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PhD in Business Administration and Management
XX Cycle

From the Firm to the Market:
The Long and Winding Road to New Product Success

PAPER 1

To Integrate R&D and Marketing or not to Integrate? The Combined Effect of the Level and Type of Product Innovativeness

ABSTRACT

The paper proposes a knowledge perspective to solve the long debate around the optimal level of R&D-marketing integration. Product innovativeness, which has a big impact on the knowledge necessary to successfully introduce a new product, is analyzed as a possible moderator in the integration-new product performance relation. Data about 11 new product development processes in 5 firms have been analyzed through qualitative analysis. It revealed that the level and type of innovativeness have a combined moderation effect. New-to-the-market products need high integration. For new-to-the-firm products, high integration has positive effects on market performance, but negative effects on process performance. When innovativeness is low, low integration is better.

More integration between marketing and R&D leads to better new product performance (Leenders and Wierenga, 2002)

Not all projects within a company need to achieve equal level of integration for successful development (Griffin and Hauser, 1996)

INTRODUCTION

R&D– marketing integration is a long-standing topic in the NPD literature, and is acknowledged as one of the main antecedents of new product performance (NPP) (Song and Xie, 2000). Still, two divergent opinions exist. Those who contend that firms should pursue high levels of integration in any case (e.g., Jassawalla and Sashittal, 1998; Song and Parry, 1997; Calantone and Di Benedetto, 1988) are criticized by those who propose that differing new product development (NPD) processes should be managed with different levels of integration (e.g., Gupta, Raj, and Wilemon, 1986; Griffin and Hauser, 1996). Even though the latter pointed out the negative effects of too much integration on new product performance (NPP), attempts to find some contingencies according to which define the optimal level of integration (i.e., that that maximizes NPP) failed. Then manager's dilemma "to integrate or not to integrate" is still without an answer.

We contend that an answer can be found by looking at the main goal of integrating R&D with marketing: combining the two critical pieces of knowledge for new product success– technical and market – that otherwise would be separate (Danneels and Kleinschmidt 2001; Li and Calantone, 1998). Many scholars observed that product innovativeness is the main determinant of the knowledge necessary to guarantee new product success (Song and Montoya, 1998; Atuahene-Gima, 1995; Veryzer, 1998; Kleinschmidt and Cooper, 1991). However, there is no empirical evidence of how the effects of integration on NPP vary according to product innovativeness.

This paper analyzes how knowledge needs vary in different NPD processes to investigate the role of product innovativeness. From our analysis, it emerged that the level (i.e., high vs.

low) and the type (i.e., new-to-the-market and new-to-the-firm) of innovativeness have a combined effect, which moderates the relationship between R&D-marketing integration and the two different dimensions of NPP: process and market.

BACKGROUND LITERATURE

R&D-marketing integration: much is better

Innovation literature has acknowledged two main sources of new product success: market knowledge, which mainly lies in the marketing department, and technology knowledge, which mainly lies in the R&D department (Danneels and Kleinschmidt 2001). Unfortunately, R&D personnel and marketers constitute different worlds of thought, that is "a community of persons engaged in certain domain of activity who have a shared understanding about that activity" (Dougherty 1992: 182). Each community develops its own interpretative schemes and is likely to better understand certain issues and to ignore others. R&D people are devoted to exploit new technologies, build neat new products and they largely emphasize the product performance in technical terms. On the other hand, marketers are devoted to meeting customer needs and are concerned with the impact of the new product on the firm's relationship with customers (Maltz and Kohli 2000). Because of discrepancies in priorites, dissonance between R&D and marketing is the rule rather than the exception (Moenaert et al., 1994).

The capability to integrate Marketing and R&D is a strategic resource because it allows combining two critical pieces of knowledge for new product success. Integration comprises two components: interaction (e.g., information exchange, meetings, communication), and collaboration, through which two departments "have mutual understanding, a common vision, share resources and achieve collective goals" (Kahn, 1996, p. 139). Firms with higher levels of R&D-marketing integration outperform their rivals because they can exploit their

technological capabilities in a way that is more consistent with the market's requirements (Li and Calantone, 1999; Song and Parry, 1997). Higher integration is said to lead to shorter development processes, cost reductions, joint contributions to the accomplishment of the overall organizational goals, improved quality, faster time to market, and eventual commercial success (e.g., Song, Montoya-Weiss, and Schmidt, 1997; Ayers, Dahlstrom, and Skinner, 1997). This position is well summarized by Leenders and Wierenga's (2002) motto: *More integration between marketing and R&D leads to better new product performance* (p. 306).

The dark side of integration: more is not always better

In contrast with this view, some scholars contend that integration is not positive *tout court*, but only when it is coherent with the real needs of integration within an organization (Griffin and Hauser, 1996; Gupta et al., 1986). These scholars pinpoint some negative effects due to an excess of integration. Most interaction activities have been found not to promote performance success, while overburdening personnel with too many meetings and stress (Kahn 1996; Kahn and Mentzer 1998). As for common goals and cohesion, according to organizational behavior literature, too much cohesion may lead to agreement about a group decision, regardless to its correctness (Sethi, Smith and Park., 2001). In the NPD literature, an excess of cohesion has been found to harm the NPD process, by limiting objective criticism (Souder 1988) or by generating myopia and premature elimination of options (Swink 2000). Finally, too much integration may lead to an excess of formalization that, in turns, has a negative effect on NPP (Burns and Stalker 1961). Since this, Griffin and Hauser (1996) warn: "*The need for integration is situational… Not all projects within a company need to achieve equal level of cooperation for successful development*" (p.197).

Reconciling competitive perspectives: knowledge needs and product innovativeness

A few studies have tried to identify some contingencies according to which define the optimal level of integration. They mainly focused on "external" factors, not directly related to the NPD process: e.g., demand uncertainty and rate of technological drive (Parry and Song 1993), environmental uncertainty and the organization's innovation strategy (Gupta et al. 1986), the business unit strategy (Ruekert and Walker 1987), etc. These studies reported inconclusive evidence. One study analyzed how integration should vary across different phases of the NPD process (Song, Thieme and Xie, 1998). Surprisingly, there are no studies that directly investigated how the optimal level of integration depends on the knowledge necessary to obtain a good NPP. We argue that this is a serious gap in the literature, since the main benefit of integrating R&D and marketing integration is indeed the generation of the knowledge necessary to successfully develop and launch a new product (Li and Calantone, 1998). A closer look at factors influencing knowledge needs may help in clarifying whether firms should pursue the highest level of integration in any case or if they should switch from higher to lower levels.

Many scholars have noted that the level of innovativeness – i.e., radical vs. incremental – does influence the extent to which new knowledge has to be generated by combining functional knowledge (e.g., Song and Montoya, 1998). The nature of the NPD process for radical products is more exploratory, it requires a large degree of new knowledge on the marketing side, because consumer demand is latent, and market opportunities are often unspecified and unclear. New knowledge is necessary the R&D side, because product requirements are unarticulated (Veryzer, 1998). Due to this knowledge requirement, the development of radical innovations is more likely to require greater learning and behavioral change on the part of the firm as well as to involve greater market, technology and competitor uncertainty (Atuahene-Gima, 1995). Incremental innovations, instead, are direct extensions

of prior product knowledge (Kleinschmidt and Cooper, 1991). Therefore, there is room to suppose that product innovativeness plays a critical role in affecting the optimal level of integration (because different levels of innovativeness require different knowledge combinations). There is only study that investigated the moderating role of product innovativeness on the relationship between R&D-marketing integration and NPP (Song and Xie, 2000). However, the study, which is focused on cross-cultural issues, does not analyze how knowledge needs vary according to fluctuating levels of innovativeness. Our work investigates if the optimal level of integration depends on the innovativeness embedded in the product, because this generates different knowledge needs. In other words, we aim to answer the following research question:

RQ: *How does product innovativeness influence the effect of R&D marketing integration on NPP?*

RESEARCH DESIGN AND METHOD

Sample

Since little is known about the effect of product innovativeness on the relationship between R&D-marketing integration and NPP, we adopt a qualitative approach to answer our research questions. Indeed, it is not possible to define *a priori* some hypotheses and an inductive approach should be preferred over a deductive one. Hence, we prefer not to develop any model a priori, but rather allow the theoretical framework to emerge from our empirical observations. Second, a qualitative analysis is preferable when "how" questions are the core of the research, as in our case (Yin, 1994).

In defining our sample, we focused on manufacturing industries rather than on service industries, because the role of R&D seems to be more relevant in the former case. Among these, we focused on business-to-consumer industries, because targeting and positioning are more difficult herein (Hultink et al., 2000). We selected our case studies in two industries:

food and shoes. These industries have been chosen because they are characterized by intensive new product launches in which both technology and marketing knowledge have a relevant role.

We adopted a two-step approach to select our case studies. In the first stage, we contacted the President of each industry association. During two separate meetings, authors presented the purposes of the research, and asked each president to show the most relevant firms for the study. We asked for a list of medium to large firms that are well-known for their frequent innovations. A minimum size was requested in order to guarantee that targeted firms had both an R&D and a marketing department. At the end of the first phase we obtained a list of 18 firms. In the second stage, we contacted R&D and marketing heads in each firm, presented the research, and asked them to participate in the study. Only when both managers accepted, were firms included in the sample. In the very end, five firms accepted to take part in our research project: two in the shoe industry and three in the food industry. Detailed data about each firm are reported in Appendix A. (Because of privacy concerns, we are not allowed to disclose the names of the firms we interviewed. Names can be provided to the editor or reviewers by request). To gain multiple perspectives, we interviewed both R&D and marketing managers in each firm. In one firm we also interviewed the manager responsible for the NPD processes and in another one we interviewed two marketing managers, one responsible for new products development and the other in charge of communications with the market. A total of 12 top managers were interviewed.

Due to the fact that within a given firm there is often a considerable variation in NPD processes (Sethi et al. 2001), in each firm we asked interviewees to discuss two different NPD processes. In this way, we could take into account the various levels of innovativeness and different ways of managing R&D-Marketing relationships within the same firm. The two processes had been decided on in a preliminary phase and agreed upon between R&D,

Marketing manager and authors. In order to control for the different effects of integration and newness on performance, we asked managers to select one successful and one failure case. Success and failure has been defined according to Griffin and Hauser's (1996) recommendations, along customer, financial, and process dimensions. In one firm we had the opportunity to discuss three different processes. These NPD processes represent our unit of analysis. To summarize, our sample is made up of 11 NPD processes: 5 successful and 6 failures cases.

Data collection

Each of the two authors conducted semi-structured interviews in specific companies and took notes. Interviews were also tape-recorded in order to compare notes taken by the author who personally participated in the interview with the other author's understanding of the recorded interview. This tactic is suggested by Eisenhardt (1989) as an effective way to have a more objective eye to the evidence. Interviews lasted between 150 and 180 minutes and were conducted during March-May 2006.

The interview protocol was made up of two parts. In the introductory part, we asked interviewees to describe the role and relevance of Marketing and R&D within the organization, the amount of interaction between the two functions, and the quality of the relationship. We asked questions such as: *To what extent do the two functions share common goals? Can you describe the relationship with the R&D (marketing) people? What is the role of your department within the firm?* Moving to the process-level, we asked our interviewees to describe the characteristics of the product, and to assess to what extent it differs from existing products, in terms of technological novelty and benefits for consumers. Then, we asked them to describe how the idea emerged and the many steps that led to the launch of the product in the market, with particular attention to the type of knowledge and competencies they had to develop. Examples of questions are: "*Where did the idea of the new product come*

from?" or "*To what extent did the competencies you used to develop this product differ from those that you had before starting?"* Subsequently, we asked them to describe the nature and quality of the inter-functional relationship in the specific NPD process. Finally, we allowed the managers to freely describe the performance of each process in their own words.

A subsequent codification made by the authors revealed that managers tend to assess the performance of a new product along two dimensions. The first refers to an internal measure of success, in which managers evaluate whether or not the product fulfilled the initial budget and time to market. Sentences such as "*we needed more money than the amount initially planned*" or "*we respected the scheduled plan*" or "*it took more time to come out with the final product*" are generally used to describe this dimension of performance, which we labeled as process performance. The second dimension refers to market performance (i.e., sales, market share). Interestingly, functional belonging did not influence managers' performance assessment, so that marketing managers also talked in terms of process performance and R&D managers also talked in terms of market performance. In only two cases (firm C and E), did the R&D managers not explicitly talk about marketing performance. We subsequently re-contacted these managers and asked for their product's marketing performance. Inter-managerial assessment was highly consistent.

After collecting data for the 11 processes, we decided to stop and not look for other firms mainly because of time and resource constraints, but also because we started finding clear signs of data saturation. Managers increasingly reinforced the patterns we had identified, without adding significantly to the breadth of findings.

Analysis procedure

For each NPD process, we conducted a within-case analysis and started classifying cases into five different categories: the nature of the relationships between the two functions, the

level of innovativeness, the type of knowledge developed, the process, and the market performance. However, at this point, by reading taped interviews and written notes, we observed a consistent pattern in the terms managers used to describe the type of knowledge necessary to develop the product. In certain cases, manager talked about an "internal" source of knowledge, a term with which they refer to the fact that the knowledge was developed internally by either one function or the two together. In other cases, managers talked about an "external" source of knowledge, a terms with which they refer to the fact that the idea was copied by some other product existing in the market. There was a third situation, in which managers said that there was no source, because the NPD process needed no knowledge at all. By comparing the innovativeness of the products for which managers used the term "*internal*" versus the products for which they used the term "*external*" and those for which there was *no* knowledge needs, we found that there is a consistent difference in the type and level of innovativeness. Products described as highly innovative belong to either the first or the second group; products with low innovativeness belong to the third group. In the first situation, products are based on existing firm competencies and aim to create something new for the market. When talking about the reasons why they introduced these products, managers used concepts such as "*creating new consumption habits*", "*differentiate our offerings from competitors*" or "*finding new ways to use our competencies*". In the second situation, products are mainly imitations of others in the market, but required the firm to develop new competencies. Concepts such as "*entering a profitable niche*" or "*following our competitors*" are used to describe the reasons behind the development of these products. In the third case, products rely on firm competencies and are already produced by some competitor. Managers talked about the opportunity to "*enter a successful niche with low investments*" or to "*use our capabilities to develop products that already have success in the market"*. Consistent with the literature (e.g., Atuahene-Gima, 1995; Booz, Allen and Hamilton, 1982), we labeled products

in the first group (internal knowledge) "new-to-the-market", products in the second group (external knowledge) "new-to-the firm", and products in the third group (no knowledge) "line extensions". Hence, we added a further variable – innovativeness type – with which we classified our cases (see Table 1).

As a second step, we searched for cross-case patterns. Since we have both successful and failure cases, we compared cases belonging to the same category and looked at the relationship between NPP and integration. During this highly iterative process we systematically compared the emergent frame with the evidence from each case comparison. We adopted a replication logic in which each case served to confirm or disprove our emerging propositions. The internal validity of this multiple case study is significant, because all the individual case studies present consistent patterns supporting the causality between key constructs (Eisenhardt, 1989). However, we left to future quantitative research for a larger, random sample the task to assess the external validity of our propositions and framework.

CONCEPTUAL FRAMEWORK

For each NPD project, we briefly report in table 2 a list of the relevant variables and the explanation of success or failure.

Insert Table 1 about here

Integration. We found that firms in our sample did not vary integrative mechanisms during NPD processes and, importantly, do not regard innovativeness as a key variable that influences the optimal level of integration. On the contrary, they maintain the necessity of

having a standardized way of managing cross-functional relationships. Firms C and E enlist a person, a sort of "liaison role", to keep contacts between functions. The role is an informal mean of communication between the two areas, which acts irregularly only when new ideas have been developed. According to our interviewees, collaboration and coordination are limited, and information sharing is incomplete. The two functions operate relatively autonomously until (most of the times) marketing forces R&D to develop some new products, but communications are said to be difficult because people have different perspectives. In firm E, the two departments are physically located very distant from each other, and this makes communication more difficult.

Firms A and D instituted cross-functional teams including both R&D and Marketing people (and other functions as well), which meet periodically to discuss NPD processes in progress and future opportunities that each function had developed on its own. In both firms meetings occur about twice a month, and the two functions are jointly responsible for the development of new products. Periodically (i.e., every four months in one firm, and every three months in the other), the two functions jointly present to other members in the firm the new ideas they have developed. Managers describe their relationships as "peer-relationships", in which people share a common language. The marketing manager in firm A described himself as a very good friend of the R&D manager.

Firm B employed a product manager to manage cross-functional relationships. He describes his role as "*the bridge between functions"*. Integration between R&D and Marketing starts at the very beginning of each project, usually about one year and half before the launch of the new product in the market. Communications and information sharing go on along the whole NPD process. Consistently during our interviews, it emerged that in this firm marketing and R&D people cooperate with each other and have common goals. R&D and marketing managers describe each other as fundamental partners in order to have a clear idea of what

the market wants as well as of what new opportunities the firm could take advantage of: "*R&D people learn from us what is trendy in the market, and we learn from them the possibilities to catch up with the trend*" (Marketing manager in firm B).

Integration: when does it become too much?

Our cross-cases analysis was articulated in three steps. First, we considered products scoring high in the new-to-the-market dimension, and we compared products managed with high integration with products managed with low integration. Second, we repeated the same type of analysis with very new-to-the-firm products. In the last step, we analyzed those products with a low score in both dimensions. For each group we report an exemplary case. Characteristics of each new product are briefly described in Appendix B.

Newness to the market. We have 4 new-to-the-market products: 2, 3, 6, and 10. They introduced in the market new consumption habits (as in the case of product 3) and required consumers some efforts to recognize the product's benefits (as in the case of product 2).

High integration: product 2. In firm A, which developed product 2, R&D and marketing share the responsibility of the success of new products. They have periodic meetings twice a month, in which they discuss products under development and new ideas. During one of these meetings, R&D proposed to use the firm's technology to enter the segment of long-life milk. At first, marketing shows resistance to this idea, because in the Italian market long life milk is regarded as an unhealthy product. There was the risk of damaging firm's image. However, the idea was not completely discarded: "I*t is difficult to have a good idea at the first shot. This is why we have so many meetings: by talking with us, R&D can realize how to successfully use our competencies".* After a couple of meetings, one person from the marketing department asked if it were possible to do something to make the product more

similar to a fresh one. In the end, the firm introduced a bottle of long life milk that maintains all the properties of fresh milk. It rapidly achieved a relevant market share and sales exceed forecasting. The development process respected the budget, because "*When we started everyone here knew what we were going to do*. W*e and marketing had a shared development plan. No discussion on what to do next*" (R&D managers)

Low integration: product 6. In firm C, contact between marketing and R&D is infrequent and the two functions tend to be focused on their own goals. So R&D has little knowledge of what happens in the market. In the case of product 6, R&D had the idea of a new boot made of a new material that would allow boots to survive more than one year. This is a revolutionary marketing concept because, in this target, consumers are used to buying a new boot every year in order to follow fashion trends. R&D contacted the liaison person and asked her to tell Marketing they were developing this new product. "*We did not pay so much attention to their project, we received informal information from our person, but we had thousands of other things to do… after a week I almost forgot what they were doing*" (Marketing manager). Developed in these conditions, the product was a great failure for the firm. Indeed, consumers were totally unconcerned with the characteristics of the new product: they did not want a more robust boot, they simply wanted a fashionable boot. Since marketing did not collaborate, R&D managers lacked this relevant piece of information. Further, the process was very time consuming for R&D. "*We were aware of the fact that the product was new for the market, so we wondered: What do our customers want? We spent a lot of time developing many prototypes… If only marketing had told us it was not a good marketing idea, we would have never started that project. But they did not. They told us nothing*" *(*R&D manager).

Newness to the firm. Things are a bit more complicated when we move to newness-to-the-firm. In our sample, we have a total of 4 new-to-the-firm products: 4, 7, 9, and 11. Firms developed new competencies to develop products that are sold in the market by competitors.

High integration: product 4. Product 4 is new shoes made with a material that improves the wellness of feet, by higher transpiration and better protection to avoid micro-trauma. This product was already in the Italian market (it was introduced by one of the main competitors) and was experiencing fast growth. Marketing saw a good opportunity to enter a new segment. In this firm (B), R&D and marketing are both strongly committed to the overall organizational goals and collaborate with each other for the success of new products. As usual, this process was managed by a project manager, but joint meetings and communication exchange were very frequent. Because of this strong integration, marketing did not limit its influence by passing the idea to the R&D but monitored each step in the development of the new material itself. This slowed the process down that cost more time (and resources) than expected. The project manager said "*It would have been better to let R&D to manage the process. Marketing was totally unhelpful; it gave us information that was useless during the first phase"*. Or in the R&D manager's words: "*We had to spend hours and hours describing each single step to them and I was overloaded by their information, most of which was useless for me. But we couldn't say "guys, let us do our job", they are good friends of ours"*. Too much information, too much concern with keeping good personal relationship, and too much interaction are the negative effects of high integration that emerged during the development of product 4. However, once developed, the product was a success in the market, and rapidly achieved a good market share. The R&D manager recognized that: "*Marketing was really important in launching a product that consumers appreciated very quickly, it knew perfectly what we were selling and had no difficulty in convincing our customers that it was a worthwhile product to buy*". Due to close integration, marketing co-

developed the new knowledge with R&D. "*Weekly meetings helped us to gradually build our knowledge of the product. When it was ready, we too were ready with our marketing strategy. We knew everything about the product's benefits*" (Marketing managers)

Low integration: product 11. The story is the exact opposite for product 11. In firm E, R&D and marketing are located in two different cities, with no opportunity for physical interaction. The relationships are managed by a liaison role, namely a person in the marketing department who personally visits the R&D each time her department develops a new idea. Occasionally, she can be contacted by R&D managers if they have something to communicate to marketing (e.g., the development of a new technology). Roles are neatly defined and distinct: marketing develops ideas to satisfy consumers, R&D focuses on improving technologies. There is no shared vision or common goal, and communication is sporadic. In case 11, marketing observed that a competitor had launched a new type of yogurt that, if eaten daily, helps reduce cholesterol. Since the product seemed to have immediate success, marketing asked R&D to develop a similar product in about two/three months. The liaison person communicated the decision to R&D and explained the characteristics of the new product. However, according to the R&D manager "*They gave us a few pieces of information. We met with their guy, who told us that we had to develop a product to reduce cholesterol. In our language, this can mean several things […]. Only in a second meeting we understood that they were referring to yogurt".* Meetings lasted about two hours and there were only three meetings. In the last one, R&D managers presented the new yogurt to the marketing person. Competencies necessary to develop the new yogurt were brand new for R&D, which worked hard to fulfill the time requirement. "*They put a lot of pressure over us, but fortunately they did not bother us too much […]. We saw their man a couple of times and we dedicated all our efforts to develop the new product."* Because of this, the firm was able to have a reduced time to market. However, poor coordination and collaboration between

R&D and Marketing had bad consequences for the quality of the product. The yogurt had a terrible taste that consumers did not like at all. The marketing manager told us that they had collected information about the taste of the new yogurt, but R&D was probably not concerned with taste: "*They usually do not pay attention to what the market wants. They aim to develop the perfect product from a technological point of view, and think consumers will automatically appreciate the effort"*. As one R&D manager confirmed: "*We focused on healthy characteristics and left taste alone*". This was the outcome of poor communication with Marketing: "*We never received this information, so we simply did not care about it. They should have told us, if they wanted us to focus on taste as well"*. In this case, weak integration allowed R&D to respect the scheduled plan. However, since marketing didn't completely communicate all of its knowledge into the organization, the new product lacked a critical piece of information (i.e., consumers' tastes and was withdrawn from the market a couple of months later.

Line extensions. We have three cases of line extensions (products 1, 5, and 8), namely products which are low in newness to the market as well as to the firm. Firms used their existing knowledge, either technological or market-related, to develop a new product, very similar to others on the market. Through these cases we analyzed the effect of integration when the level of newness is low.

High integration: product 8. Several years ago, firm D decided to extend its line of soft drinks, with a new beverage that included a high percentage of milk. The firm had all the competencies to develop the beverage, which was already produced by another firm. However, since the two functions are accustomed (and also obliged) to meet every two weeks to share each single step in the NPD process, the development was pretty slow. "*We thought that idea was really simple. But since we are used to discussing every project several times,*

and to share everything with marketing, we wasted a lot of time talking, when there was nothing to talk about (R&D managers). Since the NPD process was pretty slow, the new drink was ready after several months. In the meanwhile two other companies launched similar products. Because of the extended time-to-market, the product arrived late and was never able to reach the break-even-point. It was withdrawn eight months later.

Low integration: product 5. Firm C yearly introduces new sneakers. Product 5 was a slight improvement in the material used the year before, which allowed the use of new colors. We discussed integration in this firm when presenting case 6. As a byproduct of another project, R&D upgraded an old material with some new chemical properties that made the use of a wider range of colors possible. R&D managers charged one person to communicate this possibility to marketing. Marketing managers saw in this new material a good opportunity to offer more fashionable shoes. The same person came back to R&D and asked them to go on with the process. The new material was ready to be used as a part of the new collection. Consumers liked the new colors and the new sneakers had optimal sales. The NPD process was very fast, with only two interactions between the functions.

Insert Figure 1 about here

DISCUSSION: FROM CASE STUDIES TO THEORY

From our analysis, it emerged that integration has a varying effect on NPP according to the level and type of product innovativeness. So, for instance, products 2 and 8 were both managed with strong integration, but whereas the former (new-to-the-market) had good process and market performance, the latter (line extension) was introduced too late because of

slow NPD process. This is due to the fact that innovativeness influences the nature of the knowledge generated during the NPD process and is necessary when creating a successful new product.

The level of innovativeness determines the first, macro distinction in knowledge needs among NPD processes. Highly innovative products, both new-to-the-market and to-the-firm, require the development of new knowledge. Non-innovative products as line extensions do not require the development of any new knowledge, but they are a way through which the firm exploits existing competencies. We observed that line extensions managed with high integration (products 1 and 8), had an expanded time-to-market and never achieved a satisfactory market share (product 8 was even withdrawn). On the contrary product 5, managed with low integration, had a very fast development process and met costumer needs. Since knowledge needs are very low, non innovative products require rapid "yes or not" decisions to enter the market before it becomes saturated. Frequent meetings and information exchange are not necessary, because both departments have the competencies necessary to engineer the new product and to launch it. A sequential NPD process, in which R&D develops the product and then marketing launches it, with no interactions in the meantime, appears to be the winning combination in this case. As product 5 shows, low integration is optimal for products with low newness to the market. Accordingly, we develop the following proposition:

P1: High integration is harmful when the level of innovativeness is low

Unfortunately this does not imply that integration is always beneficial when innovativeness is high. It emerged that, in this situation, the type of innovativeness determined the knowledge a firm has to develop and, thus, the effect of integration on NPP. The role of newness to the market differs from the role of newness to the firm.

The development of a new-to-the-market product appears to be an exploratory process, in which frequent interactions between R&D and marketing are necessary to develop something that consumers can appreciate. R&D can envision using its competencies to enter a new segment, but it needs market knowledge to select the right competitive space. Otherwise there is the risk of entering a niche that is open simply because not profitable (e.g., long lasting products in a fashionable market, as for product 6 or candies too small to generate pleasure when eaten, as for product 10). Only close integration seems to guarantee the fine-tuning activities necessary to find a profitable space. First, since the two departments have ongoing information exchange, they can rapidly realize if something is going wrong and pursue another option. Second, since they perceive each other as valuable partners in the process, they positively evaluate each other function's ideas and feedback, and tend to mutually sustain each other along the process. On the contrary, when integration is low, market knowledge is not combined with technical knowledge. The process is much slower, because R&D can try and figure out what the market wants, but, without the support of marketing, this is an arduous process, which requires a lot of resources (e.g., for products 6 and 10 R&D had to develop many prototypes). Further, since there is no common vision on the company's strategy, the new product can be far from the traditional target and marketing may not develop the necessary competencies to sustain the new product. The products managed with high integration (2 and 3) were successful, the other two (6 and 10) managed with low integration wasted a lot of resources and had poor market performance. On this ground, we propose:

P2: Newness to the market positively moderates the relationship between integration and a) market performance and b) process performance

The knowledge necessary to develop new-to-the-firm products is generated through a different process. Firms developed their ideas by looking at what other competitors were

doing. Strategically speaking, these products are launched to enter an existing and profitable space in the market. This knowledge has to be absorbed from the external environment and brought into the organization in order to develop new competencies. In our sample, marketing started the NPD process after observing the success of some competitors' products. It is then, when the idea passes from the marketing to the R&D department, that integration plays its critical, and contradictory, role. Products 4 and 9, managed with high integration, had an NPD process that lasted longer than what was planned, but very positive market performance. Products 7 and 11, managed with low integration, respected the initial budget, but were not appreciated by the market. Combining external and internal knowledge in a proper way for consumers is a long process, which requires a lot of interaction (e.g., discussion, communication) and collaboration between the two departments. The fact is that usually these products generate uncertainty on the R&D side, but less on the marketing side, because the latter had already observed the product on the market. Case 9 shows that trust, a byproduct of strong integration, is fundamental: R&D did not want to introduce a simple replica of another existing product and proposed some modifications. When marketing replied that consumers were not ready for this, R&D accepted the decision and maintained their commitment to marketing's idea. Since R&D needs marketing support, the NPD tends to be long. When there is poor communication, R&D cannot reduce its uncertainty. So, it decides to focus on the variables under its control (e.g., respecting time to market, money available), and to forget those variables for which it has no knowledge, i.e., consumer needs. It is not by chance that the two R&D managers who did not talk with us about market performance are those in firms C and E, firms in which integration is low. Hence, the NPD process is in general faster and consistent with the budget. Since the final product lacks market knowledge, it tends to have poor sales and generate low profits (products 7 and 11).

These cases suggest the existence of a trade-off between market and process performance: high newness to the firm managed with high integration lowers process performance, but increases market performance. The opposite hold when high newness to the firm is managed with low integration. On these grounds, we develop the following propositions:

P3a: Newness to the firm positively moderates the relationship between integration and market performance.

P3b: Newness to the firm negatively moderates the relationship between integration and process performance.

CONCLUSIONS

The literature presents contradictory perspectives on the effect of R&D-marketing integration on NPP. Some argue that more integration is always better; some contend that the optimal level of integration is contextual. Since one of the main purposes of integration is to combine critical pieces of knowledge, we tried to solve this dilemma by investigating the role of innovativeness. Indeed, knowledge needs should vary according to the level of product innovativeness (Atuahene-Gima, 1995; Veryzer, 1998; Kleinschmidt and Cooper, 1991). But, whereas prior theory maintains that knowledge needs depend solely on the level of innovativeness, we also found that the type of innovativeness plays a critical role. Successfully developing a new-to-the-market rather than a new-to-the-firm product requires a different type of knowledge. In the first case, internal knowledge is combined to enter a brand new segment; in the second case, external knowledge is absorbed to enter an existing competitive territory. The inconclusive evidence reported in the only study that analyzed the moderating role of innovativeness may be due to the fact that it only investigated the level (Song and Xie, 2000). Our analysis found that R&D-marketing integration has variable effect on NPP, which depends not only on the level but also on the type of innovativeness. This is an important contribution to the theory, because we showed that the beneficial effect of integration is contextual rather than permanent.

It also became evident that it is necessary to assess performance along two dimensions: (a) process performance, referring to the efficiency of the process with regard to the planned time and money; (b) market performance, referring to the commercial success of the product. The two types of innovativeness present opposite effects on the process dimension: newness to the market enhances the positive effect of integration on process performance, while newness to the firm decreases the contribution of integration to the process performance. Only when NPP is disarticulated in its sub-dimensions, is it possible to fully appreciate the moderating role of innovativeness. This implies the existence of a trade-off in the development of new-to-the-firm products, with relevant managerial consequences.

Managerial implications

Firms in our sample manage all NPD processes with the same level of integration. Product innovativeness is not a relevant variable when making decisions about how to manage R&D-marketing relationships. Our findings completely overturn this perspective: by analyzing two processes for each firm, one success and one failure, we realized that integration must vary according to the type of new product under development.

Indeed, explanations provided by managers to justify failures point to an inappropriate level of integration as the main cause. It is important to note that, when discussing failure, we never asked managers to tell us what went wrong in the relationships with the other unit. It was managers who spontaneously and explicitly referred to something wrong with integration. Apart from one product, managers never offered other causes for failure (in one case, managers also discussed poor strategic support for the product, but they believed it was a consequence of initial, poor market performance).

In the last decade, managers have been repeatedly taught the importance of cross-functional teams and joint participation in NPD processes. However, we showed that too much

integration may be harmful when newness is low. For instance, some interviewees complained about of the excess of bureaucracy. When planning their relationship with marketing (or R&D), managers should carefully evaluate what type of knowledge the product needs to be successfully developed and launched. When these needs are low, a rapid process, with a little information exchange, each function focusing on its specific goals, must be preferred to a process in which R&D waste time discussing nothing of value and in which each function interferes with the other's goals.

New-to-the-firm products are critical for firm profitability, since they represent 31% of firm turnover, against the 7% generated by new-to-the-market products (EUROSTAT, 1998). The analysis shows that their development is problematic, because integration has an opposite effect according to the type of performance assessed. Too much integration slows down the process, mainly because R&D must take into account Marketing's insights and cannot be totally focused on product development only. Similarly to what happened in process 4, R&D may present different prototypes to Marketing and many of them may be rejected. However, repeated interactions with Marketing allow the development of a product that meets consumer needs. Hence, managers must be aware of a trade-off in developing new-to-the-firm products: either they focus on the efficiency of the process or they sacrifice process performance for market success. Since the latter seems to be more important, we suggest that managers emphasize strong integration, and, at the same time, prepare for some inefficiencies during the process.

Poor process performance for new-to-the-firm products may be due to managerial misconceptions about the amount of time and money necessary to successfully develop a product for which the firm has to develop brand new competencies. The fact that it already exists in the market does not necessarily mean that its development will be easy and imitation might be a longer and more difficult strategy than what may appear at first glance. This is

what happens in case 11, for which strict time requirements were fixed. R&D managers were concerned with having a good process performance, but they came out with an unsatisfactory product. Because of this, managers should keep in mind, even before starting the NPD process, that new-to-the-firm products may require more time and money than other NPD processes.

LIMITATIONS AND FUTURE RESEARCH

This work presents some limitations that may act as stimuli for future research. First, only one possible factor affecting the right level of integration has been investigated. It is possible that other factors influence this optimal amount. In an effort to focus attention on variables related to knowledge needs, we suggest that product complexity may be another variable worthy of investigation.

Second, this study investigates the interface between marketing and R&D only. We have stated that market and technological knowledge are the two critical sources of NPP; however, other functions provide relevant contributions too (Song, Thieme and Xie, 1998) For instance, production is critical to developing ideas that can be effectively produced. The relevance of these functions to the NPD process may vary according to product innovativeness. Additional research on these issues is particularly relevant, given the current tendency to include almost all corporate functions in the NPD process. It may be the case that different levels of integration must be used, even within the same process, to manage interfaces between different departments.

Third, given the nature of our analysis, we could compare only two levels of innovativeness – high and low. Future quantitative research may increase the variance of this variable to investigate if there is a linear or curvilinear moderation effect.

Fourth, the qualitative analysis is limited to firms operating in two industries. Even though we believe there is no reason to expect findings which are sectorially biased, we cannot confidently affirm that things work the same way in other industries as well. Further research is needed to investigate the same issues in other contexts, for instance in business-to-business markets. In these situations, marketing and R&D may have different relevance which may affect reciprocal relationships and lead to somewhat different findings.

Finally, future research should investigate what happens in the case of new-to-the-world products, namely products in which both newness to the firm and to the market are high. We had no new-to-the-world products in our sample, but there is reason to assume that knowledge needs are extremely high in this case, because there are two sources of innovation: the firm and the market. Future research has to clarify whether the combined effect of the two types of newness is different from the simple sum of the two. Additional research specifically dedicated to new-to-the-world products appears essential to complete the framework proposed in this paper.

In conclusion, we must acknowledge limits due to the way the analysis has been conducted. We tried to limit as much as possible our personal biases when analyzing data. However, even though the framework emerged from data, our own interpretations may have biased some findings. Hence, rigorous tests of the framework are a clear avenue for future research. Statistical analyses in larger, random samples are necessary to guarantee the generalizability and the validity of these results.

REFERENCES

Atuahene-Gima, K. 1995. An exploratory analysis of the impact of market orientation on new product performance. A contingency approach. *J.Product Innov. Manage* **12** 275–93.

Ayers, D., Dahlstrom, R., and Skinner, S. J. (1997) An exploratory investigation of organizational antecedents to new product success. *Journal of Marketing Research*, 34: 107–116.

Booz, Allen, Hamilton Inc. (1982). New Product Management for the 1980s. New York: Booz, Allen, and Hamilton Inc.

Burns, T., and Stalker, G. M. 1961. The management of innovation. London: Tavistock.

Calantone, R. J., Di Benedetto C. A. (1988) An integrative model of the new product development process: an empirical validation. *Journal of Product Innovation Management*, 5: 201–215.

Danneels, E., E.J. Kleinschmidt. 2001. Product innovativeness from the firm's perspective: its dimensions and their relation with project selection and performance. *J.Product. Innov. Manage* **18** 357–373.

Dougherty, D. 1992. Interpretive barriers to successful product innovation in large firms. *Organ. Sci*. **3** 179-202.

Eisenhardt, K. M. 1989. Building theories from case study research. *Acad. Manage Rev*. **14** 532-550

EUROSTAT (1999), *Community Innovation Survey 1997/1998*, Statistics in Focus, Theme 9-2/1999, Luxemburg, 1999.

Griffin, A., J. R. Hauser. 1996. Integrating R&D and marketing: A review and analysis of the literature. *J.Product. Innov. Manage*. **13** 191-215

Gupta A. K., S. P. Raj, D. Wilemon. 1986. A model for studying R&D-marketing interface in the product innovation process. *J. Marketing*. **50** 7-17.

Hultink, E. J., S. Hart, H. Robben, A. Griffin. 2000. Launch decision and new product success: an empirical comparison of consumer and industrial products. *J.Product. Innov. Manage* **17** 5-23.

Jassawalla, A. R. and Sashittal, H. C. (1998) An examination of collaboration in high-technology new product development process. *Journal of Product Innovation Management*, 15: 237-254.

Kahn, K. B. 1996. Interdepartmental integration: a definition with implications for product development performance. *J.Product. Innov. Manage*. **13** 137-151.

Kahn, K.B., J.T.Mentzer. 1998. Marketing's integration with other departments. *J.Bus. Res*. **42** 53–62.

Kleinschmidt, E.J. and Cooper RJ. (1991) The impact of product innovativeness on performance. *J.Product. Innov. Manage* 8(4): 240-251

Leenders, M.A., B. Wierenga. 2002. The effectiveness of different mechanisms for integrating marketing and R&D. *J. Product. Innov. Manage.* **19** 305-317.

Li, T., R. J. Calantone. 1998. The impact of market knowledge competence on new product advantage: conceptualization and empirical examination. *J. Marketing* **62** 13-29.

Maltz, E., A. K. Kohli. 2000 Reducing marketing's conflict with other functions: the differential effects of integrating mechanisms. *J. Academy Market. Sci.* **28** 479-492.

Moenaert, R.K., W.E. Souder, A. Demeyer, D. Deschoolmeester. 1994. R&D-Marketing integration mechanisms, communication flows, and innovativeness. *J.Product. Innov. Manage* **11** 31-45.

Parry, M. E., X. M. Song. 1993. Determinants of R&D-marketing integration in high-tech Japanese firms. *J. Product. Innov. Manage*. **10** 4-22.

Ruekert, R.W., O.C.J. Walker. 1987. Marketing's interaction with other functional units: a conceptual framework and empirical evidence. *J. Marketing*. **51** 1-19

Sethi, R., D.C. Smith, W.C. Park 2001. Cross-functional product development teams, creativity, and the innovativeness of new consumer products. *J. Marketing* Research. **38** 73-85.

Song, X. M., J. Xie. 2000. Does innovativeness moderates the relationship between cross-functional integration and product performance? *J. Intern. Marketing*. **8** 61-89.

Song, X. M., M. M. Montoya-Weiss, J.B. Schmidt. 1997. Antecedents and consequences of cross-functional cooperation: a comparison of R&D, manufacturing and marketing perspectives. *J.Product. Innov. Management*. **14** 35-47.

Song, X. M., M.M. Montoya-Weiss. 1998. Critical development activities for really new versus incremental products. *J.Product. Innov. Manage*. **15** 124–35.

Song, X. M., Thieme, R J. and Xie, J. (1998) The impact of cross-functional joint involvement across product development stages: An exploratory study. *J.Product. Innov. Manage* 15 289-303

Song, X. Michael and Parry, Mark E. (1997). Teamwork Barriers in Japanese High-Technology Firms: The Sociocultural Differences between R&D and Marketing Managers. *Journal of Product Innovation Management* 14:356–367

Souder, W.E. 1988. Managing relations between R&D and marketing in new product development projects. *J.Product. Innov. Management*. **51**, 6–19.

Swink, M. 2000. Technological innovativeness as a moderator of new product design integration and top management support. *J. Product. Innov. Manage*. **17** 208–220.

Veryzer R.W. 1998. Discontinuous innovation and the new product development process. *J.Product. Innov. Manage.* **15** 304-21.

Yin, R. K. (1984) *Case Study Research: Design and Methods*, Thousand Oaks, CA: Sage

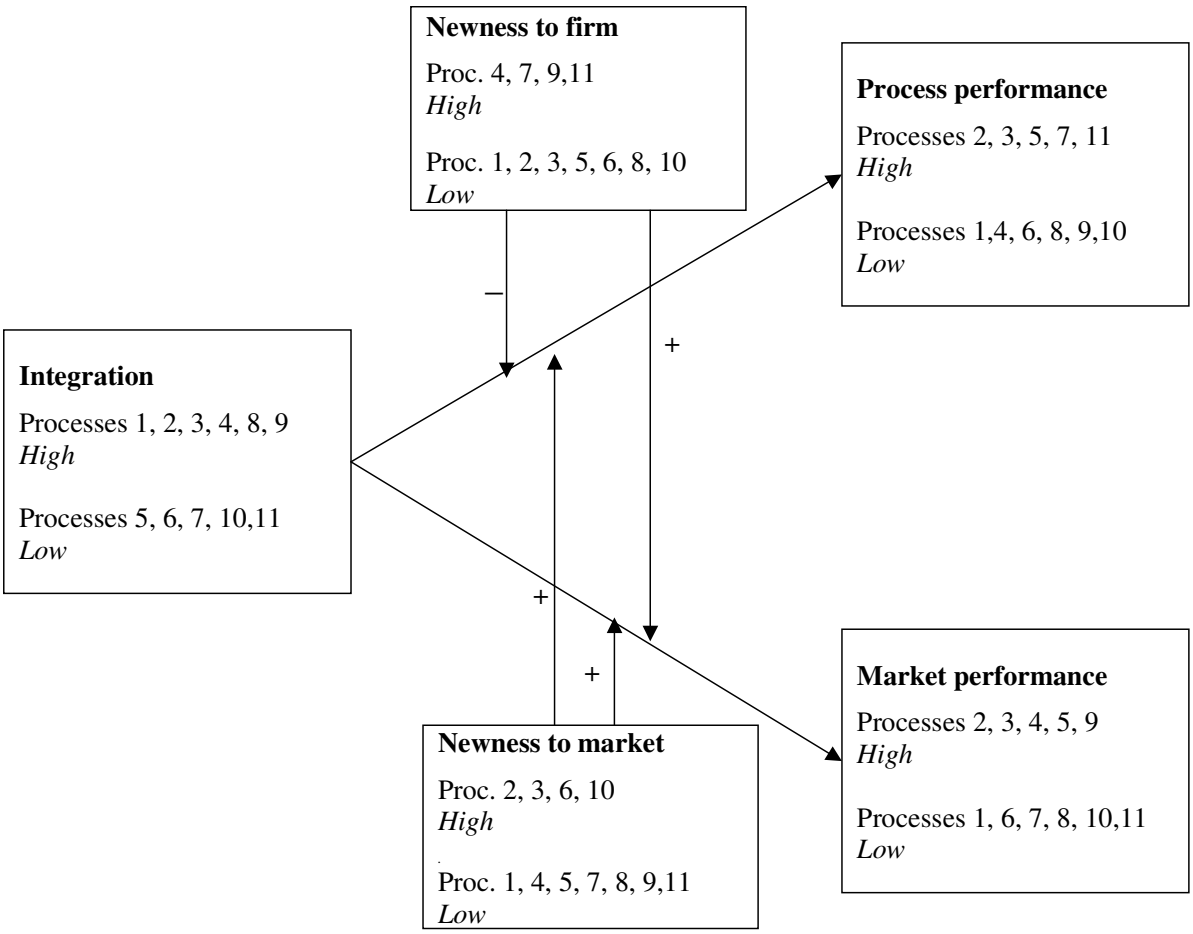
Table 1: NPD processes analyzed

NPD process	Integration	Knowledge owned at the beginning of the NPD process	Knowledge created during the NPD process	Type of innovativeness	Performance	Reasons of success/failure
Process **2** (firm A)	▪ Meetings twice a month ▪ Shared responsibility on NPP	Technical competencies to produce long lasting beverages	How these competencies can be used in the milk market, without wasting firm's image	New-to-the-market	Market and process success	▪ Ongoing information exchange ▪ Joint involvement to realize a successful product
Process **3** (firm B)	▪ Project manger to coordinate ▪ Frequent joint meetings ▪ Communication along the whole process ▪ Cooperation and common goals	▪ Technical competencies to produce comfortable shoes ▪ Design competencies to produce fashionable shoes	How to combine comfort and design to develop and launch a product that is appreciated in the fashion segment.	New-to-the-market	Market and process success	▪ Close collaboration between R&D and marketing ▪ Reciprocal trust
Process **6** (firm C)	▪ No interaction ▪ R&D is kept in touch with marketing through a person ▪ Focus on functional goals	▪ Technical knowledge to produce lasting shoes ▪ Marketing knowledge to sell fashionable shoes	No useful new knowledge was created	New-to-the-market	Market and process failure	▪ Since marketing did not share its knowledge, R&D developed a product not consistent with market needs ▪ R&D waste a lot of time developing prototypes
Process **10**	▪ Departments are	▪ Market	No useful new	New-to-the-	Market and	▪ R&D spent a lot of time

(firm E)	geographically distant ▪ A marketing person visits R&D every time a new idea is developed ▪ Focus on functional goals	knowledge about consumer preference for low calories food ▪ Competencies to produce low calories sweet	knowledge was created	market	process failure	trying to create something new. However…. ▪ because of poor communication, it misunderstood marketing suggestions and the product did not satisfy consumers
Process **4** (firm B)	▪ Project manger to coordinate ▪ Frequent joint meetings ▪ Communication along the whole process ▪ Cooperation and common goals		How to produce and sell shoes that guarantee more comfort and wellness	New-to-the-firm	Market success. Process failure.	▪ Too information exchange and joint responsibility at the beginning (poor process performance) ▪ Co-development of the knowledge about what market wants (good market performance)
Process **9** (firm D)	▪ Meetings every two weeks ▪ R&D and marketing conceive each other as valuable partner			New-to-the-firm	Market success. Poor process performance	
Process **7** (firm C)	▪ No interaction ▪ R&D is kept in touch with marketing through a person		No useful new knowledge was created	New-to-the-firm	Market failure. Process success	R&D didn't realize that baby shoes need different characteristics from normal shoes. This was due to the fact that marketing did not

	▪ Focus on functional goals					communicate that.
Process **11** (firm E)	▪ Departments are geographically distant ▪ A marketing person visits R&D every time a new idea is developed ▪ Focus on functional goals		No useful new knowledge was created	New-to-the-firm	Market failure. Process success.	▪ No communication ▪ Marketing did not monitor what R&D was doing. This generated a fast NPD process, but a product not consistent with consumer tastes.
Process **1** (firm A)	▪ Meetings twice a month ▪ Shared responsibility on NPP		No knowledge was created	Line extensions	Poor market performance. Process failure.	▪ Too communication and interaction ▪ Too long NPD process
Process **5** (firm C)	▪ No interaction ▪ R&D is kept in touch with marketing through a person ▪ Focus on functional goals		No knowledge was created	Line extension	Market and process success	▪ Poor interaction ▪ Too long NPD process
Process **8** (firm D)	▪ Meetings every two weeks ▪ R&D and marketing conceive each other as valuable partner		No knowledge was created	Line extensions	Market and process failure	▪ Too much bureaucracy

Figure 1. The conceptual framework



APPENDIX A: Characteristics of the firms analyzed

	Firm A	Firm B	Firm C	Firm D	Firm E
Employees	2008	2220	1455	1051	10255
Turnover 2005	890 mil €	96 mil €	146 mil €	700 mil €	1,435 bil €
Investments in R&D	6% revenues	5% revenues	8 mil €/year	45 mil €/year	75 mil €/year
Investments in marketing	11% revenues	9% revenues	15 mil €/year	110 mil €/year	120 mil €/year
New products in a year	40-50	15-20	30-35	30-35	15-20
Competition areas	Europe, Asia	Europe, China	Europe, Far East	Europe, Americas, Asia	Europe, US

APPENDIX B: Brief description of the characteristics of each product

Project	Description	Newness type and degree
Project **2** (firm A)	A bottle of long life milk that maintains all the properties of fresh milk. This is an interesting innovation for the Italian market, in which long life milk is regarded as a unhealthy product because of its lack of freshness.	New-to-the-market
Project **3** (firm B)	A wedge that offers comfort and wellness. It is a new product in the market, because	New-to-the-market

	for the first time in the fashion target they introduce the idea that design must be combined with comfort. Patents and technologies developed by the firms for other segments are tailored to a new target.	
Project **6** (firm C)	New boots with materials traditionally used for other types of shoes. The new material should allow the boot to survive more than one year. It is a new marketing concept, because traditionally boot consumers are used to buy new boots every year because of fashion trends. The product failed because consumers in this segment do not want to have the same boot for more than one year.	New-to-the-market
Project **10** (firm E)	A mini-candy that should have only 1 kcal. The idea is to allow consumers to have many "sweet" moments during a day, because of low calories in each candy. It was the first time a similar idea was introduced in the market. The product failed because candies were too small. Consumers felt they were assuming calories, without the pleasure of eating candies	New-to-the-market
Project **4**(firm B)	New shoes made up of a material that guarantees more protection and higher transpiration to feet. The material is brand new for the firm and had to be developed by R&D.	New-to-the-firm
Project **9** (firm D)	Snacks to substitute meals.	New-to-the-firm
Project **7** (firm C)	A series of new shoes for babies. The firm is usually targeted towards other segments. Since this it (should) had to develop new competencies: technological, related to the characteristics of the shoes for babies, and marketing, related to the better way to promote product's benefits in a brand new segments. Roughly speaking, R&D simply reduced the size of the shoes. The product failed because it didn't have the usual characteristics (e.g., softness) of baby shoes	New-to-the-firm
Project **11** (firm E)	Yoghurt which helps to reduce cholesterol. Marketing copied the idea from a competitor, but R&D had to develop brand new competencies to produce it	New-to-the-firm

Project **1** (firm A)	Yoghurt drinks. Other two competitors were producing them. Firm had the competencies to produce them too. R&D proposed the idea, but they spent a lot of time discussing with marketing if it was a good idea. When eventually launched, consumer preferences for this type of beverage were dramatically diminished.	Line extension
Project **5** (firm C)	New sneakers with a material which was a slight improvement from that used the year before. The product rapidly achieved the market and was appreciated by consumers	Line extension
Project **8** (firm D)	A new beverage including a relevant percentage of milk. Similar beverages already exist in the market. On the firm's side, it didn't require new competencies. Because of a slow NPD process, it was launched when the market was already saturated.	Line extension

PAPER 2

Toward a Contingency View of New Product Creativity: Assessing the Role of Product and Consumer Characteristics

ABSTRACT

Although creativity is widely recognized as a critical element for firms to develop new products, knowledge about how consumers evaluate product creativity remains far from definitive. The authors analyze how the relevance of novelty and appropriateness— two main elements of creativity—varies according to the type of product and the characteristics of the consumer. A sample of 283 consumers indicates a negative interaction effect between novelty and appropriateness, suggesting that creativity depends on either, according to contingencies. Novelty is more relevant when consumers evaluate design-based products, are highly involved, or have little knowledge of the product. Appropriateness is more relevant when consumers evaluate technology-based products, are minimally involved, or have significant knowledge. Theoretical and managerial implications are provided.

1. INTRODUCTION

Creativity has long been acknowledged as a critical factor for new product success (Cooper, 1983), and in current competitive scenarios, which focus more on innovation than on cost reductions, creativity has become even more important (Galunic & Eisenhardt, 2001), forcing firms to realize its relevance for differentiating their offerings and commanding premium prices. For instance, in 1999, Whirlpool launched an extensive program to increase the creativity of its products to set them apart in the largely undifferentiated appliance market. As a result, 30% of Whirlpool's current sales growth results from creative new products, and the average prices of its products have risen 5% annually since 2003 (Arndt, 2006).

Existing knowledge about creativity relies largely psychology research, which mainly analyzes artistic creativity (e.g., drawings, poems, music) (e.g., Amabile, 1983; Simonton, 1999). Psychologists argue that two factors influence creativity: novelty, or the extent to which an object differs from conventional practice, and appropriateness, or the extent to which it is meaningful in the conventional domain to which it belongs (Amabile, 1983; Jackson & Messick, 1965). Only recently have marketing scholars started dedicating specific attention to the concept of creativity in the context of new products. Borrowing from psychology, they define a product as creative when it "is different from competing alternatives in a way that is valued by customers" (Sethi, Smith, & Park, 2001, p. 76). However, the few studies that specifically deal with new product creativity limit their analysis to managerial evaluations rather than analyzing consumers' judgments (Im & Workman, 2003; Sethi et al., 2001), which may lead to different conclusions, because manufacturers and customers do not share the same perceptions of new product characteristics (Calantone, Chan, & Cui, 2006). Thus, far from being definitive, knowledge of how consumers evaluate the creativity of a product remains an open research question. We contend that refinements are necessary before existing theory, developed mainly to explain

artistic creativity, can be used purposefully to explain creativity in the context of new products. In turn, we analyze which factors influence product creativity and how the relevance of these factors varies according to product and consumer characteristics.

A deeper understanding of creativity perceptions by consumers is necessary for at least two reasons. First, literature is replete with methods managers can use to increase the creativity of their products (e.g., brainstorming, template-based approach, lateral thinking). However, without a clear understanding of what consumers regard as creative, managers essentially have means without an end. Second, even good products may fail or suffer if they are not positioned appropriately. Should a firm succeed in developing a novel and appropriate product, a good launch campaign must emphasize the right factors. In 2005, for example, Clorox launched a product that could kill 99.9% of germs but was safe enough to use in the vicinity of children and food. In its first advertising campaign, the company emphasized the novelty of the product. Notwithstanding the excellent forecasts, sales were well below expectations. Clorox realized that consumers had been scared by the novelty of the product and did not perceive its usefulness. A second advertising campaign highlighted the appropriateness of the product while downplaying novelty; sales boomed +200%. Only through a deeper understanding of how consumers evaluate creative products can researchers provide insights to managers about how to increase the creativity of their products, consistent with consumers' perceptions, as well as how to position them correctly.

By focusing on consumers' evaluations, we contribute to the literature on product creativity in two relevant ways. First, we analyze two different forms of product innovations: one based on technology and one based on design (Verganti, 2005). Inspired by the huge success of Apple, more and more firms are orienting toward design in an effort to differentiate their products and attract consumers (Hertenstein, Platt, & Veryzer, 2005; Kotler & Rath, 1984). Examples of products whose success mainly relies on design are virtually countless—I-Mac

by Apple, the New MINI by BMW and New Beetle by Volkswagen, the digital camera Dual Lens by Kodak, and so on. However, despite a general agreement that consumers' assessments differ between products based on design and those on technological innovation (Bloch, 1995; Creusen & Schoormans, 2005; Page & Herry, 2002), our comprehension of how consumers react to product design remains in the pre-theory stage (Veryzer, 1999). The present study tests how assessments of creativity vary between these two types of innovation and thus provides helpful suggestions for firms attempting to innovate through design.

Second, we adopt a systems view of creativity, which suggests that creativity is not located in the creative product itself but rather in the interaction between the product and the subjects who evaluate that product (Kasof, 1995). Several studies report that different categories of subjects assess creativity differently (Amabile, 1996; Runco & Charles, 1993; White & Smith, 2001), but no study systematically examines how evaluations of creativity, related to a product, vary across consumers. We therefore investigate if consumers with different characteristics tend to perceive either novelty or appropriateness as more relevant to their assessments. Drawing from consumer behavior literature, we analyze the impact of two consumer variables: involvement, a sort of motivational variable, and knowledge, which refers to consumer information processing ability. The findings shed light on some contingencies according to which either novelty or appropriateness is more relevant.

2. THEORETICAL FRAMEWORK

2.1. Conceptualizing product creativity: What we know

Psychology scholars were among the first to study creativity. By analyzing creativity in music, drawings, and poems, they reached a certain agreement that creativity is influenced mainly by two factors: novelty and appropriateness. Such a perspective suggests the existence of a positive interaction effect between novelty and appropriateness, such that creativity should be greatest when both are high (on a similar issue, see Dahl, Chattopadhay, & Gorn, 1999). For example, a

melody that follows completely different musical schema is more creative if it also presents tonal or rhythmic coherence (Kratus, 1994). Marketing literature pertaining to creativity largely borrows from this psychological perspective, such that novelty and appropriateness provide the main factors affecting the creativity of products (Im & Workman, 2004; Sethi et al., 2001), marketing programs (Andrews & Smith, 1996), and advertisements (e.g., Haberland & Dacin, 1992).

We stress that novelty and appropriateness represent factors that influence creativity, not creativity itself. The most widely followed approach in creativity research, the "Consensual Assessment Technique, involves allowing judges to evaluate creativity freely according to their own personal and subjective measures, because it is impossible to identify ultimate objective criteria for creativity (Amabile, 1983). Indeed, creativity is something that people can recognize and often agree upon, even when they lack a guiding definition (Barron, 1965). This is particularly useful for our purposes, because it enables us to test how novelty and appropriateness relate to what consumers consider creative in a product. Because creativity theory has not been tested among consumers evaluating products, we might find that might find that novelty and appropriateness cannot explain product creativity sufficiently.

2.2. Product creativity: What we do not know

If we accept that creativity should be influenced by two factors, we also posit that a complete theory of creativity should provide indications about the importance of each factor in terms of affecting the criterion variable. Several psychologists too, have called for more research into how people really take novelty and appropriateness into account in their evaluations of creativity (e.g., Runco & Charles, 1993). Therefore, we analyze the way in which the relevant influence of novelty and appropriateness on new product creativity varies across product and consumer characteristics.

2.2.1. The role of product characteristics. A firm can innovate in two ways: through technology or through design (Verganti, 2005). We define a product as technology-based when the difference between the new product and others in the same category results mainly from certain technological innovations. We define a product as design-based when some design-related components (e.g., shape, color, materials, proportion) get manipulated to generate the new product (Veryzer, 1999), such that the variation represents the main difference with other similar products in the market.[1] In the case of the design-based Esprit TAV-L1 television, the focus was on a slide-down front panel that allowed consumers to hide the LCD when not in use rather than on the technology behind it. In contrast, for the technology-based LG BH100, winner of Best in Show at CES 2007, the focus was its capability to play both Blu-Ray and HD DVD discs rather than its design. We analyze design-based products because design is becoming more and more relevant, even in industries traditionally based on technology. For instance, in the mobile phone industry, despite the introduction of relevant technological upgrades, observers attribute Motorola's recent market share and sales drop to its launch of mobiles whose design closely resembles that of previous models. Motorola's crisis deepened because its competitors (e.g., Nokia, LG, Samsung) have largely invested in design to introduce cool-looking models (Kharif, 2007).

Several studies demonstrate that design significantly affects consumer responses. For instance, the form of a product influences beliefs about it and consumer preferences (Berkowitz, 1987). New package designs affect product attention, categorization, and evaluation (Schoormans & Robben, 1997), and more generally, behavioral studies show that consumers use different cues to evaluate products that are based mainly on new design and those based mainly on new technology (Bloch, 1995; Creusen & Schoormans, 2005). Therefore, we analyze how evaluations of product creativity differ between the two

[1] This distinction is not intended to suggest that design (technology)-based products neglect technological (design) issues. However, in each category, one aspect is predominant over the other.

categories by testing whether the product category moderates the impact of novelty and appropriateness on product creativity.

2.2.2. The role of consumer characteristics. According to Csikszentmihalyi (1998), perceptions of creativity depend not just on the intrinsic properties of the product but also on the characteristics of the perceiver. Therefore, we also analyze the judgment and evaluation processes involved when a consumer recognizes a product as creative. Behavioral literature notes two main elements that influence the way consumers collect, organize, and use information to make their evaluations of a product: involvement and product class knowledge (e.g., Alba, 1983; Bellman & Park, 1980).

Involvement refers to the personal relevance or importance of the product class to the consumer (Petty, Cacioppo, & Schumann, 1986). We focus on enduring involvement, defined as a general and permanent concern with the product class, to distinguish it from situational involvement (Houston & Rothschild, 1977). Conclusive evidence indicates that the level of involvement influences the amount of information a consumer selects and uses, as well as the cognitive effort he or she devotes to evaluating a product (e.g., Bloch, Sherrel, and Ridgway, 1986; Hoyer, 1984). Because the level of cognitive effort necessary to recognize novelty differs from that necessary to recognize appropriateness (Runco & Charles, 1993), we contend that involvement should influence whether consumers lend more credence to novelty or appropriateness. In other words, we test whether involvement moderates the impact of novelty and appropriateness on product creativity.

Product knowledge refers to the amount of accurate information held in memory, as well as self-perceptions of product knowledge (Alba & Hutchinson, 1987; Beatty & Smith, 1987). Unlike involvement, which affects the amount of resources a consumer devotes to search information, knowledge influences the way he or she processes and uses this information in the evaluation process. Consistent evidence reveals that consumers with different levels of

knowledge rely on different types of information and sets of attributes to make evaluations (Alba, 1983; Johnson & Russo, 1984; Rao & Sieben, 1992). To recognize novelty, people must use different information than that necessary to recognize appropriateness (Amabile, 1983); therefore, we test whether knowledge moderates the impact of the two factors on product creativity.

3. MODEL AND RESEARCH HYPOTHESES

The dependent variable in our model is product creativity, influenced by novelty and appropriateness (plus their interaction). The relevance of novelty and appropriateness in affecting creativity may be moderated by product (i.e., design- vs. technology-based) and consumer (i.e., involvement and knowledge) characteristics. We depict the proposed model in Figure 1.

FIGURE 1 HERE

3.1. **Design- vs. technology-based products**

We contend that the relevance of novelty is greater for design-based products, because of the way consumer responses to these products form. In a survey of product designers in Europe and North America, more than 75% of respondents declared that aesthetics were a key aspect of a design (Walker, 1995), which suggests product design involves generating aesthetic responses (Bloch, 1995). Aesthetic responses are mainly "enjoyed purely for their own sake without regard for other more practical considerations" (Holbrook & Zirlin, 1985, p. 21) and formed mainly through an unconscious evaluation process, regardless of goals or product performance (Veryzer, 1999). In turn, appropriateness, which refers to the product's capability to solve needs, should be less relevant for design-based products. This argument is corroborated by the results of one of the few studies pertaining to design-based products. In a survey of Dutch consumer households, Creusen & Schoormans, 2005 found that 65% of

respondents claim their evaluations of design-based products are driven solely by product appearance, and many give up functionalities for aesthetic value. Other studies also report that novelty is more relevant in influencing consumers' responses to design-based products (Berlyne, 1974).

In contrast, we maintain that the relevance of appropriateness is greater in the case of technology-based products, for which consumers do not evaluate products on aesthetic or symbolic value but rather on the utilitarian functions they can perform (Creusen & Schoormans, 2005). Consumers buying these products are efficiently oriented toward problem solving, and functionality is the critical element on which they evaluate products (Park & Moon, 2003). In other words, a consumer should pay more attention to how appropriate the product is for accomplishing his or her objectives. Because consumers tend to spend more time carefully evaluating the appropriateness of the product, we argue that this factor, rather than novelty, should weigh most in their evaluations of product creativity. Hence:

H1a: *The impact of novelty on product creativity is greater for design-based products.*

H.1b: *The impact of appropriateness on product creativity is greater for technology-based products.*

3.2. Involvement

Creativity research demonstrates that judgments about appropriateness take longer to develop and require more cognitive effort, because the judge must evaluate the effective capacity of a product to solve specific problems (Jackson & Messick, 1965). Differently, judgments of novelty are more readily achieved, because the judge only needs to recognize that something is different or deviates from a norm (Runco & Charles, 1993). Studies of involvement clearly

indicate that less-involved consumers are not willing to devote many cognitive resources and therefore tend to evaluate products on the basis of the most evident cues (Petty & Cacioppo, 1981). Because appropriateness judgments require a lot of effort, only consumers engaged in detailed evaluations (i.e., highly involved) will make such judgments (Batra & Ray, 1986; Kardes, 1988; Shavitt, Swan, & Lowrey, 1994).

We also argue that when involvement increases, consumers lend more credence to appropriateness and less to novelty. We offer two different explanations. First, one of the fundamental facets of product involvement is the relevance of the product (Arora, 1982; Zaichkowsky, 1985). A product can be relevant in either a functional form, because it helps solve some critical problems, or a hedonistic way, because the consumer uses the product to convey a certain self-image to others. In both cases, highly involved consumers consider the product critical for their goals and commit to searching for the right solution to their problems (Laurent & Kapferer, 1985). Because appropriateness refers to the product's capability to "solve a problem, fit the needs of a given situation, and accomplish some recognizable goals" (MacKinnon, 1970, p.25), it should be particularly important for those consumers who regard the product as relevant for their needs and the accomplishment of their goals (Kover & Goldberg, 1993; Michell, 1984). Second, risk represents a critical component of involvement, in the sense that highly involved consumers tend to perceive more risk when evaluating the product and attribute more negative consequences to a poor choice (Jain & Srinivasan, 1990). Thus, highly involved consumers should rely more on appropriateness when evaluating a product to reduce their risk of a bad choice. This discussion suggests that consumers' evaluations of product creativity should be influenced more by appropriateness and less by novelty when their involvement is high. Not only are highly involved consumers willing to expend the cognitive resources necessary to generate appropriateness judgments,

but they also devote particular attention to appropriateness to assess the product's capability to serve their goals and limit the risk of poor choices. Hence:

H2: *Involvement (a) positively moderates the effect of appropriateness and (b) negatively moderates the effect of novelty on product creativity*

3.3. Prior knowledge

Novelty judgments require a comparison among products to acknowledge that a product differs from others, whereas appropriateness judgments rely on specific evaluations of a single product (Amabile, 1983). We argue that when product class knowledge increases, consumers lend more importance to novelty and less to appropriateness. Consumers with less knowledge have difficulty recognizing similarities and differences between products, because they face high learning costs in analyzing a new item (Moreau, Lehmann, & Markman, 2001). Various studies report that less knowledgeable consumers' evaluations generally focus on the benefits of the specific product rather than comparisons with others (e.g., Conover, 1982; Mahesawaran & Sternthal, 1990; Rao & Sieben, 1992). The ability to compare attributes among products increases as knowledge becomes deeper because the consumer experiences more exposure to information about the product class (Mitchell & Dacin, 1996). Knowledgeable consumers' evaluations tend to rely more on comparisons between new and previously learned facts (Alba & Hutchinson 1987; Chi, Feltovich, & Glaser, 1981). Therefore, not only are knowledgeable consumers more able to develop novelty judgments, but they also take it into more consideration in their product evaluations.

Our argument is corroborated by Brucks (1985), who shows that knowledgeable consumers tend to adopt a two-stage evaluation process: They evaluate products first according to their appropriateness but base their final judgments on product novelty compared with other products. On the contrary, less knowledgeable consumers rely on specific benefits (i.e.,

appropriateness) of the product. Although creativity literature largely ignores the role of product class knowledge, some evidence indicates that experts weigh novelty more when evaluating creativity. In the context of artistic evaluation, Amabile (1996) asks experts who had just evaluated the creativity of some artists' works to rank-order the qualities of art products in terms of how influential each of those qualifiers were in their assessments of creativity. A high agreement emerges regarding the top criteria, with 70% of judges indicating novelty as the most important. Hence, we hypothesize:

H3: *Product class knowledge (a) positively moderates the effect of novelty and (b) negatively moderates the effect of appropriateness on product creativity*

4. METHODOLOGY

4.1. Study context and sample

To test the hypotheses, we collected data from Italian consumers in the Milan area, which offers two main advantages. First, Italy has a well-established tradition of creativity, from fine arts to business, and creativity is a relevant part of the Italian lifestyle. Second, Italy is considered a progenitor of design, and several Italian firms offer outstanding design-based products (Verganti, 2003, 2006). Therefore, Italian consumers are accustomed to dealing with design-based products and pay particular attention in evaluating them, which makes these consumers an appropriate sample to study subjective perceptions of creativity and how these perceptions vary between design- and technology-based products.

We recruited participants at the exit of a grocery store during October–December 2006 and asked them to answer two questions about their familiarity with the study products (i.e., car and camera). We assessed familiarity by asking subjects to indicate the number of cars they have owned and the percentage of their friends who own a car (Punj & Staelin, 1983); we excluded consumers who have never owned a car from the sample. Those who had owned

only one or two cars appear in the sample only if at least 60% of their friends owned a car. We then followed the same procedure for the camera. Subjects who were familiar with both categories then participated in the second phase of the study, which we called market research of a brand of new products that would soon be introduced in the Italian market. This screening phase matches Amabile's (1996) requirement that judges be selected on the basis of no other criterion than familiarity with the product. When the product is not complex (e.g., not a drawing or musical composition), moderate levels of familiarity are acceptable.

Of the 297 consumers who agreed to participate, we excluded 14 who did not meet the minimum familiarity requirement. The percentages of subjects who have owned at least three cars or cameras are 78% and 75%, respectively, and 90% (82%) of the sample declared that at least 75% of their friends owned a car (camera). Therefore, our subjects have at least a moderate level of familiarity with the products under evaluation.

We assigned subjects to groups according to their age and gender to obtain homogenous groups in terms of demographic variables. We report the age and gender distribution of each group in Tables 1 and 2. Finally, 140 consumers received the design questionnaire (71 car, 69 camera), and 142 received the technology questionnaire (72 car, 71 camera). We also paid subjects a nominal fee for participating.

TABLES 1 AND 2 HERE

4.2. Design- vs. technology-based product

We used the two chosen products to test the hypotheses because they often are used daily and widely diffused among Italian consumers. Furthermore, cars and cameras appear frequently in prior studies of involvement and knowledge (e.g., Moorthy, Ratchford & Talukdar, 1997; Punj & Staelin, 1983; Sujan, 1985). Our use of two different products also ensures that creativity perceptions are not biased by the type of product and that the results are more generalizable.

4.2.1. Design. Subjects evaluating the car viewed a picture showing the interior of a new car[2] (see Appendix 1), with the following description:

> *This five-passenger compact vehicle is designed to allow riders to enjoy a living room experience. The front seats look more like arm chairs, and the rear seat like a curving sofa. The interior space is visually divided between the working space and the living space with color and texture. The work space includes the driver's seat, steering wheel and pedals rendered in blue suede with bamboo flooring. The remaining interior is comprised of cream suede and sisal natural flooring, much like an area rug. Front arm rests and control switches traditionally located on the doors are attached to the seats, which keep the door panels simple like walls in a room.*

Subjects evaluating the camera viewed a picture of a new camera, which was to be introduced to the Italian market in the next two months. The producer would launch two new models, and one of them featured a peculiar design that differentiated it from others in the market. The description read:

> *This camera is the latest devotion to style. It has a smart and slim-line style and it is finished in an all-metal body with rounded contours and graceful lines. You can choose among 4 tantalizing colors (Steel Grey, Denim Blue, Sepia, Sizzling Pink) the one which best suits your own individual style.*

4.2.2. Technology. Subjects evaluating the car again viewed the same picture, except that the car doors were closed, which hides the design features hidden. The car therefore looked like any other car. The description was as follows:

> *This car has a particular system, which helps execute parking maneuvers. This system uses sensors to estimate if a parking space is big enough for the car. When one parking space is found, the driver selects reverse gear, lets go of the wheel and operates the accelerator and brake. The assistance system steers the car until it is in the parking space.*

Subjects evaluating the camera saw the picture of the model without any particular design features, whose colors and shape are similar to those of other cameras in the market. We provided the following description:

> *Natural, unposed scenes often make the best photos. With this camera, you can operate remotely from your PC without disturbing your subject. Take wildlife shots in the garden, or capture candid photos of your friends. Operated via your USB cable, this camera is also ideal for triggering steady time-lapse photography without*

[2] The new car presented won the Industrial Design Excellence Award 2006. It never appeared in the Italian market.

having to touch the camera. Captured images can be saved direct to your computer or to the camera's memory card. You can also control a vast array of camera functions, such as zoom, exposure, image size and image effects.

We asked subjects to evaluate the products on two seven-point scales. One scale determines the extent to which the product is based on design features, and the other rates the extent to which it is based on technological features. Respondents perceived the design-based products as significantly more based on a design innovation (M = 5.05) than the technology products (M = 1.76, F(1, 281) = 252.62, $p < .000$, $\eta^2 = .47$), and they considered the technology products significantly more based on a technological innovation (M = 6.2) than the design products (M = 2.84, F(1, 281) = 262.26, $p < .000$, $\eta^2 = .48$).

4.3. Measures, reliability, and validity

We derive the measures for our study from existing measures in the literature. After developing the questionnaire through conventional back-translation processes, we pilot tested it in in-depth interviews with 12 consumers (3 for each type of questionnaire) to determine the face validity, clarity, and relevance of the measures in the Italian context. For each scale, we provide the items in Appendix 2.

4.3.1. Creativity. Because our study relies on Amabile's (1983) conceptualization of creativity, we use her operationalization to assess subjective perceptions of product creativity. She recommends allowing judges to evaluate product creativity freely according to their personal definitions, without giving them any specific criteria. She also suggests asking for this evaluation first to avoid any influence by other questions. Accordingly, our first question is her single-item scale to assess creativity: "Using your own subjective definition of creativity, please rate the degree to which this product is creative." We also note the increasing legitimacy of single-item measures in marketing literature, because they may perform better than multiple-item scales. For example, they elicit appropriate respondent

behavior; many items may artificially inflate the Cronbach's alpha and create a validity problem, even if the incremental information from each additional item is minimal (Drolet & Morrison, 2001; Rossiter, 2002). Single items also are more appropriate when the focal object is concrete singular (Bergkvist & Rossiter, 2007); namely, when, as in our case, there is only one concrete object (i.e., car or camera) to be rated.

To guarantee discriminant validity, we separated subjective judgments of creativity from judgments of technical strength and aesthetic appeal; otherwise, the creativity evaluations may have been biased by what judges like or find technically effective. In several studies, Amabile (1983, 1986) finds that correlations between these two dimensions and creativity usually range between .2 and .5, which indicate creativity is a different construct, even though we cannot completely separate creativity from aesthetic appeal or technical strength. Therefore, we ask our subjects to evaluate aesthetical appeal with a three-item semantic scale (see Appendix 2), whose α is .94. The correlation with the subjective measure of creativity is .26 ($p < .001$). Similarly, we ask subjects to rate the technical strength of the product with a single item; in this case, the correlation is .2 ($p < .001$).

Novelty. We derive our novelty scale from Im and Workman's (2004) measures, which they test among both product managers and customers. The novelty scale consists of six items that assess the degree of change introduced by the new product. Guided by our pretest, we modify the wording of the item "stimulating" from the original scale to "is not conventional," which appeared more comprehensible to Italian consumers ($\alpha = .93$).

Appropriateness. We again adopt Im and Workman's (2004) measure. The appropriateness scale consists of four items that assess the extent to which the product is appropriate and relevant for customer's needs ($\alpha = .93$)

Involvement. Consistent with the literature, which emphasizes different dimensions of involvement and strongly recommends taking all the facets of the involvement profile into

account simultaneously (Laurent & Kapferer, 1985), we adopt a multidimensional approach to measure involvement. Thus, we operationalize involvement as a second-order construct comprising five sub-dimensions: risk probability (α = .95), pleasure (α = .94), risk importance (α = .97), sign (α = .95), and relevance (α = .94). Risk probability involves the risk of making the wrong choice; pleasure refers to the product's ability to provide pleasure, fun, and excitement; risk importance indicates the negative consequences associated with a poor choice; sign entails the symbolic value attributed to the product; and relevance refers to the importance of the product for the customer. We adopt Jain and Srinivasan's (1990) scale to measure these sub-dimensions. The alpha of the second-order construct is .9, consistent with Rossiter's (2002) suggestions.

Product class knowledge. We adapt our measure of product class knowledge from Mitchell and Dacin's (1996) knowledge scale. The scale consists of self-reported measures of knowledge (absolute and comparative), interest in and familiarity with a product class, knowledge of the characteristics of the product class that are important for providing maximum usage satisfaction, and the frequency with which the consumer reads magazines related to the product (α = .94).

We also control for the following demographic variables in testing our hypotheses: age, gender (0 = male, 1 = female), and education (0 = secondary school, 1 = high school, 2 = university degree). Prior studies show that perceptions of creativity may vary according to demographic variables (White & Smith, 2001)

We test the measurement model with a confirmatory factor analysis, using AMOS 6.0, in which we control for convergent validity, construct reliability, and discriminant validity. All items load significantly on their corresponding factor, and the factor loadings are above the cut-off value of .7 (Shook, Ketchen, Hult, & Kacmar, 2004), except for "stimulating" in the novelty scale and "reading" in the knowledge scale. We therefore drop these items. All the

constructs achieve a composite reliability greater than the cut-off of .70 suggested by Fornell and Larcker (1981), and the proportion of total variance in each construct extracted by the component set of indicator variables is greater than .50 (see Appendix 2). We test for discriminant validity by examining if the average variance extracted (AVE) for each construct is greater than the squared correlations between constructs. As we show in Table 3, the diagonal elements representing the AVE for each construct are greater than the off-diagonal elements, or the squared correlations between constructs, which satisfies the discriminant validity criterion. Finally, the absolute fit indexes indicate that the proposed measurement model fits the data reasonably well (χ^2/df = 2.17; normed fit index = .925; confirmatory fit index = .958; root mean square error of approximation = .064).

TABLE 3 HERE

5. ANALYSIS AND RESULTS

We employ hierarchical ordinary least squares regression analysis to test the hypotheses. We mean-center the continuous independent variables before creating an interaction term to reduce multicollinearity (Aiken & West, 1991). In any case, the variance inflation factors associated with each regression coefficient range from 1.04 to 1.61, which suggests no serious problems with multicollinearity. We assign a value of 0 to the camera and 1 to the car; in addition, we code the technological manipulation as 0 and the design manipulation as 1. We provide the results in Table 4.

TABLE 4 HERE

As we expected, both novelty and appropriateness have a positive and significant effect on creativity, and their magnitude is similar ($b_{novelty}$ = .101, p < .000; $b_{appropriateness}$ = .105, p < .000). The control variables (age, gender, education), type of product (car vs. camera), involvement, and knowledge have no direct effects on perceived creativity. Design-based

products tend to be perceived as more creative (b = .45, $p < .05$). This model explains almost half of the variance of product creativity ($R^2 = .472$).

Although we do not develop a specific hypothesis, because of the literature gap regarding conceptualizations of product creativity, in Model 1, we explore a potential interaction effect between novelty and appropriateness. We find a negative and significant interaction effect (b = -.006, $p < .000$), which suggests some interesting implications for the nature of the creativity construct. We return to this finding in the conclusion.

According to H1a, which we test in Model 2, the effect of novelty should be higher for design-based products. When we add an interaction term between novelty and design-based products, we increase the explained variance by 4.2% ($\Delta F = 18.4$; $p < .000$). The interaction effect between design and novelty is significantly positive (b = .09, $p < 0.000$), in support of H1a. Furthermore, as showed in Model 3, the interaction term between appropriateness and technology also is significant and positive (b = .11, $p < .005$), which suggests appropriateness is more relevant for technology-based rather than design-based products, in support of H1b. We depict the results graphically in Figure 2.

FIGURE 2 HERE

In H2a, we argue that as involvement increases, appropriateness becomes more important for predicting creativity; in H2b, we argue the opposite for novelty. Before proceeding with our analysis, we note that creativity evaluations are not statistically different between more (M = 4.91) and less (M = 4.60) involved consumers (F = 2.972, $p > .05$), and involvement has no significant effect on creativity. This finding implies that consumers evaluate the creativity of a product the same way, regardless of their level of involvement. The only thing that may vary is the relevance that more and less involved consumers assign to either novelty or appropriateness. The interaction terms involvement × novelty and involvement × appropriateness both have significant effects but opposite signs (see Model 4 and 5). That is,

the relevance of appropriateness increases (b = .003, $p < .000$) as involvement increases, whereas that of novelty decreases (b = -.002, $p < .000$), in support of H2a and H2b. We display the moderation effects in Figure 3.

FIGURE 3 HERE

With H3, we posit that consumers lend (a) more importance to novelty and (b) less importance to appropriateness when their product knowledge increases. Again in this case, we find no significant difference between more (M = 4.88) and less (M = 4.64) knowledgeable consumers in terms of their subjective perceptions of creativity (F = 1.873, $p > .05$) and no significant effect of knowledge on creativity. As knowledge increases, novelty becomes more important (b = .004, $p < .005$), and appropriateness less so (b = -.002, $p < .000$), in support of H3. The results appear in Figure 4

FIGURE 4 HERE

Using the methodology proposed by Schoonhoven (1981), we control for whether the contingency effects detected in these moderation analyses are monotone. By inspecting the partial derivatives of novelty and appropriateness on creativity along the range of relevant values of moderators, we find that for each moderator, the points at which the partial derivate is 0 fall outside of the range of interesting values. Thus, we can conclude that moderation effects exist and are monotone.

6. DISCUSSION

This study aims to advance knowledge of how consumers perceive the creativity of a product by offering three main departures from existing research: First, it tests hypotheses with a large sample of consumers, the ultimate judges in the market, rather than relying on managerial evaluations; second, these consumers evaluate real products that they actually may buy rather than artistic objects; and third, it analyzes the role of contingent factors.

Consistent with existing theory, we find that the two most acknowledged factors affecting creativity—novelty and appropriateness—both have direct effects on consumers' perceptions of product creativity. Surprisingly though, we find a negative interaction effect between the two factors, which suggests not only that novelty and appropriateness have independent effects on creativity but also that the two variables trade off in affecting the perceived level of product creativity. Because consumers use only one variable at time to develop their judgments, excessively high levels of one or the other might lower the perceived level of the creativity embodied in the product.

Furthermore, we note that the relative importance of novelty and appropriateness tends to vary according to product and consumer characteristics. The nature of the innovation embodied in the product influences the way consumers perceive creativity in direct and indirect ways. First, design-based products are perceived as more creative than technology-based products. Second, the relevance of novelty and appropriateness varies between the two types, such that consumers rely more on novelty for design-based products but ascribe more importance to appropriateness for technology-based products. The same holds true for consumer characteristics. That is, consumers highly involved with the product and those with less knowledge lend more to appropriateness, whereas consumers with high knowledge or low involvement rely more on novelty.

6.1. Theoretical implications

Our research suggests a revision of the common wisdom, according to which creativity requires both novelty and appropriateness. Although theoretically appealing, this perspective offers only doubtful validity, perhaps because creativity theory was developed by psychologists to explain artistic creativity (e.g., Amabile, 1983; Simonton, 1984). In the marketing field, this conceptualization has been largely adopted to study creativity in

advertisements, which may be similar to artistic efforts (Vaughn, 1983). However, when employed to analyze how consumers evaluate product creativity, this theory must be adapted to acknowledge that consumers evaluate products they actually use. In this context, we find that creativity may be influenced by *either* novelty *or* appropriateness, but not both. Accordingly, we propose a contingency view of creativity, such that it is sometimes affected mainly by novelty and sometimes by appropriateness. Our findings also show that the primary influence depends on product and consumer characteristics.

Im and Workman (2004) recently advanced a similar perspective on creativity in the new product context, in which they find that the two factors have better predictive power than the combined construct "creativity". Also, they report a varying effect of novelty and appropriateness on different dimensions of product performance. In light of these results, they emphasize the need to view novelty and appropriateness as two distinct variables instead of talking of about the higher-order creativity construct. Our work extends their findings by identifying conditions in which one of the two factors becomes more relevant in consumers' assessments of product creativity.

Furthermore, we clarify how consumers evaluate creativity in design-based products, which is crucial as design gains more importance among firms that use it to differentiate their products from those of competitors (Hertenstein et al., 2005). Must of Samsung's brand building strategy, for example, relies on product design. The company employs 450 people on its design staff and maintains six design centers worldwide in an effort to raise prices on the basis of a "coolness factor" (Berner, Kiley, Der, Mara, & Arndt, 2005). Our study offers an initial contribution to a deeper understanding of an empirically relevant phenomenon, which thus far has received scant attention.

6.2. Managerial implications

Managers appear to share an academic perspective on creativity. For example, on its Web site, Whirlpool defines a product as creative when "it delivers real value to our consumers [i.e., appropriateness] in ways never before seen in the industry [i.e., novelty]." In contrast, our research allows managers to refine their perspective to become more consistent with consumers. We show that to be creative, a product must be either very novel with low appropriateness or very appropriate with low novelty. This finding may be favored by managers, because developing both novelty and appropriateness is difficult and expensive. To differentiate products in a creative way, it can be enough to pursue either novelty or appropriateness, which should reduce firm investments. However, the downside is that managers cannot decide *a priori* which factor to emphasize, because the value of each factor depends on some contingencies. To beat competitors in the creativity race, firms must develop the capability to swing, for each new product introduction, between novelty and appropriateness, depending on product and consumer characteristics rather than simply investing *a priori* in one of the two.

Design-based firms should tend to emphasize the novelty of their products, the most relevant attribute for consumers. Obviously, this recommendation is not to say that they can forget about the utility of a product, but when they compete on creativity, novelty is the trump card. Corporate reputations can be built around this attribute. Companies such as Alessi or Bang and Olufsen command premium prices of approximately 30% by communicating their capability to give new and fresh shape to otherwise undifferentiated products. However, design also offers a key strategic tool for non–design-based firms (Kotler & Rath, 1984). When introducing a product whose design differs dramatically from that of others in the market, managers should focus on how their product differs rather than on its

functionality. In contrast, firms introducing products that represent technological departures from the current state-of-the-art should emphasize the product's ability to solve consumer needs. The Clorox story we mentioned previously shows what a huge difference emphasizing product capability can make when the new product is based mainly on a technological innovation.

For a product to succeed, it must target the right group of consumers from the very beginning to sustain growth before the product gets popular in the market. In the absence of such an initial group, poor sales may lead to a premature exit. Figuring out the right segment is a vital yet challenging activity for managers involved in new product launches. We suggest managers should select the initial segment according to the level of novelty and appropriateness embodied in their product. When managers perceive appropriateness as the main added value, highly involved consumers should be targeted first, because they are most likely to perceive the product as creative. In contrast, when novelty is predominant, firms should target those consumers with greater knowledge of the product class. Marketing campaigns should follow similar criteria to ensure they are tailored to the segment the firm wants to reach. For instance, articles or advertisements in specialized newspapers, read mainly by experts, should focus on product novelty. This relevant managerial implication helps to appeal to knowledgeable consumers, which have considerable influence in the marketplace (Bloch et al., 1986; Leonard-Barton, 1985),

6.3. Limitations and future research directions

As with any study, these findings must be evaluated in light of certain limitations, which should also stimulate further research. We provide four possible directions. First, creativity theory has developed almost exclusively around U.S. consumers, whereas we test our hypotheses with an Italian sample. This difference may offer a further explanation for the

partial discrepancy of our findings with theoretical predictions. However, as competition becomes more and more global, we uphold the necessity to develop a theoretical perspective on creativity that is not culturally bound or limited to a specific country. We hope this research represents a starting point for future cross-cultural studies that investigate how consumers in different geographical markets assess the creativity of a product.

Second, consistent with the literature, we assume involvement is a second-order construct. Even though there is no reason *a priori* to hypothesize that each dimension of the broader construct "involvement" has a varying effect on the influence of the individual elements of consumers' evaluations of creativity, some studies maintain that different types of involvement have differential effects on search efforts (Beatty & Smith, 1987; Laurent & Kapferer, 1985). In a subsequent analysis, we control for the effect of each dimension of involvement and find no difference in the way they affect creativity perceptions, but additional research is needed to investigate this issue more closely.

Third, we analyze the impact of product and consumer characteristics separately. However, interaction effects may exist between the two. We do not investigate this possibility; further studies could consider whether one of the two variables tends to prevail. For example, highly involved consumers could assign more relevance to appropriateness than to novelty when they are evaluating a design-based product.

Fourth, our models explain from 47% to 53% of the variance in consumer perceptions of product creativity, which represents an excellent result but also indicates that we are missing something. After borrowing from psychology, marketing scholars now should develop specific constructs, beyond novelty and appropriateness, which may be relevant to product creativity. Because of their increasing importance and specific peculiarities, further research also should investigate how consumers evaluate creativity for services. Specific factors, such

as those tied to the consumer experience, could increase the predictive capability of our models in a service context.

Our analysis aims to be a starting point for more research on product creativity. After clarifying what consumers regard as creative in a product, the next step is to analyze the consequences of product creativity. Traditional wisdom maintains that creative products should increase consumers' willingness to buy and pay a premium, but no empirical research has investigated this issue. Because we find that novelty and appropriateness have varying effects on creativity, we suggest additional research should analyze the impact of each factor on consumer's intentions to buy and pay a premium price, rather than discussing the effects of creativity in general.

REFERENCES

Aiken, L. A., & West S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage,.

Alba, J. W., & Hutchinson, J. W. (1987). Dimensions of consumer expertise. *Journal of Consumer Research*, 13(4), 411-454.

Alba, Joseph W. (1983). The effects of product knowledge on the comprehension, retention, and evaluation of product information. In *Advances in Consumer Research* (pp. 577-580), 10, Bagozzi, R. P., &. Tybout, A. M. (ed.), Ann Arbor, MI: Association for Consumer Research.

Amabile, T. M. (1983). *The social psychology of creativity.* New York: Springer-Verlag.

Amabile, T. M. (1996). *Creativity in context.* Boulder, CO: Westview Press.

Andrews, J., & Smith, D. C. (1996). In search of the marketing imagination: factors affecting the creativity of marketing programs for mature products. *Journal of Marketing Research*, 33 (May), 174-187.

Arndt, M. (2006). Creativity overflowing. *BusinessWeek*, 5 August, 50-53.

Arora, R. (1982). Validation of an S-O-R model for situation, enduring, and response components of involvement. *Journal of Marketing Research*, 19 (November), 505-516.

Barron, F. (1965). The psychology of creativity. In T. Newcomb (Ed.), *New directions in psychology, II* (pp. 3-134). New York: Holt, Rinehart & Winston.

Batra, R., & Ray, M. L. (1986). Affective responses mediating acceptance of advertising. *Journal of Consumer Research*, 13 (2), 234-249

Beatty, S., & Smith, S. (1987). External search effort: an investigation across several product categories. *Journal of Consumer Research*, 14(1), 83-95

Berner, R., Kiley, D., Der H., Mara, R., & Arndt, M. (2005). Global brands. *Business Week*, 1 August, 86-89

Berkowitz, M. (1987). Product shape as a design innovation strategy. *Journal of Product Innovation Management,* 4(4), 274–283

Bergkvist, L., & Rossiter, J. R. (2007). The predictive validity of multiple-item versus single-item measures of the same constructs. *Journal of Marketing Research*, 44(2), 175–184

Berlyne, D.E. (1974). *Studies in the new experimental aesthetics: Steps toward an objective psychology of aesthetic appreciation*. Washington: Hemisphere Publishing.

Bellman, J. R., & Park, C .W. (1980). Effects of prior knowledge and experience and phase of the choice process on consumer decision processes: A prototypical analysis. *Journal of Consumer Research*, 7(3), 234-248.

Bloch, P. H. (1995). Seeking the ideal form: Product design and consumer response, *Journal of Marketing*, 59(3), 16-29.

Bloch, P.H., Sherrel, D.L. & Ridgway, N.M. (1986). Consumer search: An extended framework. *Journal of Consumer Research*, 13(1), 119-126.

Brucks, M. (1985). The effects of product class knowledge on information search behavior. *Journal of Consumer Research*, 12(1), 1-14.

Calantone, R. J., Chan, K., & Cui, A. S. (2006). Decomposing product innovativeness and its effect on new product success. *Journal of Product Innovation Management*, 23(5), 408-421

Chi, M. T. H., Feltovich, P. J., & Glaser, R. (1981). Categorization and representation of physics problems by experts and novices. *Cognitive Science*, 5, 121-152.

Conover, J.N. (1982). Familiarity and the structure of product knowledge. In *Advances in Consumer Research*, 9, 494-498.

Cooper, R. G. (1983) The impact of new product strategies. *Industrial Marketing Management*, 12(4), p243-25

Creusen, M. E. H., & Schoormans, J. P. L. (2005). The different role of product appearance in consumer choice. *Journal of Product Innovation Management*, 22(1), 63-81.

Csikszentmihalyi, M. (1988). Society, culture, and person: A systems view of creativity. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 325-339). New York: Cambridge University Press.

Dahl, D. W., Chattopadhyay, A., & Gorn, G. J. (1999). The use of visual mental imagery in new product design. *Journal of Marketing Research,* 36(1), 18-28

Drolet, A. L. & Morrison, D. G. (2001). Do we really need multiple-item measures in service research? *Journal of Service Research*, 3(3), 196-204

Fornell C., & Larker D.F. 1981. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.

Galunic, C. D., & Eisenhardt, K. M. (2001). Architectural innovation and modular corporate forms. *Academy of Management Journal*, 44(6), 1229-1249.

Haberland, G. & Dacin, P. (1992). The development of a measure to assess viewers' judgments of the creativity of an advertisement. In *Advances in Consumer Research*, (Vol.19, pp. 817-825), eds. Sherry Jr., J. F., & Sternthal, B, Provo, UT: Association for Consumer Research,.

Hertenstein, J. H., Platt, M. B., & Veryzer R. W. (2005). The impact of industrial design effectiveness on corporate financial performance. *Journal of Product Innovation Management*, 22(1), 3-21

Holbrook, M. & Zirlin, R. (1985). Artistic creation, artworks, and esthetic appreciation: some philosophical contributions to nonprofit marketing. In *Advances in Nonprofit Marketing*, 1, Ed. R. Belk, 1–54.

Houston, M.J. & Rothschild, M. L. (1977). A paradigm for research on consumer involvement. Unpublished working paper, Graduate School of Business, University of Wisconsin, Madison.

Hoyer, W. D. (1984). An examination of consumer decision making for a common repeat purchase product. *Journal of Consumer Research*, 11(12), 822-829.

Im, S. & Workman Jr., J. P. (2004). Market orientation, creativity, and new product performance in high-technology firms. *Journal of Marketing*, 68(2), 114-132.

Jackson, P. W. & Messick, S. (1965). The person, the product, and the response: conceptual problems in the assessment of creativity. *Journal of Personality*, 33 (September), 309-329

Jain, K., & Srinivasan, N. (1990). An empirical assessment of multiple operationalizations of involvement. In: Goldberg, M., Gorn, G., and Pollay, R. (ed.). *Advances in consumer research* (Vol. 17, pp. 594-602). Provo, UT: Association for Consumer Research.

Johnson, E. J. & Russo, J. E. (1984). Product familiarity and learning new information. *Journal of Consumer Research*, 11(1), 542–551.

Kardes, F. R. (1988) Spontaneous inference processes in advertising: The effects of conclusion omission and involvement on persuasion. *Journal of Consumer Research*, 15(2), 225-233.

Kasof, J. (1995). Explaining creativity: The attributional perspective. *Creativity Research Journal*, 8, 311–366.

Kharif, O. (2007). Motorola's gamble: Substance over style. *Business Week Online*, May 17

Kotler, P. H. & Rath, A. G. (1984). Design: A powerful but neglected strategic tool. *Journal of Business Strategy,* 5(2), 16–21.

Kover, A.J., Goldberg, S.M., & James, W.L. (1995). Creativity vs. effectiveness? An integrating classification for advertising. *Journal of Advertising Research*, 35(6), 29-40.

Kratus, J. (1994). Relationships among children's music audition and their compositional processes and products. *Journal of Research in Music Education*, 42, 115-130.

Laurent, G. & Kapferer, J. (1985). Measuring consumer involvement profile. *Journal of Marketing Research*, 22(1), 41-53.

Leonard-Barton, D. (1985) Experts as negative opinion leaders in the diffusion of a technological innovation. *Journal of Consumer Research*, 11(4), 914-926

MacKinnon, D.W. (1965). Personality and the realization of creative potential. *American Psychologist*, 20, 273-281

Maheswaran, D., & Sternthal, B. (1990). The effects of knowledge, motivation, and type of message on ad processing and product judgments. *Journal of Consumer Research*, 17(1), 66-73.

Michell, P.C.N. (1984) Accord and discord in agency-client perceptions of creativity. *Journal of Advertising Research*, 24(5): 9-23

Mitchell, A.A., & Dacin, P.A. (1996). The assessment of alternative measures of consumer expertise. *Journal of Consumer Research*, 23(3), 219-39.

Moorthy, S., Ratchford, B. T., & Talukdar, D. (1997) Consumer information search revisited: Theory and empirical analysis. *Journal of Consumer Research*, 23(4), 263-277.

Moreau, P.C., Lehmann, D.R., & Markman, A.B. (2001). Entrenched knowledge structures and consumer response to new products. *Journal of Marketing Research*, 38(1), 14-30.

Page, C., & Herry, P.M. (2002). An investigation of the process by which product design and brand strength interact to determine initial affect and quality judgment. *Journal of Consumer Psychology*, 12: 133-147.

Park, C., & Moon B. (2003). The relationship between product involvement and product knowledge: moderating roles of product type and product knowledge type. *Psychology & Marketing*, 20(11), 977-997

Petty**,** R. E. & Cacioppo, J. T.. (1981) Issue involvement as a moderator of the effects on attitude of advertising content and context. In *Advances in Consumer Research*, 8 (1), 20-24.

Petty, R. E., Cacioppo, J. T., & Schumann, D. (1983) Central and peripheral routes to advertising effectiveness: The moderating role of involvement. *Journal of Consumer Research*, 10 (2), 135-146

Punj, G. N., & Staelin, R.. (1983) A model of consumer information search behavior for new automobiles. *Journal of Consumer Research*, 9(4), 366-380

Rao, A.R., & Sieben, W.A. (1992). The effect of prior knowledge on price acceptability and the type of information examined. *Journal of Consumer Research*, 19(2), 256-270.

Rossiter, J. R. (2002) The C-OAR-SE procedure for scale development in marketing. *International Journal of Research in Marketing*, 19(4), 305–335

Runco, M. A., & Charles, R. E. (1993). Judgments of originality and appropriateness as predictors of creativity. *Personality and Individual Differences*, 15(5), 537–546

Schoonhoven C. (1981). Problems with contingency theory: Testing assumptions hidden with in the language. *Administrative Science Quarterly*, 26, 349-377.

Schoormans, J.P.L. & Robben, H. (1997). The effect of new package design on product attention, categorization and evaluation. *Journal of Economic Psychology* 18(2–3), 271–287.

Sethi, R., Smith, D. C. & Park, W. C. (2001). Cross-functional product development teams, creativity, and the innovativeness of new consumer products. *Journal of Marketing Research*, 38(1), 73-85.

Shavitt, S., Swan, S., & Lowrey, T. M. (1994) The interaction of endorser attractiveness and involvement in persuasion depends on the goal that guides the message processing. *Journal of Consumer Psychology*, 3 (2), 137-162.

Shook, C. L., Ketchen Jr. D.J., Hult G. T. M., & Kacmar K. M. (2004). An assessment of the use of structural equation modeling in strategic management research, *Strategic Management Journal*, 25(4), 397–404.

Simonton, D. K. (1984). Artistic creativity and interpersonal relationships across and within generations. *Journal of Personality and Social Psychology*, 46, 1273–1286.

Simonton, D. K. (1999). Creativity as blind variation and selective retention: Is the creative process Darwinian? *Psychological Inquiry*, 10(4), p309-328

Sujan, M. (1985). Consumer knowledge: Effects on evaluation strategies mediating consumer judgments. *Journal of Consumer Research*, 12(1), 31-46.

Vaughn**,** R. L. (1983)**.** Point of view: Creatives versus researchers: Must they be adversaries? *Journal of Advertising Research*, 22(6), 45-48

Verganti, R. (2003). Design as brokering of languages: Innovation strategies in Italian firms. *Design Management Journal*, 14(3), 34-42.

Verganti, R. (2006). Innovating through design. *Harvard Business Review,* 84(12), 114-122.

Veryzer, R. W. (1999). A nonconscious processing explanation of consumer response to product design. *Psychology and Marketing*, 16(6), 497-522.

Walker, S. (1995). The environment, product aesthetics and surface. *Design Issues,* 11(3), 15–27.

White, A., & Smith, B. (2001). Assessing advertising creativity using the creative product semantic scale. *Journal of Advertising Research*, 41(6), 27-34.

Zaichkowsky, J. L. (1985). Measuring the involvement construct. *Journal of Consumer Research*, 12 (3), 341-352.

Figure 1: Proposed model

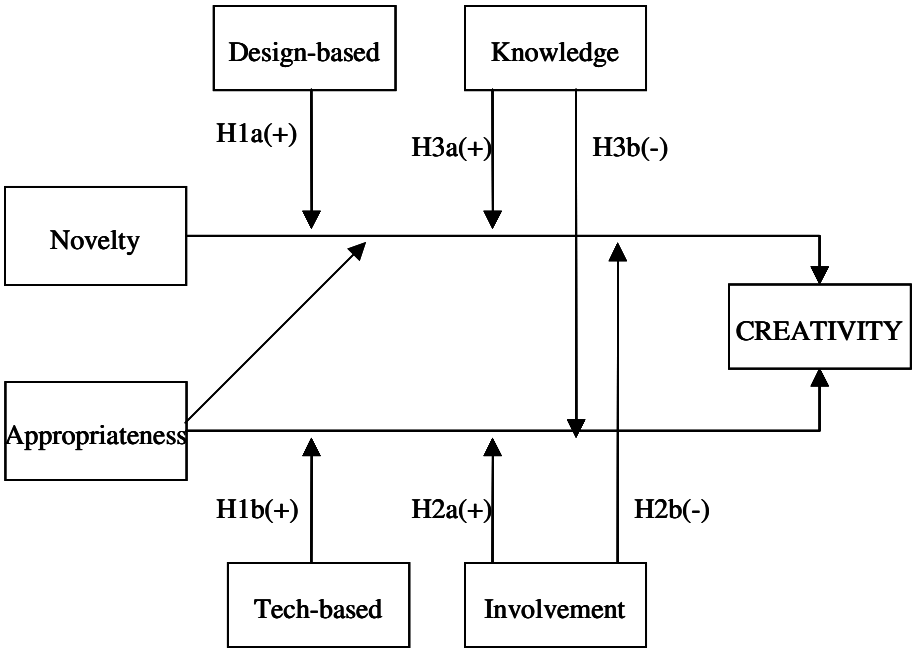


Table 1: Gender distribution in the four questionnaires

		Male	*Female*
Car	*Technology*	48.6%	51.4%
	Design	47.9%	52.1%
Camera	*Technology*	48.6%	51.4%
	Design	47.8%	52.2%

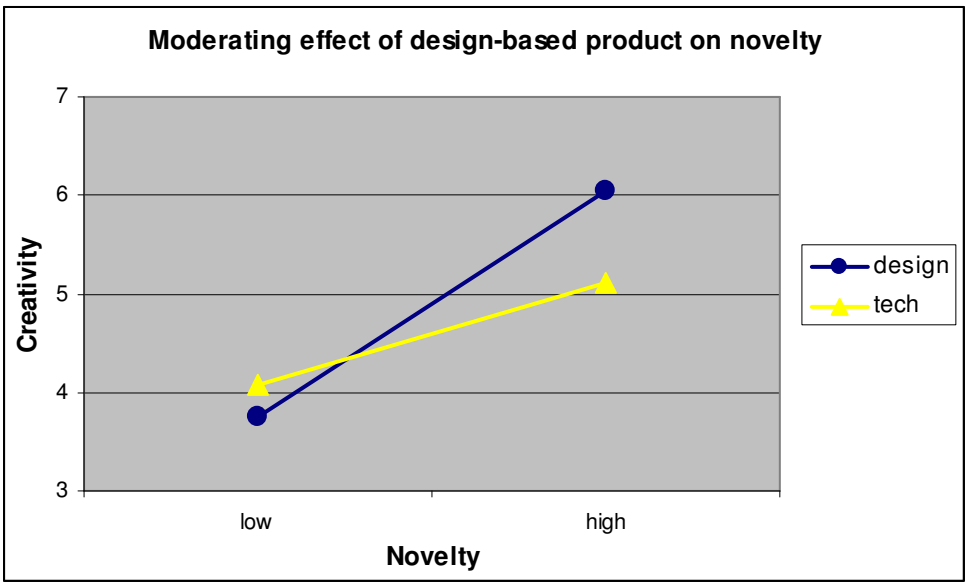
Table 2: Age distribution in the four questionnaires

		20-34	*35-49*	*50-62*
Car	*Technology*	33.8%	36.9%	29.2%
	Design	33.9%	35.5%	30.6%
Camera	*Technology*	34.9%	34.9%	30.2%
	Design	33.9%	37.1%	29.0%

Table 3: Discriminant validity: squared correlation between latent variables (off-diagonal) and AVE (diagonal)

	Novelty	*Appropriateness*	*Involvement*	*Knowledge*
Novelty	.517			
Appropriateness	.004	.729		
Involvement	.001	.03	.396	
Knowledge	.003	.058	.002	.517

Figure 2: Moderating effect of the type of innovation



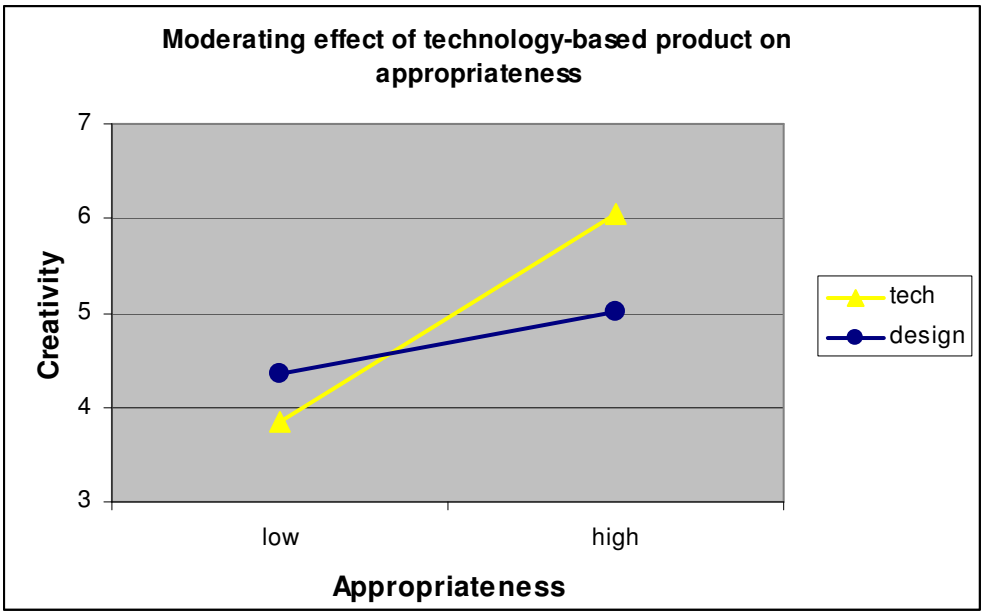
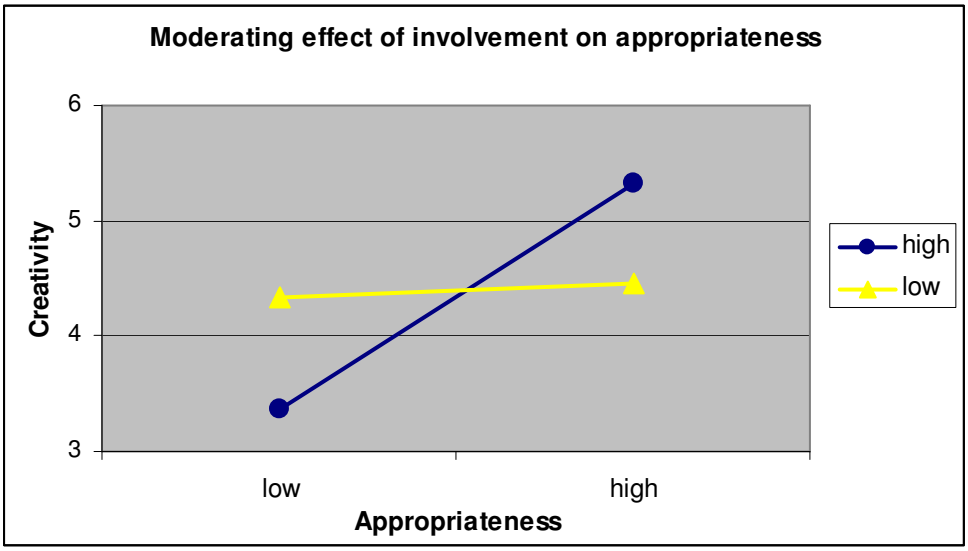


Figure 3: Moderating effect of involvement



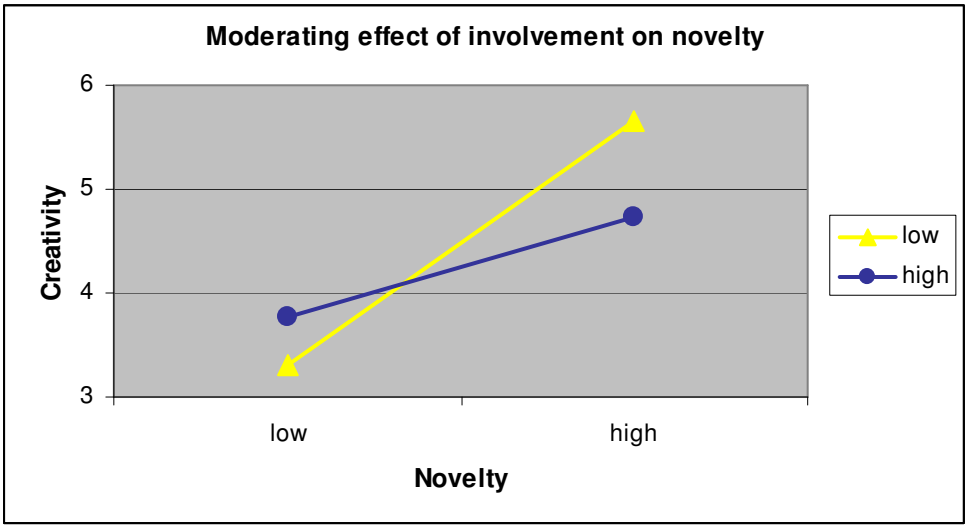
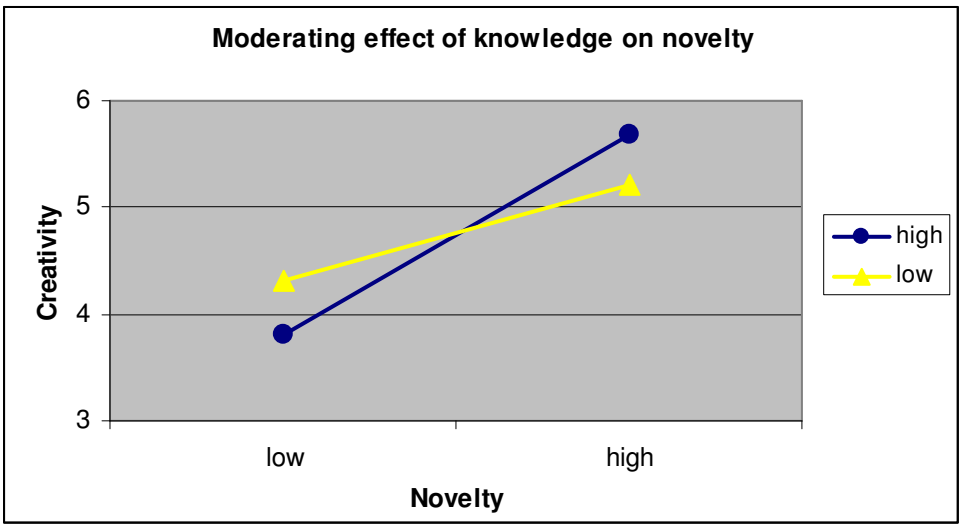


Figure 4: Moderating effect of knowledge



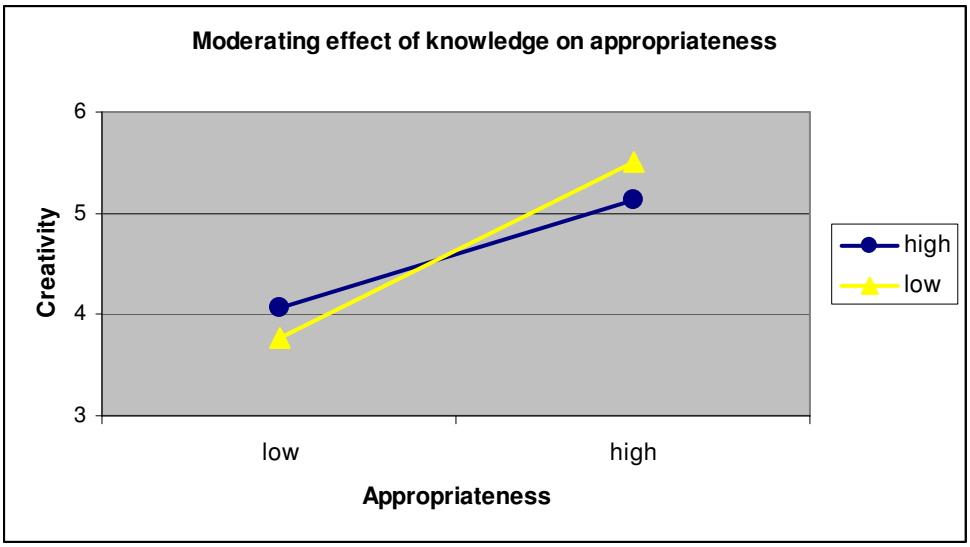


Table 4: Regression analysis

		Initial Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
	Age	.006	.003	.005	.002	.004	.006	.003	.006
	Gender	.090	.011	.043	.079	.101	-.016	.040	-.016
	Education	-.044	-.066	-.062	-.146	-.035	-.043	-.092	-.043
	Car	-.122	-.150	-.144	.003	-.045	-.244	-.182	-.244
	Design	.452*	.353*	.393*	.374*	.453*	.397*	.457*	.397*
	Involvement	-.005	-.005	-.004	-.004	.000	-.005	-.004	-.005
	Knowledge	-.002	.001	-.001	.001	.004	-.005	-.004	-.005
	Novelty	.101***	.101***	.067***	.107***	.103***	.112***	.092***	.112***
	Appropriateness	.105***	.107***	.109***	.05**	.076***	.107***	.103***	.107***
	Novelty × Appropriateness		-.006***						
H1a	Design × Novelty			.089***					
H1b	Technology × Appropriateness				.11***				
H2a	Involvement × Appropriateness					.003***			
H2b	Involvement × Novelty						-.002***		
H3a	Knowledge × Novelty							.004**	
H3b	Knowledge × Appropriateness								-.002***
	R^2	.472	.514	.517	.514	.537	.545	.501	.545
	ΔR^2		.042	.045	.047	.065	.073	.029	.073
	ΔF		18.41***	2.037***	2.67***	29.936***	34.391***	12.436**	34.391*

*$p < .05$ **$p < .005$ ***$p < .000$

APPENDIX 1: PICTURES PRESENTED IN THE QUESTIONNAIRES

Design questionnaire

Technological questionnaire

Design questionnaire

Technological questionnaire

APPENDIX 2: SCALE ITEMS

Except when indicated, all Likert-type items use seven-point scales anchored at "Strongly disagree" and "Strongly agree."

A. CREATIVITY (Amabile, 1983)
(Mean = 4.76; S.D. = 1.5)
Using your personal definition of creativity, how creative is this product with regards to similar products?
1 = not at all, 7 = extremely creative

B. NOVELTY (adapted from Im & Workman, 2004)
(Mean = 21.99; S.D. = 7.48; AVE = .52; CR = .91; α = .93)

This car (camera):	Standardized factor loadings
1. is really "out of ordinary"	.91*
2. can be considered as revolutionary	.939*
3. is not conventional^^	.616*
4. is in line with the other cars (cameras) in the market^	.781*
5. provides radical differences from other cars (cameras)	.898*
6. shows an unconventional way of solving problems	.789*

C. APPROPRIATENESS (adapted from Im & Workman, 2004)
(Mean = 14.87; S.D. = 6.93; AVE = .73; CR = .91; α = .93)

This car (camera):	Standardized factor loadings
1. is relevant to my needs and expectations	.932*
2. is considered unsuitable for my desires^	.957*
3. is appropriate for my needs and expectations	.962*
4. is useful for me	.937*

D. INVOLVEMENT (Jain & Srinivasan, 1990) — Standardized factor loadings
(Mean = 54.59; S.D. = 22.82; AVE = .40; CR = .84; α = .90)

Risk Probability	.752*
(Mean = 9.47; S.D. = 4.83; AVE = .70; CR = .87; α = .95)	
1. In purchasing a car (camera), I am certain of my choice^	.934*
2. I never know if I am making the right purchase	.927*
3. I feel a bit at a loss in choosing a car (camera)	.932*
Pleasure	.941*
(Mean = 11.02; S.D. = 5.12; AVE = .64; CR = .84; α = .94)	
1. I do not find cars (cameras) pleasurable^	.93*
2. I think cars (cameras) are exciting	.91*
3. I think cars (cameras) are fun	.928*
Risk Importance	.747*
(Mean = 12.85; S.D. = 5.93; AVE = .78; CR = .90; α = .97)	
1. It is really annoying to make an unsuitable purchase	.971*
2. A poor choice would be upsetting	.98*
3. There is little to lose by choosing poorly^	.929*

Sign	.846*
(Mean = 9.42; S.D. = 5.31; AVE = .69; CR = .87; α = .95)	
1. My car (camera) tells others something about me	.937*
2. Others use the car (camera) I own to judge me	.896*
3. My car (camera) does not portray an image of me to others^	.982*
Relevance	.814*
(Mean = 11.76; S.D. = 5.79; AVE = .61; CR = .82; α = .95)	
1. The car (camera) is non-essential*	.921*
2. The car (camera) is beneficial	.937*
3. The car (camera) is needed	.929*

E. KNOWLEDGE (Mitchell & Dacin, 1996)	Standardized factor loadings
(Mean = 18.04; S.D. = 8.23; AVE = .52; CR = .84; α = .94)	
1. I am really familiar with cars (cameras)	.941*
2. I have clear ideas about which characteristics are relevant in providing me with maximum usage satisfaction	.904*
3. I know little about cars (cameras)^	.771*
4. I am very interested in cars (cameras)	.862*
5. I frequently read cars (cameras) magazines^^	.414
6. How would you rate your knowledge about cars (cameras) relative to the rest of the population? (1= one of the most knowledgeable people; 7 = one of the least knowledgeable people)	.929*

F. AESTHETIC APPEAL	Standardized factor loadings
(Mean = 12.51; S.D. = 4.7; α = .937)	
This car (camera) is:	
1. Good–bad	.932*
2. Ugly–beautiful^	.973*
3. Pleasant–unpleasant	.951*

G. TECHNICAL GOODNESS (Amabile, 1996)
(Mean = 4.06; S.D. = 1.61)
1. This product is good technically

* Factor loading significant at the .000 level.
^Reverse coded.
^^ Item deleted because of low factor loading.

PAPER 3

Unveiling the Value of Creativity: The Moderating Effect of Technology-Based vs. Design-Driven Products

Abstract

Academics and managers take the value of creativity for granted. However, the mechanisms through which creativity can increase product performance are still ambiguous. For instance, it is not clear if creative products receive more favorable consumer evaluations and/or are more likely to be bought. This paper adopts a component-wise approach to evaluate the effect of creativity, by separately investigating the effect of novelty and appropriateness. Further, we analyze how the effect of the two components of creativity differs when a product is technology-based rather than design-driven. A sample of 250 US consumers shows that the effect of creativity does differ depending on the type of product. Novelty elicits more positive evaluations and makes consumer more likely to buy a product in the case of design-driven products. Differently, appropriateness is more relevant in the case of technology-based products, whereas novelty has a very limited role. Findings suggest that creativity has a positive impact on new product performance only when either novelty or appropriateness prevails over the other one in a way that is consistent with the type of innovation embodied in the product.

INTRODUCTION

> Design is the new advertising. The agencies should fold, they're out of line and out of touch. The only advertising that works is about product that you're drawn to any way (Marc Gobé, CEO of Desgrippes Gobé)

An axiom of business strategy is that there are only two strategies through which firms can succeed: either they are cost-leaders, i.e., they sell products at the lowest price, or they differentiate (Porter, 1985). While there is only one seat for the cost-leader in each market, differentiation guarantees many profitable spaces for several firms in the same market. The advent of Chinese producers left many Western companies with no choice: they were forced to differentiate in order to justify their higher prices with consumers.

Because of this circumstance, creativity has gained a relevant place in a number of firms' strategies, as a key step toward differentiation (Im and Workman, 2005). In recent years, many companies, such as Whirlpool, have launched extensive programs to increase the creativity of their products in an effort to pursue differentiation. Were these efforts successful? And through which mechanism can creativity increase sales for a firm? Empirical knowledge on the effect of creativity is poor. The pioneer study in this area by Im and Workman (2005) showed that creativity provides an effective route through which market orientation can generate positive returns from new products. However, it is still not clear by which means creativity increases product sales. Consumer behavior literature pointed out two main mechanisms responsible for product sales: consumers' reaction and intention to buy. So far, it is not clear if creative products receive more favorable consumer evaluations and/or are more likely to be purchased. Indeed, creativity is made up of two components: novelty – i.e., the extent to which a product differs from competing alternatives – and appropriateness – i.e., the extent to which a product solves some critical consumer needs (Sethi, Smith and Park, 2001). The effect of the two components, especially that of novelty, is pretty ambiguous. As recently demonstrated by Szymanski Kroff and Troy (2007), equivalent arguments can be

advanced for the presence of a positive, negative or non-significant relationship between novelty and new product sales.

Associated with the emphasis on creativity is the massive use of design by many companies in any market, even (and mostly) in traditionally technology-based ones. The relevance of design is witnessed by an increased number of designers being appointed at the executive level. In the last few years, many companies traditionally competing with technology, such as IBM, Hewlett-Packard, Johnson & Johnson and P&G, have appointed Vice Presidents of Design (Scanlon, 2007). Design became the last opportunity to revitalize these businesses. After three years of intensive surveys that involved thousands of consumers in 10 countries, LG concluded it would first place heavy emphasis on cool design to save its plummeting mobile phone business. The company launched a "Black Label" series of design-based mobile phones. The first two models of the series – the Chocolate (a mobile that looks like a chocolate bar, more than 13 million units sold) and the Shine (a mobile whose face and back are finished with shiny stainless steel, 5 million units sold in seven months) – have turned LG's cell-phone business around. As an effect of the introduction of these products, LG's handset division reported a profit of $332 million in the second quarter of 2007 (against a loss of $16 million a year earlier), profit margin jumped to 11.6% in the last quarter, up from 4.7% in the first quarter and 0.7% a year earlier (Ihlwan, 2007). Even Dell, a well-known cost-leader, recently resorted to design as the best chance to revitalize its struggling consumer business. The company introduced sleeker, thinner, and lighter laptops and gave its consumers the opportunity to select among eight appealing colors (e.g., ruby red or flamingo pink) rather than the usual black. Demand outstripped expectations and helped Dell recover from the crisis of previous years (Lee, 2007). Why does design seem to be the trump card for product sales? Should company turn to design rather than to technology innovation to foster product sales?

This work contributes to existing literature in three ways. First, it extends prior literature on the effect of creativity. By analyzing the effect of the two main components of creativity – novelty and appropriateness – it shows in which way creativity may help firms increase the performance of their new products. We clearly define which component is more critical to the success of a new product. This helps managers decide how much to invest in developing novelty rather than appropriateness (or vice-versa). Second, we analyze separately the effect of creativity on two types of innovations: one based on design and one based on technology. By introducing this distinction we provide evidence of a growing empirical phenomenon, which so far has received scant academic attention. Our findings highlight that a) consumers evaluate the two categories of products in a different way; and b) different factors influence their decision to buy design-based or technology-based products. Managers, therefore, should emphasize different characteristics of the product according to the type of product they are selling. Third, we contribute to the more general new product development literature by shedding new light on the effect of novelty. Ambiguous and contradictory results reported in previous research may be due to the fact that previous studies did not clearly separate products according to the type of innovation. Our findings reveal that novelty does have a varying effect on intention to buy for design-based and technology-based products.

BACKGROUND

Defining creativity

Many scholars, from the fine arts to the business sector, have tried to offer a definition of creativity. Even though some have argued that defining creativity is too challenging to be feasible (Khatena, 1982; El-Murad and West, 2004), a certain consensus on what constitutes creativity has recently been achieved. It is now widely accepted that creativity requires two elements: novelty, or the extent to which an object differs from conventional practice, and

appropriateness, or the extent to which it is meaningful in the conventional domain to which it belongs (Amabile, 1983; Jackson & Messick, 1965). For example, a melody that follows a completely different musical scheme cannot be defined as creative unless there is tonal or rhythmic coherence (Kratus, 1994). Even though creativity has long been acknowledged as a critical factor for new product success (Cooper, 1983), research about the creativity of a certain product is a relatively young field, which largely relies on the definition of creativity as a *useful novelty*, that is a "novelty that can be applied and add value" (Oldham and Cummings, 1986). Consistently, a new product is defined as creative when it "is different from competing alternatives in a way that is valued by customers" (Sethi et al., 2001, p.76).

Given the nature of new product creativity, we adopt a component-wise approach to investigate separately the effect of novelty and appropriateness on consumers' evaluations and intention to buy. This choice is supported by two arguments. First, a component-wise approach allows us to better understand the role of creativity in new product performance, by disentangling the varying role of the two components. Indeed, Im and Workman (2005) found that analyzing novelty and appropriateness separately gives a better explanation of the variance in the market and financial performance rather than the single construct of "new product creativity". Second, our component-wise approach is corroborated by a recent analysis conducted Szymansky, and colleagues (2007) on the effect of product innovativeness on new product performance. Their findings conclude that measures of innovativeness that include an appropriateness dimension, rather than simply novelty, are able to better detect more correct relationships involving new product performance.

Design vs. technology innovation

As technological competition becomes more and more fierce and consumers more and more demanding, firms are utilizing design to develop new products that do not necessarily include new technology (Verganti, 2005). We contend that there are two main ways to

innovate: through design and/or through technology. The computer industry represents a good example of an industry in which innovation can be led either by design or by innovation. Traditionally, competition has been based on the number of gigabytes in the memory or the speed of the processor. Until a few years ago, apart from Apple, every company was producing undifferentiated black boxes. As competition from substitutable products increased (e.g., camera-equipped smart phones that double as PDAs and cable services that deliver e-mail, digital photography, and other services along with basic TV), producers realized the necessity of making their products more appealing to consumers, rather than simply raising the technological bar. Intel turned to IDEO, probably the most famous design firm, to develop the concept notebook "Florence", with a very stylish shape. HP launched some PCs featuring fancy black-lacquer finishes, others were decorated with a wave-like pattern inspired by a Zen rock garden. Similarly, Sony recently launched two limited Vaio Graphic Splash Edition notebooks whose cases were designed by the emerging New York City artist Maya Hayuk, with matching wallpaper and screensaver.

We define a product as design-based when some design-related components (e.g., shape, color, materials, proportion) are manipulated to generate a new product (Veryzer, 1999), such that the variation represents the main difference from other similar products on the market, as in the case of the Sony Vaio Maya Hayuk notebooks. We define a product as technology-based when the difference between the new product and others in the same category is mostly due to certain technological innovations, such as an increase in the speed of the processor.

A large part of the new product literature has analyzed consumers' reactions to a product and intention to buy as a direct consequence of the product's utilitarian or functional benefits. For instance, products with superior product advantage, namely products that can better satisfy consumer needs, are said to be more capable of generating higher sales (Li and Calantone, 1998). However, consumer behavior literature suggests that consumers also make

purchases in order to satisfy hedonic needs. The sociological work on conspicuous consumption (e.g., Levy 1959; Sirgy 1982) has emphasized the role of the symbolic aspects of product preferences, beyond utilitarian benefits. This literature posits that, separate from utilitarian benefits, there are also symbolic benefits associated with products, which reveal how product use and/or ownership associates the consumer with a group, role, or self-image. Hence, we can say that consumers purchase goods for two basic reasons: hedonic gratification or utilitarian reasons, and that a sort of trade-off exists between the two (Batra and Ahtola, 1990; Voss, Spangenberg, and Grohmann, 2003). An experimental study conducted by Chitturi, Raghunathan, Mahajan (2007) shows that products with superior technology characteristics are selected for utilitarian reasons, namely for their capability to solve some specific consumer problems. Conversely, products with a pleasing appearance are chosen for hedonic and symbolic reasons. Since the two typologies of products are chosen for different reasons, there is room to analyze whether the product category moderates the impact of novelty and appropriateness on reaction and intention to buy.

MODEL AND RESEARCH HYPOTHESES

We have two dependent variables in our model - product evaluation and intention to buy, that are influenced by novelty and appropriateness. We test the direct effect of these two main components of creativity, plus we test for a moderating effect coming from the type of innovation embodied in the product (i.e., design- vs. technology-based). We depict the proposed model in Figure 1.

FIGURE 1 HERE

We argue that novelty tends to have an opposing effect on product evaluation and intention to buy. Past research on new product introduction suggests that adding novel attributes is likely to improve product evaluation, even when the novel attribute is totally irrelevant (Carpenter,

Glazer, and Nakamoto, 1994), and that new products tend to be evaluated more positively by consumers (Lefkoff and Mason, 1993). Prior literature provides two different explanations on why new products generate more positive evaluations. First, new products that consumers perceive as too close to pre-existing offerings, namely that are not novel, evokes only mild positive responses because they do not generate an emotional response. By contrast, the disruption of expectations that occurs when incongruity is encountered prompts a reaction and cognitive elaboration directed toward making sense of the incongruity (Peracchio and Tbyout, 1996). This in turn generates positive affect toward the product and customer excitement (Szymanski et al., 2007). Second, research on persuasion knowledge shows that consumers hold a key belief about the marketplace; they expect that manufacturers introduce new products that are maximally effective at improving attitudes toward their products (Friestad and Wright 1994). If so, then the introduction of novel attributes should be interpreted by consumers as a signal that the product offers additional advantages (rather than disadvantages) over existing alternatives (Mukherjee and Hoyer, 2001). Hence, we hypothesize that:

Hyp1a: *Novelty has a positive effect on product evaluation*

The effect of novelty on consumer intention to buy has received a lot of attention from scholars. The literature on adopting innovation sheds light on the following negative effects related to too much novelty. First, highly novel products involve a lot of social, performance and financial risk, When the perceived risk is relatively high, consumers may have a preference for the norm over novel (or even moderate novel), and hence decide not to buy the product (Campbell and Goodstein, 2001). Following this logic, umbrella-branding strategies have been regarded as effective strategies for reducing risk perceived by consumers (Montgomery and Wernerfelt, 1992). Second, when products differ dramatically from the existing alternatives on the market, consumers have to spend a great deal of effort learning

about and understanding the new product, yet consumers may still be resistant to learn new facts (Gatignon and Robertson, 1985; Moreau, Markman and Lehmann, 2001). Third, consumers may incur costs when they buy products that are too novel, because they have to adopt new behaviors, so consumer inertia may slow the acceptance rate of new products. All of these factors may lead to a negative relationship between novelty and intention to buy. This is confirmed by recent studies. Alexander, Lynch, and Wang (2007) asked to 2,693 members of a CBS Television City Online Panel to declare their intention to acquire certain services and products offered by CBS in the next six months. They found that intention to acquire products decreases as newness increases. Similarly, Calantone, Chan and Cui (2007) report that customer familiarity –the converse of novelty – has a positive impact on consumers purchase probability. Hence, we hypothesize that:

Hyp1b: *Novelty has a negative effect on intention to buy*

Appropriateness. Appropriateness is defined as the capability of a product to solve some specific problem and help the consumer achieve his/her goals (Jackson and Messick, 1965). In light of this, a product judged as appropriate by a consumer should also generate more positive evaluations, because of its close alignment with consumer goals. For instance, in a study on product design, Dahl, Chattopadhyay and Gorn (1999) found that product designs that are more useful and relevant for consumers have a greater effect on consumer appeal, namely how positively the consumer reacts to the product. Further, highly appropriate products should make them more likely to be purchased, because the consumer judges the product useful in satisfying his/her needs. Our argument has large support from previous research, which has found that those products that more closely meet and better satisfy consumer needs have a higher probability of success (e.g., Atuahene-Gima, 1996; Hultink and Robben, 1995). In the only study specifically dedicated to analyze the effect of creativity,

Im and Workman (2005) showed that appropriateness has a significant and positive impact on product market share and sales.

Hyp2: *Appropriateness has a positive effect on (a) evaluation and (b) intention to buy*

Moderating effects. We argue that novelty should have a more positive effect on consumer reaction and intention to buy in the case of design-based products. Our argument relies on the way responses to design-based products are formed and on consumers' desires for uniqueness. Different from tech-based products, design-based products mainly generate hedonic responses, which do not rely on a product's capability to satisfy consumer needs nor on its functional performance (Holbrook and Zirlin, 1985; Veryzer, 1999). For instance, in spite of its main functional drawbacks, many consumers continued to buy Apple iMac, although it was more expensive than other PCs, mainly because of its "cool" look (Page and Herr, 2002). Similarly, Creusen and Schoormans (2005) report a survey of consumers evaluating design-based products in which most of the respondents gave up functionality in favor of aesthetic value. Hedonic attributes help in attaining promotional goals, such as the desire to look cool or being sophisticated (Chitturi et al., 2007). Because of this, design-based products convey a higher symbolic meaning than tech-based products (Bloch, 1995; Walker, 1995). A recent study by Berger and Heath (2007) found that consumers tend to diverge more from others in product domains that are seen as symbolic of identity. They also found that consumers are more likely to prefer novelty in products for which appearance prevails over function, such as school sweatshirts or hair styles. This is exactly the case for design-based products when compared to tech-based ones. For instance, people buying Apple iMac wanted to appear different from other computer users. Creating a unique social image for people with iMac was the winning strategy that Apple adopted to launch its design-based product (Business Week, 2000). Since design-based products represent a domain in which consumers want to be different, we argue that, in this case, novelty should have a more positive effect on

consumer reaction than for tech-based products. Further, novelty should make consumers more prone to buy design-based products than tech-based ones, because in the former case consumers buy products to convey a unique self-identity.

Further, Mukherjee and Hoyer (2001) have shown that the positive effect of novel attributes on product evaluation is mitigated for high-complexity products, because fully understanding these products requires a large cost. These high learning costs tend to overshadow positive value inferences and hence cause a net reduction in product evaluation and intention to buy. According to the authors, since many technological innovations are perceived to be very complex, novelty should have a less positive effect on product evaluation and consumer intention to buy. Hence, we hypothesize the following:

Hyp.3: *The impact of novelty on (a) reaction and (b) intention to buy is more positive for design-based than for tech-based products*

We contend that appropriateness should have a more positive effect on reaction and intention to buy when the product is tech-based. We provide two different explanations in support of our argument. First, technology-based products are mainly evaluated and selected for utilitarian reasons, whereas design-based products are mainly evaluated and selected for hedonic reasons (Chitturi et al., 2007) On this ground, we can argue that consumers pay a lot of attention to the appropriateness of a technology-based product, because appropriateness is consistent with their utilitarian goals. Hence, a product capable of satisfying consumer needs (i.e., very appropriate) should generate a more positive reaction if this product is technology-based rather than design-based, because the main purpose of the latter is to satisfy needs that are not utilitarian in nature.

Second, technology-based products usually require that consumers change their habits and adopt new behaviors (Zhou, Yim and Tse, 2005). Changing behavior is a time-consuming and risky activity, so consumers may want to more carefully evaluate the capability of the product to more fully satisfy their needs before choosing to adopt it. For instance, in 2001

Dean Kamen announced the introduction of Segway Human Transporter, a gyro-stabilized, two-wheeled scooter claimed to transform personal transportation. However, sales fell far below expectations. The main reasons for this failure are related to the marginal ability of the product to solve consumer needs, such as difficulty maintaining equilibrium or driving on sidewalks without bothering pedestrians. On the other hand, design-based products are purchased even in the absence of a capability to perform a specific function. For instance, Frank Muller Long Island Crazy Hours is a design-based watch that has the numbers scrambled instead of in numerical order, so the typical function of any watch – to tell time– appears difficult to perform. This suggests that appropriateness has a higher impact on consumer intention to buy technological-based rather than design-based products. Hence:

Hyp.4: *The impact of appropriateness on (a) reaction and (b) intention to buy is more positive for tech-based than for design-based products.*

METHODOLOGY

Study context and sample

Data to test the hypotheses was collected from US consumers in Southern California. Participants in the study were recruited at the exit of some grocery stores during February-May 2007. They were asked to participate in market research on brand new products that would soon be introduced in the US market. Those who accepted were given the questionnaire. 302 consumers agreed to participate in the study. However, 35 of these did not complete the whole questionnaire and hence were excluded. 17 were excluded because it evident that they filled out the questionnaire without paying attention to it (on Likert scales they always indicated the same number). In the end, there were 250 usable questionnaires.

Design vs. technology-based product

Each questionnaire was made up of two sections, one presenting a design-based product and another presenting a technology-based product. In some questionnaires the design-based product was presented first, in other ones the technology-based product was presented first.

Design. In this part of the questionnaire we presented a picture showing the interior of a new car[3] (see Appendix 1) with the following description:

> *This five-passenger compact vehicle is designed to allow riders to enjoy a living room experience. The front seats look more like arm chairs, and the rear seat like a curving sofa. The interior space is visually divided between the working space and the living space with color and texture. The work space includes the driver's seat, steering wheel and pedals rendered in blue suede with bamboo flooring. The remaining interior is comprised of cream suede and sisal natural flooring, much like an area rug. Front arm rests and control switches traditionally located on the doors are attached to the seats, which keep the door panels simple like walls in a room.*

Technology. This portion of the questionnaire showed the same car as in the design part, but with closed doors, in order to keep all design features hidden. This way, the car looked like any other car. We provided a description of a technology innovation which the car possesses:

> *This car has a particular system, which helps execute parking maneuvers. This system uses sensors to estimate if a parking space is big enough for the car. When one parking space is found, the driver selects reverse gear, lets go of the wheel and operates the accelerator and brake. The assistance system steers the car until it is in the parking space.*

Measures, reliability, and validity

We derived measures for our study from existing measures in the literature. For each scale, the relating items are shown in Appendix A.

Novelty. The novelty scale is derived from Im and Workman's (2004) measures, which was tested among both product managers and customers. The novelty scale is made up of six items assessing the degree of change introduced by the new product (α=.92).

Appropriateness. We also used Im and Workman's (2004) measure for this case. The appropriateness scale is made up of four items that assess the extent to which the product is appropriate and relevant for customer's needs (α=.91)

[3] The new car presented won the Industrial Design Excellence Award 2006. It never appeared on the Italian market.

Product evaluation (α=.90). This scale was adapted from Patrick, Macinnis, and Park (2007). It is made up of three items, measuring the extent to which the subject liked the product, found it beautiful and had a positive feeling toward the product

Intention to buy (α=.90). We measured intention to buy through a two-item scale, measuring the likelihood of including the product among the options and of buying the product.

MODEL ESTIMATION AND RESULT

Manipulation checks

In order to control that the products in the questionnaire were really perceived as a design or technological innovation, we asked the same subjects to evaluate products on two seven point-item scales. One scale determining to what extent the product is based on design features and the other scale to measure the extent it is based on technological features. Design products were perceived to be significantly more based on a design innovation (M=5.57) than technology products (M=2.54), F(1, 498)= 449.15, p<.000, η^2=.47. Technology products were perceived to be significantly more based on a technological innovation (M=5.36) than design products (M=2.45), F(1, 498)=303.7, p<.000, η^2=.38.

Measurement model

We tested the measurement model with a confirmatory factor analysis (CFA), using AMOS 6.0. All items loaded significantly on the corresponding factor. However, the items "stimulating" and "in line with other cars" were below the cutoff value of 0.7, and hence were dropped-off (Shook et al., 2004). All the constructs have a composite reliability over the cutoff of 0.70. Average variance extracted (AVE) is greater than .50 (see Appendix 1). We tested discriminant validity by examining if the average variance extracted (AVE) for each construct is larger than the squared correlations between constructs. As shown in Table 1, the

diagonal elements representing the AVE for each construct are larger than the off-diagonal elements, representing the squared correlations between constructs, thereby satisfying this discriminant validity criterion (Fornell and Larcker, 1981). Absolute fit indices for the proposed model ranged from adequate to excellent (χ^2/df = 1.41; GFI=.973; NFI =.981; CFI =.994; RMSEA=.029).

TABLE 1 HERE

Hypotheses testing

According to Hypothesis 1, novelty has a) a positive impact on product evaluation, but b) a negative impact on intention to buy. In support of this, we found that novelty has a significant and positive effect on evaluation (b=.166, p<.000). However, we found that it also has a positive effect on intention to buy (b=.145, p<.000). Hypothesis 1b, hence, is not supported.

Products that are perceived as more appropriate for consumer needs receive more favorable evaluations (b=.197, p<.000), and are more likely to be purchased (b=.150, p<.000). Hypotheses 2a and 2b are, therefore, both supported.

Thus far we have tested a general model that does not distinguish between design and tech-based products. The remaining hypotheses test the existence of differences between the two types of products in the structural paths linking novelty and appropriateness to the dependent variables. Before doing that, we controlled for factorial invariance in the measurement model between the two groups (Rock, Werts, and Flaugher, 1978). The configural invariance model without equality constraints has a χ^2 of 283.243 with 142 degrees of freedom (df). The hypothesis of full metric invariance was tested by constraining the matrix of factor loadings to be invariant across groups, resulting in a χ^2 of 291.204 with 152 df. Since there is no significant increase between the configural model and the full metric model invariance ($\Delta\chi^2(10)$ = 7.96, p=.633) we can conclude that there is no difference in the measurement

structure between the two groups. Further, no critical ratio for each pair of factor loading is above the threshold of 1.96, thus also indicating invariance between single factor loadings.

In the next step, we compared the full metric invariance model with a full structural invariance model in which the structural paths between novelty/appropriateness and the dependent variables are constrained to be equal in both groups. We found a significant increase ($\Delta\chi^2(3) = 33.962$), thus suggesting that novelty and appropriateness have varying effects on a) evaluation and b) intention to buy when consumers evaluate tech-based rather than design-based products. In the next test of our hypotheses, we tested if each structural path has a significant different effect between the two groups. In order to do this, we looked at the critical ratio for difference. The critical ratio is the difference between the two parameters divided by the standard error of this difference (Arbuckle and Wothke, 1999). It has a normal distribution and tests the hypothesis that two parameters are equal in each group. Hence, absolute values above 1.96 imply that the hypothesis that the two parameters are equal must be rejected.

We found that the effect of novelty on evaluation is b=.45 for design and b=.18 for tech-based products. The difference between the two betas is significant (critical ratio for difference =-2.427), thus supporting Hyp.3a. In support of Hyp. 3b, we found that novelty has a positive impact on intention to buy for design-based products only (b=.47, p<.001), whereas it has no significant effect in the case of tech-based products (b=.11, p>.05). The difference is significant (critical ratio for difference= -3.802).

Consistent with Hyp.4a, appropriateness has a significantly more positive effect on reaction in the case of tech-based products (b=40, p<.000) than in the case of design-based (b=14, p<.000) (critical ratio for difference=2.5). Similarly, the positive effect of appropriateness on intention to buy is significantly bigger for tech-based (b=43, p<.000) than for design-based (b=17, p<.000) (critical ratio for difference=2.334), thus supporting Hyp.4b.

The two different structural models are depicted in Figure 2, to offer a graphical visualization f the significant differences in the structural paths linking novelty/appropriateness to the two dependent variables. We note here that the impact of product evaluation on intention to buy does not significantly vary between design-and technology-based products (critical ratio for difference =.006). This further supports the idea that it is just creativity that has a varying effect on the two groups. In the case of design-based products, our theoretical model explains 20% of the variance in product evaluation and 41% of the variance in intention to buy. In the case of technology-based products, we explain, respectively, 19% and 38% of product evaluation and intention to buy.

FIGURE 2 HERE

DISCUSSION

This paper advances our knowledge of the mechanisms through which creativity influences product sales. To do this we adopted a component-wise approach that allows close scrutiny of the effect of the two main constituents of creativity: novelty and appropriateness. We found that the two components have the same effect on how a consumer evaluates a new product, in the sense that both novelty and appropriateness lead to a more favorable evaluation. In the same vein, the two components have a similar effect on the intention to buy: consumers are more likely to buy products when they are highly appropriate and when they are really novel. Hence, we could conclude that creativity positively influences product sales by making consumer opinion more favorable toward the product and consumers more prone to buy.

However, we find that the effect of the two components varies according to the type of innovation embodied in the product. Appropriateness is much more relevant in affecting product evaluations and intention to buy when the product is technology-based. In this case, consumers are dealing with a product that offers new functionalities, and that in same cases

also requires new behaviors and habits. Consumers are willing to bear the risk and costs associated to the change only when they perceive an adequate payoff for that, namely when the product is really able to better solve some of their critical needs (i.e., it is appropriate). Novelty, on the contrary, has a higher influence on product evaluations and intention to buy when products are design-based. Since innovation in design-based products is not related to the way a product performs a certain function, consumers do not have to change habits (the main function is always the same) and do not pay a lot of attention to product benefits (Chitturi et al., 2007). Hence, the risk associated with novelty that consumers perceive is much lower. Further, when appearance prevails over functions, as for design-based products, consumers positively evaluate novelty because they use products as a sign of their uniqueness (Berger and Heath, 2007). All these reasons explain why novelty has a much more positive effect on sales for design-based products.

Theoretical implications

Our paper clarifies the way in which creativity generates higher sales in the market. So far, the positive effect of creativity has been taken for granted, so that countless articles and books suggest that managers increase the creativity of their products through different techniques (e.g., lateral thinking, use of templates, brainstorming). We detangle the positive effect of creativity, by separating between novelty and appropriateness. In this way, we can provide more precise implications on the effect of these two components, rather than talking of a generic effect of creativity. Our analysis has three main implications for current literature.

First, we shed light on a somewhat neglected construct in the new product development literature. A large part of this literature has analyzed the impact of innovativeness, with specific references to novelty. A limited percentage of previous studies have included a

dimension of appropriateness in their definition of innovativeness. In a meta-analysis, Syzmansky et al. (2007) found that these measures of innovativeness have a higher predictive power in explaining new product performance. However, more correctly, such measures should be considered operationalizations of the construct creativity. Our component-wise approach reveals that the superior performance of these measures is due to the fact that appropriateness has a positive impact on new product performance in any case (even though it is superior for technology-based products), whereas novelty only in some cases (i.e., design-based products). This seems to suggest that the construct "creativity", rather than "innovativeness", should be used to detect the effect of new product characteristics on their performance.

Second, we provide better understanding of the controversial role of novelty on new product performance. Our findings show that the effect of novelty on intention to buy does depend on the type of innovation. Our results do not confirm the negative effect of novelty on new product performance, reported in some studies. We contend that previous ambiguous results (e.g., positive, negative, null impact) may be partially due to the lack of a clear distinction between new products with different characteristics. In the case of design-based products, novelty has a double positive effect –direct and indirect, on intention to buy. Instead, when the innovation is technological in nature, the only effect of novelty on intention to buy is through product evaluation.

Finally, we introduce a distinction between design-based and technology-based products. Our analysis shows that the type of innovation embodied in a product determines which component of creativity is more important. Since firms are more and more frequently resorting to design for innovatation, rather than to technology, it is important for academics to know the way in which this new typology of innovation differs from traditional technological innovation. We contend that the main difference between the two categories of products

relies on the different reasons for purchase: design-based products mainly satisfy hedonic needs, technology-based products mainly satisfy functional needs. Product evaluations and purchase intentions are formed accordingly. In this way, we build upon the emergent stream of research on form vs. function (Batra and Ahtola, 1990; Voss et al., 2003; Chitturi et al., 2007). However, so far this theory has provided as examples of products in which form prevail over function either fashion goods (e.g., T- shirts) or hedonic goods (e.g., music). We showed that the prevalence of form or of function is a matter of the type of innovation embodied in the product, not of the product itself. So, for instance, a mobile can be bought either to perform a specific function (e.g., talking with friends) or to satisfy hedonic needs (e.g., appearing cool to friends).

Managerial implications

In the last decade, a lot of attention has been given to creativity in the managerial world. MBAs started to include creativity among the courses offered and many books suggested different ways for mangers to increase the creativity of their firm (e.g., Goldenberg and Mazursky, 2002). Paradoxically, we leave managers alone when they have to decide which component of creativity should be emphasized. Since we know that creativity has two faces – novelty and appropriateness – we should also guide managers in deciding which attribute to favor. Indeed, developing creativity within an organization is a long and costly process. For instance, Whirlpool came out with a product that was both novel and appropriate only after 3 years of work. Hence, before putting their firm in a long and expensive race, it is helpful for managers to know whether both novelty and appropriateness are equally necessary or whether (and when) only one of the two will have a bigger impact on product sales. We identify in the nature of the innovation embodied in the new product the variable according to which to select the component that should be emphasized during the development process.

Novelty has always been a question mark for firms. For each success story showing that only radical innovators survive in the long-run, there is at least the same number of products (or companies) that failed because of an excess of innovation. Goldenberg, Lehmann, and Mazursky (2001) report that radically new products have a higher failure rate than moderately new; making out that novelty is something that managers must handle with care. Even though firms develop brand new products, during the launch phases it is critical to understand when it is better to emphasize novelty and when it is better to downplay it. We suggest that managers heavily invest in novelty when they want to come out with a design-based product. These products are made to attract consumers' attention and hence need to be radically different from other alternatives. On the other hand, many technology-based products failed or had a hard time being accepted because managers emphasized their novelty too much without adequately emphasizing their appropriateness. For instance, Clorox developed a very powerful, new disinfectant "Clorox Anywhere" that was so gentle it could used around kids and food. This property of the product was absolutely new compared to other household cleaners on the market. At the same time it was very appropriate for the target market (usually mothers). Excited for the dramatic difference between its product and competitor's alternatives, during the launch campaign Clorox emphasized the novelty. However, consumers were scared by the excess of novelty and did not buy the product. In a subsequent advertising campaign, Clorox put emphasis on the capability of the product to solve some critical problems, such as using the product anytime without being worried about kids being around, and sales boomed +200% (Rubera and Tirunillai, 2007).

We point out to managers that a good design is not only helpful to differentiate, but it might also be a good strategy for convincing consumers to buy new products. A unique design contributes to the creation of a precise identity and makes consumers more comfortable taking the risk of buying a new product. The new segment of hybrid cars well exemplifies our

point. Hybrid cars were first introduced by Toyota in Japan in 1997 and in 2000 in the U.S. According to some analysts, the success of Toyota Prius over all the other hybrid cars is also due to its unique design. For instance, the Ford Escape hybrid is barely distinguishable from the gas version; Saturn has the Vue Green Line hybrid, but the GM division didn't go far enough to set it apart from the standard Vue. On the other hand, Toyota gave a specific identity to its hybrid car by creating a brand new design. Superior design may be one of the main reasons behind delivery waiting lists for Toyota Prius as long as one year in 2002, 2003, and 2004. The Japanese producer learned this lesson so well that in the beginning of 2007 it developed a concept car that proposes a specific design language for hybrid models (Business Week Online, 2007c).

Limitations and future research directions

This study presents some limitations that suggest several avenues of research. First, we limited our depedent variables to product evaluations and intention to buy. Another relevant effect of creativity should be consumer's willingness to pay a premium price. We found that creativity helps firms gain more favorable evaluations and, hence, to sell more products. Previous research has shown that sometimes consumers are willing to buy products that differ from others, but not to pay a higher price for them. This is the case for green products. Consumers are willing to buy products that are environmentally friendly, but when the price is higher they prefer traditional products. It may be interesting to know if this is also the case of creativity: are consumers willing to pay a higher price to have a product that is creative or, as for green products, are they willing to buy but just at the same price as other alternatives in the market?

Second, we drew a clear distinction between technology and design innovation. We acknowledge that some products contain both types of innovations; however two reasons led us to set a clear separation. First, for some products there is a specific emphasis on design

only, such as for "Black Label" products for LG. Second, this is the first study that explicitily analyzes the difference between the two types of innovations. Because of this, we preferred to keep the effects separate in order to have a clearer understanding of how technology and design innovations differently influence consumers' behaviors. We leave to future research the task of analyzing the combined effect of technology and design innovations when they are both present at the same time.

Third, we analyze just the effect of product characteristics, omitting the effect of individual variables. For instance, Chitturi et al. (2007) showed that some individuals are more prone to prefer form over function. Personal variables may act as a further moderator in the impact of creativity components on product evaluations and intention to buy. Our results suggest that the effect of appropriateness (novelty) should be higher for consumers more prone to function (form), but future research is needed to clarify this issue. Further, it may be interesting to test the existence of a three-way interaction involving product and individual characteristics.

REFERENCES

Amabile, T. M. (1983). *The social psychology of creativity.* New York: Springer-Verlag.

Amabile, T. M. (1996). *Creativity in context.* Boulder, CO: Westview Press.

Atuahene-Gima, K. (1996).Differential potency of factors affecting innovation performance in manufacturing and services firms in Australia. *Journal of Product Innovation Management,*13, 35-52.

Batra, Rajeev and Ahtola, Olli T. (1990). Measuring the hedonic and utilitarian sources of consumer attitudes. *Marketing Letters*, 292), 159-170.

Berger, Jonan, and Heath, Chip (2007). Where Consumers Diverge from Others: Identity Signaling and Product Domains. *Journal of Consumer Research*, 34 (2), 121-134

Bloch, P.H., Sherrel, D.L. & Ridgway, N.M. (1986). Consumer search: An extended framework. *Journal of Consumer Research*, 13(1), 119-126.

Business Week Online (2007). Toyota Goes Beyond the Prius. Accesible at: http://www.businessweek.com/autos/content/mar2007/bw20070308_248381.htm?chan=search

Calantone, Roger J., Chan, Kwong, and Cui Anna S. (2007) Decomposing Product Innovativeness and Its Effects on New Product Succes. *Journal of Product Innovation Management*, 23(5), 408-421

Campbell, Margaret C., and Goodstein Ronald C. (2001) The moderating effect of perceived risk on consumers' evaluations of product incongruity: Preference for the norm. *Journal of Consumer Research*, 28, 439-449

Carpenter, G.S. Glazer, R. and Nakamoto, K. (1994). Meaningful brands from meaningless differentiation: the dependence on irrelevant attributes. *Journal of Marketing Research* 31 (August), 339-350.

Creusen, M. E. H., & Schoormans, J. P. L. (2005). The different role of product appearance in consumer choice. *Journal of Product Innovation Management*, 22(1), 63-81.

Chitturi, Ravindra, Raghunathan, Rajagopal, and Mahajan, Vijav (2007). Form versus function: How the intensities of specific emotions evoked in functional versus hedonic trade-offs mediate product preferences. *Journal of Marketing Research*, 44

Cooper, R. G. (1983) The impact of new product strategies. *Industrial Marketing Management*, 12(4), p243-25

Dahl, D. W., Chattopadhyay, A., & Gorn, G. J. (1999). The use of visual mental imagery in new product design. *Journal of Marketing Research,* 36(1), 18-28

El-Murad, Jaafar; West, Douglas C. (2004). The Definition and Measurement of Creativity: What Do We Know? *Journal of Advertising Research*, 44 (2), 188-201.

Friestad, Marian and Peter Wright (1994), "The Persuasion Knowledge Model: How People Cope with Persuasion Attempts," Journal of Consumer Research, 21 (June), 1-31

Fornell C., & Larker D.F. 1981. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.

Gatignon, H. and Robertson, T.S. (1985). A prepositional inventory for new diffusion research. *Journal of Consumer Research*, 11 (March): 849-867.

Goldenberg, J., Lehmann, D.R., and Mazursky, D. (2001). The idea itself and the circumstances of its emergence as predictors of new product success. *Management Science*, 47(1): 69-84.

Goldenberg, Jacob and Mazursky, David (2002), Creativity in Product Innovation. Cambridge University Press.

Holbrook, M. & Zirlin, R. (1985). Artistic creation, artworks, and esthetic appreciation: some philosophical contributions to nonprofit marketing. In *Advances in Nonprofit Marketing*, 1, Ed. R. Belk, 1–54.

Hultink, E.J., and Robben, H.S.J. (1995). Measuring new product success: The difference that time perspective makes. *Journal of Product Innovation Management*, 12, 392-405.

Ihlwan, Moon (2007). LG: New Camera Phone, New Hopes. *Business Week Online*, August 29

Im, S. and Workman, J.P. Jr. (2004). Market Orientation, Creativity, and New Product Performance in High-Technology Firms. Journal of Marketing, 68, 114-132

Jackson, P. W. & Messick, S. (1965). The person, the product, and the response: conceptual problems in the assessment of creativity. *Journal of Personality*, 33 (September), 309-329

Khatena, J. (1982). Educational psychology of the gifted. New York: Wiley & Sons.

Kratus, J. (1994). Relationships among children's music audiation and their compositional processes and products. *Journal of Research in Music Education*, *42*, 115-130

Lee, Louise (2007). Dell's In-Progress Recovery? *Business Week Online*, August 30 http://www.businessweek.com/technology/content/aug2007/tc20070830_532391.htm?chan=search

Lefkoff-Hagius, R. and Mason, C. (1993). Characteristics, beneficial, and image attributes in consumer judgment of similarity and preference. *Journal of Consumer Research*, 20(1): 100-110.

Levy, Sidney J. (1959). Symbols for sale. *Harvard Business Review*, 37(4), 117-124

Li, Tiger, and Calantone, Roger J. (1998). The Impact of Market Knowledge Competence on New Product Advantage: Conceptualization and Empirical Examination. *Journal of Marketing*, 62(4), 13-29

Mandler, George (1982), "The Structure of Value: Accounting for Taste," in Perception, Cognition and Development: Interactional Analysis, ed. Margaret S. Clarke and Susan T. Fiske, Hillsdale, NJ: Erlbaum, 3-36.

Meyers-Levy, Joan and Tybout Alice M. (1989) Schema congruity as a basis for product evaluation. *Journal of Consumer Research*, 16 (1), 39-54

Montgomery, Cynthia A. and Birger Wernerfelt (1992), "Risk Reduction and Umbrella Branding," *Journal of Business*, 65 (January), 31-50.

Moreau, P.C., Lehmann, D.R., and Markman, A.B. (2001). Entrenched knowledge structures and consumer response to new products. *Journal of Marketing Research*, 38(1), 14-30.

Mukherjee, Ashesh and Hoyer, Wayne D. (2001). The effect of novel attributes on product evaluation. *Journal of Consumer Research*, 28 (3), 462-472.

Oldham, Greg R., and Cummings, Anne (1996). Employee Creativity: Personal and Contextual Factors at Work. *Academy of Management Journal*, 39 (3), 607-634

Page, C., & Herry, P.M. (2002). An investigation of the process by which product design and brand strength interact to determine initial affect and quality judgment. *Journal of Consumer Psychology*, 12: 133-147.

Patrick, Vanessa M., Deborah J. Macinnis, and C. Whan Park (2007), "Not as Happy as I Thought I'd Be? Affective Misforecasting and Product Evaluations", *Journal of Consumer Research*, 33(4), 479-489

Peracchio, Laura A. and Alice M. Tybout (1996), "The Moderating Role of Prior Knowledge in Schema-Based Product Evaluation," Journal of Consumer Research, 23 (December), 177-192.

Porter, Michael E., "Competitive Advantage". 1985, The Free Press. New York.

Rock, D.A., Werts, C.E., and Flaugher, R.L. (1978) The use of analysis of covariance structures for comparing the psychometric properties of multiple variables across populations. *Multivariate Behavioral Research*, 13: 403-418.

Rubera, Gaia and Tirunillai, Seshadri (2007), Accelerating Market Acceptance in a Networked World, MSI Conference Summary, 07-301

Scanlon, Jessie (2007). Wanted: VPs of Design. Business Week Online, August 29.

Sethi, R., Smith, D. C. and Park, W. (2001). Cross-Functional Product Development Teams, Creativity, and the Innovativeness of New Consumer Products. *Journal of Marketing Research*, 37, 73-85.

Sirgy, M (1982). Self-Concept in Consumer Behavior: A Critical Review. *Journal of Consumer Research*, 9(3), 287-300

Szymansky, David M., Kroff, Michael W. and Troy, Lisa C. (2007) Innovativeness and new product success: insights from the cumulative evidence. *Journal of the Academy of Marketing Science*, 35:35-52

Verganti, R. (2006). Innovating through design. *Harvard Business Review,* 84(12), 114-122.

Veryzer, R. W. (1999). A nonconscious processing explanation of consumer response to product design. *Psychology and Marketing*, 16(6), 497-522.

Voss, Kevin E., Spangenberg, Eric R., and Grohmann, Bianca (2003). Measuring the hedonic and utilitarian dimensions of consumer attitude. *Journal of Marketing Research,* 15, 310-320.

Walker, S. (1995). The environment, product aesthetics and surface. *Design Issues,* 11(3), 15–27.

Zhou Zheng, Kevin; Yim, Chi Kin (Bennett); Tse, David K. (2005) The Effects of Strategic Orientations on Technology- and Market-Based Breakthrough Innovations. *Journal of Marketing*, 69(2),42-60

Figure 1: Proposed model

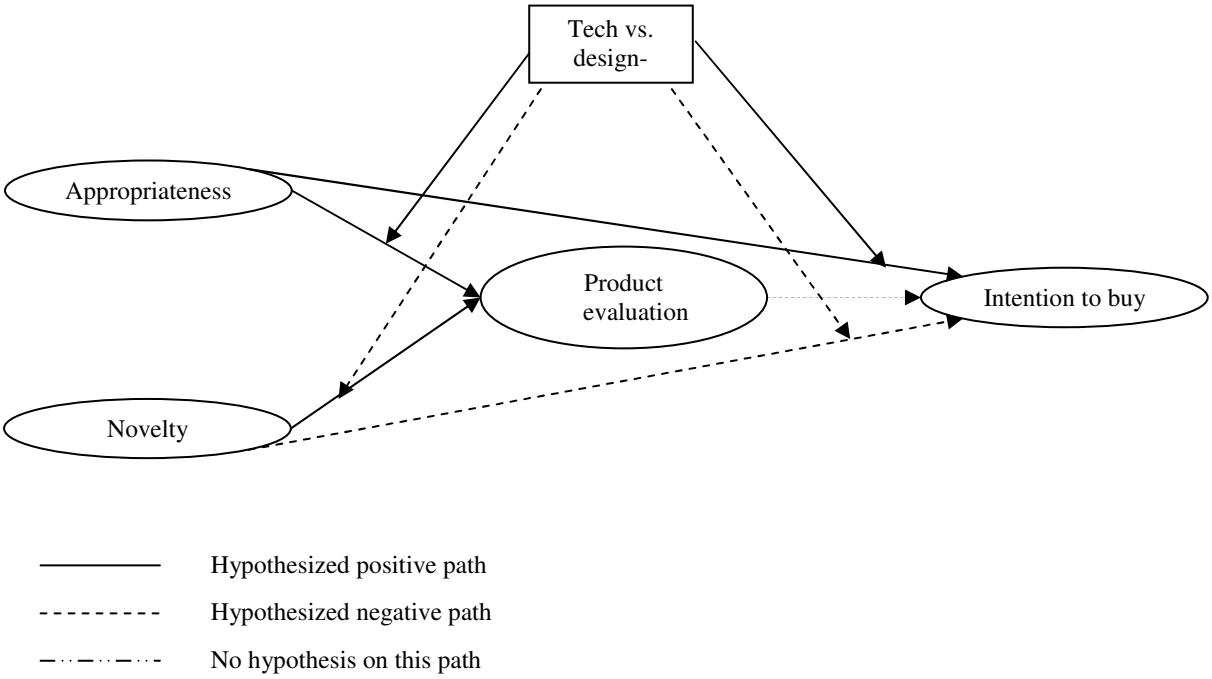
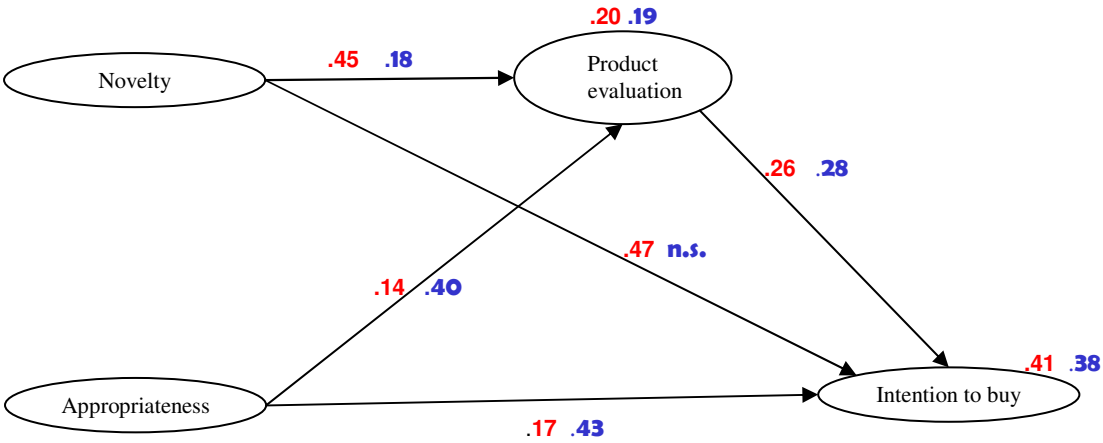


Table 1: Discriminant validity: squared correlation between latent variables (off-diagonal) and AVE (diagonal)

	Novelty	*Appropriateness*	*Evaluation*	*Intention to buy*
Novelty	.529			
Appropriateness	.02	.507		
Evaluation	.11	.012	.533	
Intention	.04	.09	.22	.616

Figure 2: Design vs. technology-based products



Design-based
Tech-based

APPENDIX 1: SCALE ITEMS

Except when differently indicated, all Likert-type items use seven point scales "Strongly disagree – strongly agree".

A. NOVELTY (adapted from Im and Workman, 2004)
(Mean= 16.13; S.D.=6.03; AVE=.53; CR=.82; α= .91)

This car (camera):	Standardized factor loadings
7. is really "out of ordinary"	.875*
8. can be considered as revolutionary	.865*
9. is stimulating^^	
10. is in line with the other cars in the market^^ [a]	
11. provides radical differences from other cars	.877*
12. shows an unconventional way of solving problems	.863*

B. APPROPRIATENESS (adapted from Im and Workman, 2004)
(Mean= 16.6; S.D.=5.82; AVE=.51; CR=.80; α= .92)

This car (camera):	Standardized factor loadings
5. is relevant to my needs and expectations	.866*
6. is considered unsuitable for my desires [a]	.842*
7. is appropriate for my needs and expectations	.864*
4. is useful for me	.848*

C. PRODUCT EVALUATION (adapted from Patrick et al., 2007)
(Mean= 12.2; S.D.=4.09; AVE=.61; CR=.75; α= .91)

1. this car is beautiful	.853*
2. I had a negative feeling toward this car [a]	.895*
3. I like this car	.896*

D. INTENTION TO BUY
(Mean= 6.55; S.D.=3.17; AVE=.53; CR=.77; α= .89)

1. If I were buying a car, I would include this one among my options	.931*
2. If I were buying a car I would buy this car	.873*

* Factor loading significant at the .000 level
[a] Reverse coded
^^ Item deleted because of low factor loading