived NPC, in this study, is defined as the degree to which new products are meaningful and are uniquely different from competitor products in terms of consumers' perceptions in a way that the meaningful and unique attributes could be appreciated by consumers. This perspective defines consumer perceived NPC from the output side.

1.3. Conceptualization of consumers' view of new product creativity. The purpose of creating new products is to produce superior value and induce consumers to purchase these products. The important role of NPC is to deliver "new product creativity value" to consumers. Consumers are the recipients of the new values. According to the test market model from Narasimhan and Sen (1983), consumers screen new products in the process of making purchase decisions. This awareness-trial-repeat process indicates that consumers adopt new products through careful understanding and appreciation of targeted new products. Also, Moreau et al. (2001a) state that learning about the new products is critical in order that consumers will arrive at an adoption decision. With that premise, this study conceptualizes consumer perceived NPC from three dimensions: novelty, meaningfulness, and communicableness.

1.4. Novelty. Being novel is to "break the rules of the game" (Caroline, 2003), which involves producing unusual or surprising combinations (Boden, 1990, p. 30). Novelty is always identified as a central element in all kinds of creativity definitions. For instance, Amible (1996, p. 35) has stated that responses to the task at hand should be "novel" if a product or response is judged as creative. Meanwhile, "unique differences from competitors' products" was used in the study of Im and Workman Jr. (2004), while "originality" is reported by Simonton (2002) as one of the conditions of creative products. According to him, "Creative ideas are novel, surprising, unexpected-sometimes even shocking."

The goal of new product novelty is to differentiate products from those of competitors. Product novelty means that new products are expected to be better than old ones. New products with the feature of novelty can break the clutter among the competition of different offerings, which in turn can generate new product differentiations and continuous competitive advantages. Consistent with previous research, new product novelty used in this study refers to the extent to which consumers perceive that new products uniquely differ from competitive products.

1.5. Meaningfulness. Recent research (Amabile, 1996a; Burroughs and Mick, 2004, p. 403; Boden 2003, pp. 30-41) demonstrates that being novel by being bizarre is not creativity and being unusual was neither enough for creativity nor for any value generation. Creativity should differentiate ideas that "did not occur before" from the ones that "could not have occurred before". That is to say, should an idea be creative, impossible ideas must be separated from possible ideas in terms of first-time novelty.

The adaptive theory of creativity (Simonton, 2002, p. 191) further supports this inspiration. For example, if one makes a blimp from solid concrete, this idea is original. However, if this strange idea cannot "fly", it is not a creative idea.

These advocates bring us the second essential component of creativity – meaningfulness. In turn, meaningfulness is demonstrated by some researchers from two aspects. The first refers to the aspect of usefulness and is the value assessment of creativity, which is demonstrated by some researchers. Guilford (1950) proposes that creativity is a process of value creation, as massive fiscal value results from new ideas. For the moment, Runco (2004) indicates that creativity must be a response that is "useful and effective".

The second aspect refers to the "appropriateness" of creativity and is the problem solving aspect. Some studies (Boden, 1991; Lubart, 1994, p. 290) note that creativity is problem-solving. Without problem solution, novel things are irrelevant responses. Others argue that creativity is a form of both problem finding and problem solving

(Csikszentmihalyi, 1988b). Further, researchers (White and Smith, 2001; Mackinnon, 1970) note that appropriateness "must serve to solve a problem, fit the needs of a given situation, and accomplish some recognizable goal."

When applied to the product level, creativity emphasizes results (i.e., products) and the things caused by the creative process (Runco, 2004). Therefore, in the NPD context, NPC meaningfulness refers to the usefulness of new products to consumers or the received benefits to users (Rijsdijk, Langerak and Hultink, 2011). As Sternberg and Lubart (1995, p. 12) describe, creative offerings should be appropriate ones that meet needs, which implies that: (1) products should be appropriate and be discriminated from inappropriate products; (2) products should be useful, meet customer needs, and solve consumer problems.

Consistent with previous theories on creativity, the NPC meaningfulness dimension in this study refers to the degree to which the attributes imbedded in a new product are useful to consumers as perceived by them.

So far, the novelty and meaningfulness aspects in NPC are consistent with research in other domains such as psychology, which is supported by a diversity of authors (Mayer, 1999). Earlier research (Barron, 1963) also supported the notion that creativity should have embraced a "novel solution" to a product related problem, which included the components of "novel" and "solution".

Table 2. Creativity dimensions

Author (chapter)	Feature 1: Originality	Feature 2: Usefulness
Gruber & Wallace (5)	Novelty	Value
Martindale (7)	Original	Appropriate
Lumsden (8)	New	Significant
Feist (13)	Novel	Adaptive
Lubart (16)	Novel	Appropriate
Boden (17)	Novel	Valuable
Nickerson (19)	Novelty	Utility

Source: Taken from Mayer (1999, p. 450).

1.6. Communicableness. Novelty and meaningfulness are necessary but insufficient for creativity applied to the new product development context, however. There are some cases where consumers may not buy products in which novel and meaningful ideas are embedded or that consumers cannot perceive benefits resulting from a product's novelty and meaningfulness.

Analysis of the new product failure cases brings out the third dimension for consumer perceived effective new product creativity – the communicableness. In turn, communicableness is defined as the extent to which new product novelty and meaningfulness are understandable and discernible by customers. Forman (1986, p. 12) has reported that consumers are more likely to subsequently evaluate the product favorably and experience feelings of satisfaction if they can understand the nature of products. Consumers in turn gain product – attribute confidence. Since customer consumption of creativity is the purpose of NPC and the base to realize the role of NPC for gaining competitive advantages and profits, creative ideas in products must be conveyed to consumers in order to realize new product creativity.

As some researchers (McIntyre, Hite and Rickard, 2003) indicate, ideas in products should be communicated to other people who are not the idea generator. Barron (1988) and White and Smith (2001) report that the "ingredients of creativity" should include "making connections". At the same time, Lubart (1994, p. 291) indicates that a product will be less creative if the novelty and appropriateness cannot be turned into a product and audiences do not fully appreciate the novelty and appropriateness of ideas. Therefore, new product creative activities should guarantee not only that a creative idea is transformed into a product, but also that the transformed creativity in a product is communicable to the consumer.

The significance of NPC communicableness is also supported by other earlier scholars. Sternberg and Lubart (1995) and Rubenson & Runco (1994) report that creative ideas are accepted by others, and that creative ideas become popular with the premise of convincing others by the creative person of the value of the new ideas. At the same time, Moreau et al (2001b) report that first traced categorization-based knowledge and explicit mapping information that relates to really new products reference consumers' product choices. Implied in this study is that overt information with regard to new products would increase consumers' preferences. Therefore, NPC communicableness is essential for creativity in the new product development field and for product innovators to achieve NPC efficiency.

In practice, marketing practitioners are familiar with eliminating NPC communication barriers. For

instance, marketing strategies, such as new product promotions, are used to educate consumers to recognize benefits resulting from creativities. Meanwhile, in order to connect to consumers and increase NPC communicableness, NPD teams have invited consumers to be involved in virtual NPD processes (Bonner and Walker, Jr., 2004; Enkel et al., 2005). All of these kind of marketing activities help improve consumer understanding of new products novelty and meaningfulness.

In all, consumer views of new product creativity (NPC) should consider all three elements including novelty, meaningfulness (usefulness and appropriateness) and communicableness (delivery of product attributes). If any one of the three elements is lost, NPC is not an efficient creativity carrier in terms of consumer perspectives. Only if novelty, meaningfulness (appropriateness, usefulness) and communicableness are co-presented in a new product, will NPC meet consumer perceptions.

1.7. Methods. *1.7.1. Pretest one.* A new product creativity scale was developed based on a comprehensive literature review in marketing and other relevant domains. A 39 item, seven point Likert scale was produced for new product creativity. Twenty-two items remained after review by faculty and experts in the domain of marketing. The Likert scale is anchored from *strongly disagree* (1) to *strongly agree* (7).

Members of a convenience sample of students in a southwestern U.S. university were asked to complete a 15 to 20 minute questionnaire developing the new product creativity. The sample size for pretest one was 54. Exploratory Factor Analysis (EFA) was conducted to refine the NPC scale. The Principal Axis Factoring (PAF) extraction method and the direct Oblimin with Kaiser Normalization rotation method were used in EFA. The authors also confirmed the simple structure for the scale of purchase intention by using Principal Axis Factoring extraction method and the Direct Oblimin with Kaiser Normalization rotation method. PAF analysis analyzes only the variance in the items that is shared with other items. PAF is generally considered best for exploring underlying factors for theoretical purposes (Hair et al., 2006). Direct Oblimin rotation generates correlations among factors and provides a more accurate and practical illustration on the correlation among constructs (Fabrigar et al., 1999). Missing values were replaced with the mean.

A total of 20 items were finalized from the pretest one EFA test after a cross-loading item and an item with factor loading below 0.4 were deleted (see Table 2). However, item number 18 “this new product idea is acceptable” is negatively loaded with the third factor of communicableness, which is -.603. After the researcher examined the questionnaire carefully, it became apparent that a possible explanation is that this negative loading may have been caused by misunderstandings on the part of the respondents to the meaning of item.

In pretest one, the reliability for factor novelty was .8525, for factor meaningfulness .8167, for factor communicableness -.0264, which indicated that item number 18 should be modified to increase the inter-item reliability of factor communicableness.

Therefore, the researchers revised the questionnaire and conducted the second pretest.

Table 2. Pretest one factor loading and reliability

	Factor loadings			Alpha
	Meaningfulness	Novelty	Communicableness	
Original		0.768		.8167
Fresh		0.71		
Unique		0.762		
Different from competitive products		0.652		
Out of ordinary		0.486		
Not know before		0.528		
Has advantage over competitive products		0.458		
Useful	0.633			.8525
Valuable	0.627			
Solves real problem	0.581			
Beneficial	0.857			
Helpful to me or others	0.754			
Meet my needs and wants	0.496			
Effective	0.74			
Works	0.521			
Acceptable			-0.603	-.0264

Table 2 (cont.). Pretest one factor loading and reliability

	Factor loadings			Alpha
	Meaningfulness	Novelty	Communicableness	
Noticeable			0.438	
Know the purpose of this product			0.836	
Know the needs it fills			0.926	

1.7.2. Pretest two. A Likert scale with a total of 29 items was constructed, based on the modification of pretest one results for pretest two of the new product creativity scale. The Likert scale is anchored by *strongly disagree* (1) to *strongly agree* (7).

Members of convenience samples of students in a university in the southwestern U.S. were asked to complete a 10 to 15 minute questionnaire. The sample size for pretest two was 135. Exploratory factor analysis was conducted to refine the NPC scale. The principal axis factoring extraction method and the Oblimin with Kaiser Normalization rotation method were used in EFA. Missing values were replaced with the mean.

A total of 22 items were finalized from EFA for pretest two (see Table 3). However, item number 24 "the creative feature of this product is noticeable", which should be converged with items of the factor of communicableness. This may be caused by the ambiguity of the sentence wich contains "creative feature". This item is modified and replaced with the item "the features of this product are easy to understand" in the final data collection.

The Cronbach's alpha for reliability for factor novelty is .81; for factor meaningfulness is .89; for factor communicableness is .89, which indicated that the inter-item reliability for all three factors of the NPC scale is above the acceptable level of 0.7 suggested by some researchers (Hair et al., 2006; Nunally and Bernstein, 1994).

Table 3. Pretest two factor loadings and reliability

	Factor loading			Alpha
	1	2	3	
NPC1		0.924		.8056
NPC2		0.882		
NPC7		0.512		
NPC8	0.666			.8936
NPC10	0.651			
NPC11	0.4			
NPC12	0.672			
NPC13	0.757			
NPC14	0.642			
NPC15	0.815			
NPC16	0.57			
NPC17	0.558			
NPC19	0.382			
NPC21	0.509			
NPC22	0.466			
NPC23			0.429	.8851
NPC24		0.463		
NPC25			0.696	
NPC26			0.717	
NPC27			0.693	
NPC28			0.726	
NPC29			0.566	

1.8. Sample of final data collection. The authors collected the final data in a university in the southwestern U.S. among all graduate and undergraduate students. The sample size was 463, well beyond the acceptable sample size of 200 for using structural equation model for data analysis.

The respondents were asked to complete a 10 to 15 minute questionnaire. The sample for final data collection consisted of 463 respondents.

2. EFA of NPC scale

The authors followed the suggestions from Churchill (1979) and Gerbing and Anderson (1988) for final validation of the NPC scale. In the final data analysis process, principal axis factor analysis with direct oblimin rotation was used to confirm the structure of the data. Principal Axis Factor as the best method for exploring the underlying factors for theoretical purposes. Direct oblimin allows correlations among factors (Hair et al 2006). Missing data were replaced with the mean in this study.

A total of 12 items, across three factors, were available for a confirmatory factor analysis; these factors account for 74.176% of the variance. Eigen values for these three factors are 5.513, 2.186 and 1.202, which are larger than the suggested value of 1 (Hair et al., 2006). As shown in Table 4, there is no significant cross-loading, which provides evidence of discriminate validity for this scale (Gerbing and Anderson, 1988). Reliability values for all factors exceed the 0.7 cutoff value as suggested by Hair et al. (2006) and Nunally and Bernstein (1994). The Cronbach's alpha for reliability value is .83, .87 and .91 for new product novelty, new product meaningfulness and new product communicableness respectively (see Table 4 below).

Table 4. Pattern matrix of factor loadings and reliability of NPC scale

		Factor loadings			Alpha
		Meaningfulness	Communicableness	Novelty	
The idea is original	NPC 1	-0.08	-0.06	0.86	.83
This idea is fresh	NPC 2	-0.03	0.00	0.91	
This product is revolutionary	NPC 5	0.19	0.08	0.59	
Solves some problems	NPC 7	0.63	-0.09	0.05	.87
Helpful to me	NPC 9	0.72	0.08	0.01	
Be effective	NPC 12	0.74	-0.12	-0.01	
Does a lot of good	NPC 13	0.94	0.06	-0.03	
A lot of benefit	NPC 14	0.75	-0.10	0.04	
Needs met are clear	NPC 17	0.06	-0.76	0.04	.91
Idea is understandable	NPC 18	0.00	-0.93	0.03	
Clear what it is for	NPC 19	-0.05	-0.90	0.00	
The features are easy to understand	NPC 20	0.05	-0.76	-0.04	

Notes: Extraction method: Principal Axis Factoring; Rotation method: Oblimin with Kaiser Normalization, rotation converged in 6 iterations.

3. CFA for NPC scale

To assess the goodness of fit of the measurement model of new product creativity, the authors constructed a covariance matrix for the NPC database and conducted a CFA test by using Lisrel 8.8 for the final data analysis. Fit indices and chi-square values were used. The Chi-Square in this test is 138.918 with degrees of freedom of 51. CFI and NNFI are 0.985 and 0.981, respectively. CFI and NNFI are above the acceptable level of .90 as suggested by Hair et al (2006). RMSEA is 0.0606, which is between the acceptable level of .05-.08 (Hair et al., 2006). IFI is .985, standardized RMR is .0408 and GFI is .953 in this study. According to Özyürek (2005), if GFI, IFI and CFI are 0.9 or above and if the standardized RMR is below .10, then the goodness of fit of the model to the database is decided. Therefore, the measurement model fits the database very well in this study.

Conclusions and implications

These findings differ from previous research from the managers' perspective (Caroline, 2003, Im and Workman Jr., 2004). These researchers have noted that new product creativity is composed of new product novelty and meaningfulness and both of these two factors are directly and positively related to new product performance. This study discussed new product creativity from a new angle, from the consumers' perspective. New product creativity is conceptualized into three factors including new product novelty, meaningfulness and communicableness, which is supported by data. This means that, in general, a new product should be understandable to consumers other than merely novel and useful; otherwise a new product is not creative.

This study is unique and complements earlier researchers on NPC. The results of this inquiry contribute to both scholars and practitioners. This study quantifies consumer perceived NPC and offers a NPC scale. It can theoretically contribute to new product creativity research and can also guide practitioners in achieving new product creativity efficiency. Specifically, it provides marketing scholars and practitioners with a platform to develop new product creativity measurement and to examine NPC influences on new product success. Marketing scholars can apply this concept of consumer perceived new product creativity to their new product research as a mean of improving new product success. Product managers can adopt this concept and scale to generate marketing strategies such as customer orientation strategies and customer-involved production. In addition, it provides market practitioners with some important marketing insights of which new product successes is influenced not only by product novelty and meaningfulness, but also by product communicableness, in which ideas embedded in products are made truly understandable to final consumers.

The literature in marketing and related areas attests to the importance of product innovation, with only some moderate mention of creativity. Yet, this latter concept is of substantial importance to new product introduction. Too often, new products are developed by those in research and development, engineering, or other departments, which are more focused on technical matters than on producing offerings that are creative in the eyes of consumers. Sometimes, technical oriented product designers are unmindful of the meaningfulness and communicableness of new offerings and focus primarily upon the newness of the product. An implication which flows from the work of the authors is that new products should be creative, in order that they might be successful. But the dimensions of new product creativity include

meaningfulness and communicability and new product managers and teams should devote considerable attention to these.

An implication is that creativity is important. Many quantitative oriented marketing managers have relied upon numbers to achieve their goals. Advantages over competitors have been sought by devoting more funding to advertising, hiring sales representatives, bringing out large numbers of new products, and expanding the distribution network. Some of these are effective, of course, but they all require substantial funding. An alternative to such efforts is to focus more on quality than on quantity. And creativity is an important qualitative element that often requires moderate or no additional monies. This consideration is especially important for small companies with only limited financial resources, such as entrepreneurships and other small firms.

Another important implication of the study is that new product managers and teams should devote considerable attention to meaningfulness. It would appear that this element is neglected all too often. Many new products that are introduced by entrepreneurs and small firms on the Internet, for instance, seem to overlook this quality. Their new offering is novel, but not of relevance to the consumer. Small firms are normally not in a position to finance large-scale research studies to determine meaningfulness, but many have been able to learn what consumers want through study of consumer trends, geographic patterns, small sample interviews, and even introspection. Such efforts are recommended. Managers should also consider how to incorporate strategies on product meaningfulness into the new product development process to increase their creativity efficiency.

This study has introduced communicableness as an ingredient to new product creativity. This dimension has not been examined in previous research. An implication for managers is that this should be a consideration. A new product may be very novel and meaningful, yet not very communicable. Radical new products are more likely to have this characteristic than are continuous new products or brand extensions. Serious attention should be devoted to ensuring that the creative elements of the product are transmitted to target customers in an effective manner. This requires careful attention to characteristics if the target customer, the medium, the message itself, and to potential sources of noise. For large companies, the selection of a suitable advertising or public relations agency has been useful in this regard. Some firms have been very successful in marketing to their employees and then using these individuals as sources of communication with target customers and other sources of information and influence, either in person or through blogs and social networks. Others have used guerilla communication tactics to carry out effective communication.

This research has examined the importance of creativity in the new product introduction field. An indirect implication is that creativity is equally significant in other domains of the marketing mix, such as promotion, merchandising and distribution. In these fields uniqueness, meaningfulness, and communicability are probably just as important as they are in new product introduction. Promotions, for example, are often not especially novel and there is considerable "me too" effort in advertising and sales promotion. Some merchandising efforts appear to be lacking in meaningfulness and therefore are not likely to be seen as creative. Much the same may be said for communicability, where the marketer's efforts to transmit information and attitudes to target consumers is not effective.

An important implication that this study has examined is that managers should view creativity as perceived by consumers and not necessarily as that foreseen by managers. The latter are often insulated and not in direct contact with consumers and may have only limited empathy as regards the latter. What is creative in their eyes may be considered quite differently than what consumers see as having this ingredient. Managers can learn consumer creativity perspectives through research, such as focus group interviews, group interviews, blog investigations, study of trends service personnel interviews, intervention studies, and even guerilla research tactics. At the business-to-business level, marketers can gain similar information through trade shows and discussions with sales representatives.

There are implications for those in the company who are charged with creative responsibilities – product designers, advertising creative people and sales managers – whose tasks include providing creative inputs to their work. When these individuals make attempts to be creative they often focus on novelty and often neglect meaningfulness and communicableness. Meaningfulness in particular is often not addressed. It is recommended that all three of these ingredients be considered.

An implication not explicitly stated in this dissertation but probably visible is the conclusion that creativity is important to new product introduction. This would suggest that those who are charged with product manager responsibilities would have creative ability or have others on their staff with these capabilities. Or, if new product teams are employed, at least some of these should

be creative. If the new product staff does not include those who have creative abilities, then an effort may profitably be made to seek out these capabilities in new hires. The level of intensity of rivalry in most industries today is very intense and those who bring out new products require elements of creativity to ensure competitive advantage.

Limitation and future research

As with any research, this dissertation must be considered in light of certain limitations.

The first limitation is associated with the choice of the sample frame. The authors choose the sample of this study from a university in Southwestern U.S., which excludes other customer segments that are involved in the judgments of creative ideas in purchase decision making process. Therefore, although students are customers at the same time, and certainly for the product used in the study, future research should be extended to consider diverse customer segments such as industrial workers, hi-tech employees etc. As such, these extensions would help generalize the findings of this research.

This inquiry can contribute toward future research in both new product development and consumer behavior. In the future, this study can also be extended to investigate customer segments other than students to generalize the NPC scale. Further research can also discuss the influences of consumer perceived new product creativity on new product performance and new product success. The discrepancy between company reports and customer reports on NPC and their relationships with profit have not been assessed in previous research. Future research can investigate this issue. Also compatible capability, marketing fit, and customer needs can be evaluated for the future research on new product creativity.

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Appendix

Table 1A. Previous most widely accepted studies on creativity

Name	Definition	Goal	Found
Lubart (1994)	Creativity includes central features (novelty and appropriateness), peripheral features(quality, importance and production history) and social consensus(creativity judgment is influenced by experience and weight differences)	Creativity and its components and process	Specify creativity and attributes and measurements of creativity
Teresa M. Amabile and Elizabeth Tighe (1993)	"Our original conceptual definition of creativity included three elements: novelty of responses, appropriateness of responses, and open-endedness of task"	Define creativity	Conceptualization of creativity
Burroughs, James E. and David Glen Mick (2004)	"While novelty and functionality are fundamental to most definitions of creativity, they may, nevertheless, underspecify this construct within consumer behavior [...] As such, the conceptualization of creativity might benefit from adding a third dimension, aesthetics, which refers to a beauty of refinement in an outcome or product"	Antecedents and consequences of creative consumption	Different antecedents have different level of influences on each dimension of creativity.
Fillis, Ian and McAuley Andrew (2001)	Discussed previous definition	How creativity occur at the marketing entrepreneurship interface	Provide a conceptual model of how creativity occur at the marketing entrepreneurship interface.
Subin Im & John P. Workman Jr. (2004)	Use uniqueness dimensions (unique differences from competitors) and meaningfulness dimension (appropriate and useful to target customers)	Our study	Creativity as a mediator influence the relationship between marketing orientation and NP performance
Moreau C. Page (2005)	"Two factors are considered to be critic to components in the assessment of a product's creativity: its novelty (e.g., originality, uniqueness) and its appropriateness (e.g., usefulness, effectiveness)"	Understand the influence of input constraints on consumers' information processing strategies subsequently influence the creativity of the outcome	Input constrains encourage more creative information processing

Table 1A (cont.). Previous most widely accepted studies on creativity

Name	Definition	Goal	Found
Andrews, Jonlee and Daniel C. Smith (1996)	"We define marketing program creativity as the extent to which the actions taken to market a product (e.g., package changes) represent a meaningful difference from marketing practices in the product category"	Test individual and situational factors on marketing program creativity	Marketing program creativity is a function of individual problem-solving inputs, motivational factors and situational factors
Moorman, Christine and Anne S. Miner (1997)	"New product creativity refers to the degree to which a new product is novel and has generative capacity(potential to change thinking and practice"	Test influences of organizational memory on new product creativity and performance	Organization memory may influence new product financial performance and creativity in different ways
Titus, Philip A. (2007)	"Creativity is defined as encompassing those activities undertaken to produce creative breakthrough products, services and marketing initiatives that are both (a) unique to the marketplace and (b) create value or utility for the customer	Integrate creativity instruction into marketing classroom	Creative marketing breakthrough model and its constrain on individual creativity are found
Eliot, T.S. (2002)	"A creative idea is an idea about which field experts agree that that it is creative"	Study the template of creativity	three invention of creativity template
Hirunyawipada (2008)	"New product idea creativity is considered as the ideas that could turn out to be products that are novel to and useful for customers, and appropriate to firms' existing production systems".	Examine the componential factors and constrains in new product ideation	Specialization and diverse expertise essentially and collectively increase NPD ideation, also goal constrains was discussed
Jackson and Messick (1965)	Creative products have 4 response properties: unusual, appropriate, transformed and condensation	Study correct responses in assessing creativity.	Conceptualization of assessing creative products
Haberland and Dacin (1992)	Creativity of advertisement is the extent to which it is original and unexpected, appropriate and meaningful, refumulatable and condensed	Create a measurement to assess viewer's judgment to ad creativity	Data analysis support the proposed four dimensions of ad creativity assessment