

“Patent marking” as a signaling strategy: Impacts on perceived product innovativeness and innovation adoption

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Abstract

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• *Research purposes*

Patent marking allows companies to communicate information to consumers about inventions implemented in their products. However, no research explored how customers react to such signalling strategy. This article explores under which conditions the patent marking acts as a signalling or communication strategy to promote the adoption of innovative products.

• *Method*

An experimental study, based on products of different categories, was conducted with a representative sample of the French population (N=547).

• *Results*

We show that patent marking enhances the perception of the constitutive dimensions of perceived product innovation (i.e., novelty and utility) by activating an inference in consumers’ minds about the firm’s ability to develop inventive, non-imitative, and technically superior products. As a result, consumers respond favourably, in terms of purchase intentions and propensity to pay a premium price, to products subject to patent marking. Our results also show that these effects vary according to consumer profile.

• *Managerial implications*

Our results suggest that managers and entrepreneurs can use the patents protecting inventions embedded in their innovative products to make observable the technological benefits and attributes of the latter and thus facilitate their adoption by consumers.

• *Originality*

The originality of this article is twofold. On the one hand, it suggests patent marking as a novel strategy for signalling innovative products and explains to what extent it contributes to the construction of their innovativeness as perceived by consumers. On the other hand, it shows that patent marking allows crossing the chasm separating the niche market from the mass market by promoting the adoption of innovation by pragmatic consumers.

• **Keywords:** innovative products adoption, patent marking, signalling theory, patents, marketing strategy.

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This research focuses on the influence of patent marking on consumer adoption of innovative products. Patent marking consists of communicating to consumers information about the patents associated with a product through different means (engraving of a “patented” mention, advertising indications, etc.). Understanding the influence of patent marking on the adoption of innovative products is important because the competitiveness of companies depends on their ability to develop innovative products using one or more patented technologies and to promote the adoption of these products by consumers. Several studies show that a considerable number of innovative products are withdrawn from the market because of their non adoption. A study of 9,000 consumer products (edible, beauty, health, etc.) showed that only 40% survive beyond three years after launch (Anderson *et al.*, 2015). Another study of more than 80,000 diverse products (beverages, frozen foods, sauce, hygiene, home care, etc.) points to a failure rate of 25% in the first year and 40% in the second (Victory *et al.*, 2021).

One explanation for these high levels of failure lies in the difference between managers’ and consumers’ perceptions of innovation (Szymanski *et al.*, 2007). Indeed, managers perceive innovation in terms of newness compared to what their company offers (incremental innovation) or compared to their market (radical innovation). For its part, the marketing literature defines innovation perceived by consumers (perceived product innovativeness) as their evaluation of the degree of newness and meaningfulness of an offer (Henard and Szymanski, 2001; Lowe and Alpert, 2015). On the one hand, the newness of a product refers to its originality, its singularity and its relative difference from existing products in various aspects (product concept, technology used or design). On the other hand, meaningfulness describes the relevance (appropriateness), superiority or functional performance of the

new product compared to competing offers. This two-dimensional conceptualization of perceived product innovation allows us to better understand the reasons for the failure of innovative products. Indeed, these two dimensions (newness and meaningfulness) may exert opposing effects on the adoption of innovative products (Cantalone *et al.*, 2006; Stock and Zacharias, 2013). The perceived meaningfulness of innovative products positively influences adoption, as consumers expect benefits in terms of quality, performance, or price. Conversely, newness may exert a negative effect on adoption, as it is synonymous with risk and a break with what already exists and may require consumer effort to learn new habits. However, the effect of newness on the adoption of innovative products is complex, and existing research has not reached a consensus. Indeed, work has shown that consumers may in some cases respond favorably to newness and adopt innovative products (Fu and Allot, 2013; Lowe and Alpert, 2015; Rubera *et al.*, 2011). One interpretation of these contrasting results proposed by the literature is that it is not the newness itself that influences the adoption of innovative products but how it is communicated or signaled to consumers. Lowe and Alpert (2015) explain that the challenge for companies is to communicate the newness of innovative products without confusing consumers with too much complexity. In this sense, works have shown that communication strategies, mobilizing opinion leaders or highlighting the functional attributes and the benefits of innovations for different groups of consumers can improve the perceived value of new products and thus promote their adoption (Béji-bécheur and Gollety, 2007; Fautrero *et al.*, 2017; Sadik-Rozsnyai and Bertrandias, 2019).

Our research aims to enrich the understanding of the influence of communication or signaling strategies on consumers’ perception and adoption of innovative products and responds to some authors’ calls for research

to “*examine how different types of messages can affect consumers’ perception of innovation and lead to more favorable attitudes and higher purchase intention*” (Lowe and Alpert, 2015 p.12). To this end, our research explores an original signaling strategy, patent marking, and its influence on the perception and adoption of innovative products.

Patent marking consists of communicating information about patents protecting the technological inventions used in a product. It can be mobilized in material form (the word ‘Patent’ engraved on the product, on its packaging or on a label), in virtual form (a web page indicating the patents of the imple-

mented inventions used in a product) or in the context of advertising activities that explicitly refer to patents (drawings or technical terms extracted from the patent document). The case of GEOX (Box 1) illustrates patent marking (PM in the rest of the article). The practice of PM has been analyzed primarily by legal and economic researchers (de Rassenfosse, 2018; McCaffrey, 2011).

However, the effects of PM on consumer behavior have never been examined thus far. We propose to shed light on this gray area by exploring the effect of PM on the adoption of innovative products.

Box 1: Patent marking, the emblematic case of GEOX

GEOX is an Italian company specializing in shoes and ready-to-wear. Its sales reached 264 million euros in the first half of 2021. It was founded in 1995 by Mario Moretti Polegato following a business trip to Nevada in the USA. Taking advantage of his free time to go hiking, Mario found his feet burning and sweating because of his shoe. He decided to pierce the shoe with a pocketknife.

Upon his return to Italy, Mario looked for shoes that would allow his feet to breathe while being waterproof and found that no solution existed. He began experimenting and developing a membrane to be integrated into the sole of the shoe to allow the feet to breathe while blocking the entry of water drops. He decided to file a patent to protect the membrane in order to sell it to a shoe manufacturer (Adidas, Timberland, etc.). When these companies did not show interest, Mario decided to start his own company to produce and market shoes with his membrane.

In less than ten years, GEOX has become a major player in the footwear market thanks to patents, as its founder explains: “*Intellectual property has played a fundamental role in GEOX’s success, because our patents have allowed us to market a unique product that no one can copy. Today, we continue to patent our innovations to ensure that we remain unique in the marketplace*⁽¹⁾». Beyond their power to differentiate from the competition, patents are cited for their ability to provide a beneficial solution to consumer needs. “*95% of the people in the world still prefer to wear shoes with rubber soles due to the comfort, but it is difficult to eliminate the odor problem caused by sultry heat, and only GEOX can provide a patented solution*⁽²⁾». Indeed, the company uses patent marking in its advertising campaigns to communicate to consumers the innovative nature of its products using patent information. The images in Figure 1 (below) show advertising posters and an excerpt from a patent held by GEOX. A comparison of these images shows that the advertising posters explicitly refer to the patent (“Italian Patent”) and draw on information from the patent itself, including terms (“waterproof and breathable” in the posters, “waterproof and vapor-permeable” in the title of the patent) and drawings (air evacuated from the inside of the sole to the outside). In its annual report, the company states its commitment to deliberately communicating patent information to consumers in order to highlight the benefits of its products: “*Customers should always be aware of Geox’s unique patents. This reinforces their purchase decision and reassures them of the benefits and comfort they will receive from a pair of shoes Geox*⁽³⁾».

(1) Excerpt from the interview conducted by the site “Leaders League” with Mario Moretti Polegato (published on April 30, 2014).

(2) Extract from the interview conducted by the website “Luxe.CO” with Mario Moretti Polegato (published on March 17, 2020).

(3) Extract from GEOX’s 2021 annual report (p.154).

In this context, our research has a double objective: to improve the understanding of the phenomenon of innovative product adoption and to highlight the effects of PM on consumer behavior. To this end, we mobilize signal theory to conceptualize PM as a signal that promotes the adoption of innovative products by facilitating the understanding of their unobservable characteristics. Our predictions have been tested on different types of products with a sample of French consumers. The results confirm our predictions and show that PM positively influences the two dimensions of perceived product innovation and favors their adoption in terms of purchase intention and propensity to pay a premium. They also show the existence of variations according to consumer profiles. These results allow us to identify theoretical and practical implications concerning the phenomenon of innovative product adoption and PM practice.

The article is structured as follows. In the first part, we will discuss the practice of PM in light of signal theory and explain how it could influence the perception of the newness and the meaningfulness dimensions of innovative products and foster their adoption. The second part will outline the empirical study and its results. The last part will discuss the theoretical and practical implications of these results.

Patent marking through the lens of signaling theory

This section aims to present the foundations of signal theory to explain why PM represents an effective signal before showing how it influences the perception of the newness and meaningfulness dimensions of innovative products and promotes their adoption.

The PM as an effective signal

Signaling theory addresses the issue of informational asymmetry between economic agents (Spence, 1974). It postulates that

consumers have an information deficit about products (quality, performance, durability, etc.) and that firms are better informed about the unobservable attributes of these products (Boulding and Kirmani, 1993; Erdem and Swait, 1998). This asymmetry is stronger for innovative products that are by definition new and different from existing solutions on the market. Firms can then influence consumers' decisions by transmitting signals that make it possible to reduce the informational asymmetry and infer the perceived quality of products (guarantees, advertising campaigns, association with a known brand, etc.). Signals are defined as manipulable activities or attributes that communicate information about the characteristics of an economic agent and its supply (Spence, 1974). Effective signals allow consumers to distinguish between firms offering quality products and those selling poor quality products (Dean and Biswas, 2001). In this sense, the literature identifies two characteristics of signal efficiency: cost and certification.

First, an effective signal is an expensive signal for two reasons. First, the investments associated with a signal (e.g., spending and effort on an advertising campaign) differentiate between firms offering quality products and those offering poor quality products (Connelly *et al.*, 2011). Indeed, only firms offering quality products have an incentive to invest in signaling strategies, as only they can absorb the associated costs. On the other hand, signaling theory posits that efficient signals are costly because transmitting “false signals” puts the firm at risk of incurring significant monetary (refunds in the case of warranties, etc.) and nonmonetary (loss of customer trust, boycotts, etc.) losses (Rao *et al.*, 1999).

A signal is otherwise effective when it is certified (Connelly *et al.*, 2011; Deb, 2013). Certification can be defined as a process by which the observable quality of an artifact (financial security, product, management

system, etc.) is made known to the consumer through a label or certificate issued by an independent third party (credit rating agency, standards committee, etc.). A certified signal is therefore credible and effective information in the eyes of consumers, as it is not controlled by the company but is provided by a trusted independent third party after a long and costly review process (Dean and Biswas, 2001; Lansing *et al.*, 2019).

PM can be considered an effective signal because it has both of these characteristics. First, the PM generates various costs¹. Its use implies logistical expenses (investments for the adaptation of machines to engrave the product with the patent mentioned in one or more languages, etc.) and additional advertising costs (adaptation of posters or packaging, etc.). In the same vein, PM can be a source of sanctions if the company reports false information (for example, communicating on a nonexistent patent or mentioning a patent belonging to another company). In many countries, “false” PM is considered to be a crime and a form of unfair competition that can be subject to legal proceedings and significant financial penalties. Second, PM is an effective signal because it provides certified information. It communicates the existence of at least one patent issued to the company on a technology incorporated in the product. A patent is granted by a third party (the patent office) after a long (24 to 36 months from the filing of the application) and costly examination process (drafting, filing and examination fees, annual fee for maintaining the patent in force, etc.)². PM is the-

1/ These costs are specific to PM and are different from the expenses related to obtaining and maintaining the patent being marked (fees for drafting, filing, and examining the application, annuities for maintaining the patent, etc.).

2/ This process essentially aims to ensure that the patent application meets the three criteria of patentability, namely: novelty (involving a new feature that is not part of existing knowledge), inventiveness (involving an inventive step that is not obvious to a person skilled in the art) and usefulness of a technical invention (having a commercial or industrial application).

refore a certified signal because the information communicated (patent) is “delivered” by a trusted independent third party (the patent office).

These arguments show that PM is an effective signal according to signal theory. In the specific case of innovative products, it reinforces the perception of their innovative character by communicating unobservable properties to consumers and ultimately promotes their adoption.

The influence of PM on the perception and adoption of innovative products

Innovative products are sources of important informational asymmetries, as they are by definition new and different from existing solutions on the market. We hypothesize that PM facilitates their adoption by signaling their unobservable properties to consumers. More precisely, we suggest that PM reinforces perceived product innovation (PPI in the rest of the paper) by signaling the newness and inventiveness of the product as well as its usefulness in terms of functional benefits and technical superiority over existing solutions. Indeed, PM allows for the signaling of how an innovative product implements a new technology (different from those existing on the market), inventive (not obvious for an expert in the field) and useful (offers better yields or superior quality). As a result, PM can influence consumers, as it signals the uniqueness and technical performance of a product. In this respect, the case of the GEOX company is emblematic. As the images in Figure 1 show, the advertising campaigns systematically refer to patents (patent on an innovative membrane) to signal the uniqueness or newness of the products as well as their technical advantages and attributes (shoes that allow feet to breathe while being waterproof).

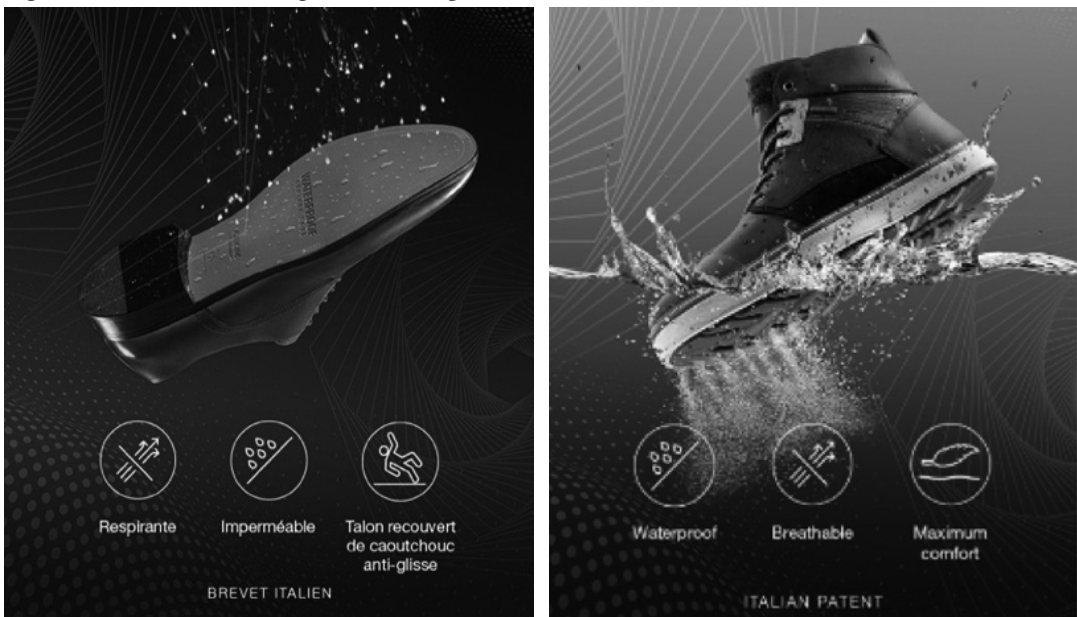
More precisely, and as shown in Figure 2, we postulate that PM signals both dimensions of PPI: it accentuates the perception of newness,

thus promoting the adoption of innovative products, and reinforces the perception of their usefulness, which can then positively influence their adoption. Our conceptualization of the influence of PM on the adoption of innovative products builds on existing work showing that the integration and communication of new and useful technological attributes positively influences PPI and increases purchase intention and the propensity to pay a premium (Fu and Allot, 2013; Lowe and Alpert, 2015; Rubera *et al.*, 2011; Sadik-Rozsnyai and Bertrandias, 2019). This work highlights three mechanisms to explain this influence: rewarding technological merit, satisfying the need for uniqueness, and presenting expected benefits.

The first mechanism emphasizes that technological newness positively influences PPI and purchase intention because it reflects technological merit of the product (i.e., a complex problem-solving ability) that consumers are willing to reward. As Lowe and Alpert (2015 p.4) suggest, “*easy achievements, such as adding the promise of carbon reduction to*

a candy bar, do not elicit as much admiration as a difficult technological advance. The greater the intellectual achievement of the innovation, the more credit and recognition consumers give it...they have less respect for seemingly simple twists that are presented as novel”. The second mechanism, technological newness, describes the positive influence that newness has on the propensity to pay a premium price for an innovative product because the product offers consumers a way to express their uniqueness. Indeed, Sadik-Rozsnyai and Bertrandias (2019) have shown that the technological newness of a product responds to social motivations related to consumers’ need to appear unique. This increases their propensity to pay a premium price. The third mechanism, that of expected benefits, focuses on the positive influence of the benefits offered by an innovative product on purchase intention and the propensity to pay a premium. Many authors have thus shown that consumers are more inclined to buy and pay a premium for an innovative product when it incorporates a new technology offering more perceived benefits (better qua-

Figure 1: Illustration of the patent marking for GEOX



Source : <https://www.geox.com/fr-FR/technologiegeox>

Source : <https://patentimages.storage.googleapis.com/d6/49/17/f05445997bccd0/WO2016202658A1.pdf>

lity or performance) or saving time or effort (Fu and Allot, 2013; Lowe and Alpert, 2015; Rubera et al., 2011).

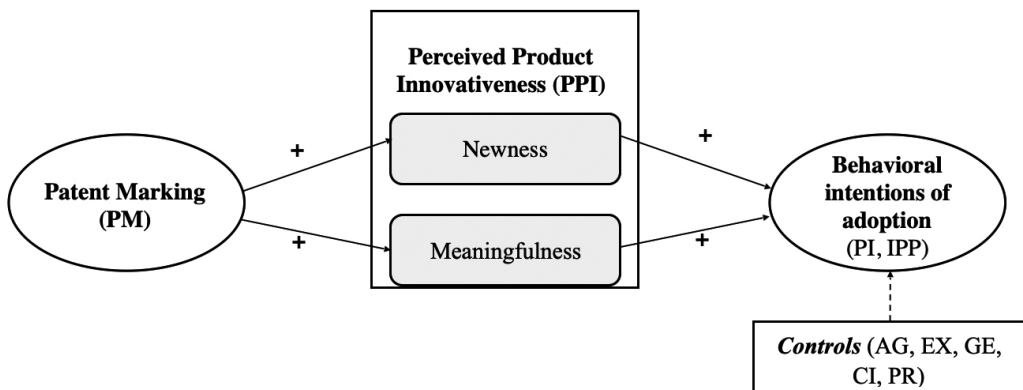
The three mechanisms put forward by these works underlie our conceptualization of the influence of PM on the dimensions of perceived product innovation (newness and meaningfulness) and consumer adoption (purchase intention and propensity to pay more) through the signaling of the existence of new, inventive, and useful technology within products. However, our research differs from this previous work by being the first to focus on PM as an effective strategy for signaling product innovativeness.

Furthermore, we suggest that the effect of PM varies according to consumer (adopter) profiles. According to the literature on the adoption of innovative products, the latter can be differentiated according to two criteria or personality traits: the innovativeness of consumers and their relationship to risk (Hirunyawipada and Paswan, 2006). On the one hand, consumer innovativeness refers to the propensity of some consumers to adopt innovative products and technologies more often and quickly than others (Arts *et al.*, 2011; Midgley and Dowling, 1978). Rapid adoption is explained by some consumers' attraction to newness and their competence in the product category (Arts *et al.*, 2011; Goldsmith and

Newell, 1997). On the other hand, risk appetite influences innovation adoption, as some consumers are more risk-taking than others. Indeed, those who adopt innovations more quickly have an informational advantage because they belong to social groups that allow them to be informed, as well as a favorable attitude toward risk (venturesome) (Gatignon and Robertson, 1985; Rogers, 2003). These two criteria (innovativeness of consumers and relationship to risk) make it possible to distinguish two adopter profiles: the visionaries (innovators and early adopters) who are characterized by high innovativeness and low-risk perception, on the one hand, and the pragmatists or general consumers (early majority, late majority, etc.) characterized by low innovativeness and higher risk perception, on the other hand (Moore, 1991; Muller and Yogev, 2006). The existence of these two distinct groups in terms of expectations and characteristics creates a chasm that slows or even interrupts the diffusion of innovation at the point of transition between the two groups (Moore, 1991).

We suggest that the positive effect of PM on PPI is stronger among pragmatists, as in the first majority than among visionaries (innovators and early adopters). Indeed, pragmatists perceiving higher risk would have a greater informational need and be more receptive to PM. By pointing out the unobser-

Figure 2: Conceptual Model



PI = purchase intention; IPP = intention to pay a price premium; AG = Age, EX = Expertise; GE = Gender; CI = consumer innovativeness; PR = perceived risk.

vable properties of innovative products (new and useful technologies), PM thus meets an information need and reduces the information-seeking effort required to evaluate them before adoption. Moreover, PM accentuates the perception of the usefulness of innovative products (performance and superiority of the technologies they incorporate), which represents the main criterion of adoption by pragmatists. As Muller and Yogev (2006) point out, ‘pragmatic’ consumers are looking for a reliable and effective functional solution and are not prepared to ‘gamble’ on innovation. On the other hand, PM may be of limited value to visionaries, as they can rely on their product category expertise as well as their social network embeddedness to gain information about, evaluate and adopt innovative products. As a result, we postulate that PM has a greater effect among ‘pragmatic’ consumers, as it addresses their need for information about the attributes of innovative products.

To summarize, we propose a positive influence of PM on the PPI dimensions (newness and meaningfulness) and on consumer adoption (purchase intention and propensity to pay a premium) (see Figure 2). We suggest that this influence is stronger among pragmatic consumers than among visionaries. This is methodologically reflected in the inclusion of two control variables, consumer innovativeness and perceived risk. In addition, we introduced other control variables: two demographic variables (age and gender) and another controlling for consumer expertise in the product category. Expertise refers to a consumer’s level of knowledge or familiarity with a product category. This variable is frequently mobilized for the study of innovative product adoption because of the influence of consumers’ level of knowledge on their decisions (Erdem and Swait, 2004; Fu and Alliot, 2013).

Empirical study and results

The objective of this section is twofold: to describe the methodology used in the empirical study and to present the results (experimentation and classification). To empirically validate our conceptual model, an experimental approach was adopted (Box 2). The objective was to manipulate PM (presence vs. absence) on three categories of products of different brands: cleansing gel (TriXera brand), toothpaste (Yotuel brand) and smartphones (Archos brand). After two preliminary studies, we validated the experimental manipulations presented in Appendix 1. To seek a better external validity of our study, a questionnaire was sent to a representative sample of the French population in terms of gender and age (from 21 to 74 years old) via the Qualtrics Research Services panel. After cleaning the database (incomplete answers, too fast or not passing the attention test), we obtained a usable database of 547 answers. All the scales selected were found in the literature and had good psychometric properties (Appendix 2 presents details of the statements and reliability scores). Indeed, the loadings and Cronbach’s alphas were higher than the thresholds commonly used in the literature (0.5 and 0.7, respectively).

Influence of patent marking on the dependent variables

Model 2 represents the relationship between PM and newness, ‘NO’. The effect is also positive between these two variables ($\beta=0.191$; $p<0.05$; see Appendix 3). Furthermore, both R^2 values are high ($R^2=0.63$ for UT, $R^2=0.51$ for NO), which shows that both models can explain more than half of the variance in perceived usefulness and newness. The robustness of our models is ensured by controlling for confounding effects: consumer innovativeness, expertise, perceived risk, age and gender. In other words, the mention of “patented product” on a product’s package activates an inference in the consumer’s mind that asso-

ciates the patent with the inventive activity of the firm allowing it to produce innovative products and providing more value or meaningfulness. This result is consistent with our initial hypothesis.

Since the main effect of PM on MN and NO is significant, we examine through Models 3 and 4 the mediation effects of these same variables on two dependent variables: PI and IPP. Model 3 shows that the main lever that triggers purchase is perceived usefulness, as its effect is significantly greater than that of novelty ($\beta=0.650$; $p<0.01$; $\beta=0.376$; $p<0.01$ see Appendix 3). Model 4 denotes an inverse relationship, as the main lever of intention to pay a premium is product novelty ($\beta=0.356$; $p<0.01$; $\beta=0.146$; $p<0.01$). This suggests that consumers are willing to pay for a product whose perceived innovation is promoted by PM. Models 3 and 4 explain a significant portion of the variance in PI and IPP, as they amount to 77.9% and 72.1%, respectively. It is important to note that all our results are estimated by considering the control variables, and in particular the innovativeness of the consumer, which is significant in all four models. These results are confirmed by the mediation analyses presented in Appendix 4. The effects are well significant (the 95% bootstrapped confidence intervals do not contain the value zero), and the MN and NO variables mediate the relationship between PM and the two dependent variables PI and IPP well.

Influence of PM according to the consumer profile

The literature shows that a substantial number of innovations fail because they only diffuse within a niche of visionaries, without spreading to the general population (i.e., pragmatists) (Andersson, et al., 2015; Moore, 1991; Muller and Yogevev, 2006). We postulate that a PM strategy could facilitate crossing the chasm between the two categories of consumers (visionaries and pragmatists). To

test this, we performed a classification (Box 3). We applied our theoretical model to the two subgroups identified: the visionaries and the pragmatists. These two categories are presented in Appendix 6.

The bootstrapped path coefficients analysis attests to a significant effect of PM on NO ($\beta=0.144$; $p<0.01$; see Appendix 7) and of PM on MN ($\beta=0.076$; $p<0.05$; see Appendix 7) for the pragmatic consumer category. This is not the case for the visionary category, as none of the structural relationships are significant ($\beta=0.033$; $p>0.05$ (PM \rightarrow NO); and $\beta=-0.010$; $p>0.05$ (PM \rightarrow MN); see Appendix 8). This result shows that mentioning the existence of a patent on the package of an innovative product reinforces the perception of its novelty and usefulness. The previous results support our theory that PM creates a positive indirect link to purchase intention. In particular, purchase intention is triggered when there is a PM and a perception of usefulness (see path analysis in Appendix 3 to 4 and Figure 2). To test this theory further, we performed additional analyses on the two identified classes. The PM \rightarrow MN \rightarrow PI path is validated for the pragmatic consumer class, while it is invalidated for the visionary consumer class. This shows that the PM strategy would pay off to accelerate the diffusion of an innovation to pragmatic consumers, such as the first majority, and thus cross the chasm that occurs between the niche market and the mass market.

Discussion of the results and contributions

The present research has attempted to understand the phenomenon of innovation adoption by the market by focusing on the practice of patent marking. The mobilization of the economic theory of signaling has allowed us to conceptualize this practice as a signaling strategy to influence perceived product innovation (PPI) and to promote the adoption of innovative products by consumers. The

Box 2: Methodology of the study

Pretesting to validate the stimuli

The objective of the two preliminary studies (N=105 and N=121) was to develop our stimuli and to validate the understanding of the product benefits in three different categories: shower gel, toothpaste, and smartphones. We selected three existing brands to expose consumers to quasi-realistic situations. The brands are of low notoriety (TriXera, Yotuel, Archos) to reduce the potential bias linked to a strong brand. After some adjustments (better clarity of the product benefits and addition of a link to the patent for the condition with patent marking), we retained the stimuli presented in Appendix 1.

Experimental design

Our design comprises the factor “patent marking” with 2 modalities within subject design and product categories in repeated measures (2 products per participant) between design. The stimulus shows a product from the brand’s website (to provide more credibility) and product characteristics. The TriXera brand is a thermal water-based cleansing gel for dry skin. In the experimental condition ‘patent marking’, the same product description is proposed with an increased number of mentions specific to patents, such as “new patented formula”, “the new formula (...) is protected by patents registered in numerous countries”. In addition, the following statement is included: “this web page is intended to provide more information about our patented formula”. The link leads to a real patent registered by Pierre Fabre (the company that owns the TriXera brand), which attests to the veracity of the mentioned “patented formula” that was added to the product. The same procedure is used for the other two product categories (see Appendix 1). For the selected brands, we integrated real existing patents to expose consumers to quasi-realistic situations.

An online study by the Qualtrics panel randomly exposed 300 individuals to the stimulus with PM (50% men, 50% women, average age 44) and 300 individuals to the stimulus without PM (50% men, 50% women, average age 46). In these two experimental cells, 100 individuals were randomly assigned to one of the three product categories. In other words, each individual was subjected to two out of three product categories in a randomized fashion and in such a way as to have an equal number of respondents per experimental cell. After being exposed to the different stimuli, the individuals answered a questionnaire.

Manipulation check

To verify that the manipulation worked, we asked the following question at the end of the questionnaire based on the random assignment of the respondent (e.g., in the case of the cleansing gel): Which of the following statements best describes the body cleansing product? TriXera Body Cleanser/TriXera Body Cleanser New patented formula. A χ^2 test shows that the manipulation is effective, as those assigned to the patent marking condition for the TriXera brand correctly answered the verification question $\chi^2(1, N=183) = 183; p = 0.000$. This test was also significant for the other two brands. In addition, attention questions are introduced into the questionnaire to eliminate individuals who do not take the time to read the questions. Fifty-three responses that did not pass this test were removed.

Finally, a test on the main dependent variable, purchase intention, shows that the product category has no significant effect on our results: $F(2,543)=0.465, p>0.05$). On the other hand, we did not observe common method variance bias.

Method of analysis

Appendix 3 presents the results of our multiple linear regressions that include the mediator variables (Model 1: UT, Model 2: NO) and the dependent variables (Model 3: IA and Model 4 IPP). All these regressions are computed with the control variables that we find most appropriate. They allow us to incorporate demographic (age and gender) and psychological (consumer innovativeness, expertise and perceived risk) confounding effects.

SPSS 27 and the PROCESS v3.5 macro are used to test the relationships between all the variables in our theoretical model. These path analysis tools rely on linear regressions (OLS) that can estimate the effects of mediations (direct and indirect). This automatic procedure tests the importance of mediation based on nonparametric bootstrapping (Hayes, 2017). It generates multiple “boosted” samples by calculating mediation effects axb for each sample (the product of the effect of the independent variable on the mediating variable (a) and the effect of the mediating variable on the independent variable (b)).

Confidence intervals are thus obtained to validate the mediation effect (absence of null value in the confidence interval) thanks to 5000 “bootstrapped” samples. The result of the mediation effect analysis of the MN and NO variables is reported in Appendix 4. The mediation model analysis is based on linear regressions (OLS) and uses the same dependent (PI and IPP) and independent (PM experimental conditions) variables and varies the mediating variables (MN and NO). Because of a strong correlation between the mediator variables (see Appendix 5, $r=0.804^{***}$), the variables were introduced in Model 4 of the PROCESS macro separately. The discriminant validity is, however, verified for these two variables.

results of our research offer both theoretical and practical implications.

From a theoretical point of view, our research makes a major contribution to the innovation marketing literature. The latter shows that the adoption of innovative products is influenced by the extent to which a product is perceived as innovative (what?) and by the profile of potential adopters (who?) (Arts *et al.*, 2011; Lowe and Alpert, 2015; Moore, 1991; Rogers, 2003). Our research contributes to the understanding of both facets of adoption, the “what” and the “who.”

Regarding the “what?”, our research shows the novel influence of patent marking on PPI as well as the effects of this influence on consumer response. On the one hand, patent marking accentuates the perception of the novelty of innovative products and generates a positive reaction (purchase intention). On the other hand, it makes it possible to signal the usefulness of innovative products by highlighting their technical superiority, benefits and inventiveness, which triggers a positive reaction from consumers. However, the effect of patent marking on the perception of the usefulness of innovative products is more important than its effect on the perception of their novelty (and the risk-taking that this induces). This translates into an intention to buy and to adopt. In other words, the bene-

fit/risk ratio associated with the adoption of innovative products seems to be more advantageous in the eyes of consumers if a patent marking is present. Furthermore, our results show that the perception of the novelty and usefulness of innovative products, enabled by patent marking, is associated with a significant propensity to pay a premium price. These results make four contributions to the subject of PPI. First, they confirm research findings that link PPI and purchase intention (Fu and Elliott, 2013; Lowe and Alpert, 2015; Rubera *et al.*, 2011). Second, our results complement the limited work that explores the conditions under which consumers would be willing to pay a premium price for innovative products. Sadik-Rozsnyai and Bertrandias (2019) showed that the integration of technological attributes increases the benefits perceived (superior performance or/and better functionality) by consumers and decreases their price sensitivity, which translates into a higher intention to pay a premium. Our research confirms and completes this result. It confirms this by showing that the perception of the meaningfulness (advantage and technological superiority) of innovative products, indicated by the patent mark, triggers a propensity to pay a premium price. It enriches the result of Sadik-Rozsnyai and Bertrandias (2019) by suggesting the role of patent marking in signaling and making observable the unobservable technological features of inno-

Box 3: Cluster analysis methodology

To assess whether patent marking allows for a better diffusion of new products, a hierarchical cluster analysis is performed. This method is widely used in marketing, as it allows the identification of homogeneous groups (Franke *et al.*, 2009). In our research, the classification allowed us to rigorously identify two important groups in the diffusion of innovations: visionaries and pragmatists. The two segmentation variables used (perceived risk and consumer innovativeness) were selected based on the literature. Indeed, research on the diffusion of innovations shows that visionaries are more inclined to try new products and take risks than pragmatists (Rogers, 2003). To determine the number of classes to be retained for our typology, hierarchical ascending clustering based on Ward's criterion was first performed. Following the analysis of the dendrogram and the evolution of the intraclass distance, a two-class solution was retained. A nodal typology (k-means) was then used by setting the number of classes to two. The typology was carried out based on averages of the variables. Appendix 6 shows that the “visionaries” profile has a significantly higher mean on the “consumer innovativeness” variable than the “pragmatists” profile. Similarly, the “visionaries” are less risk averse than the “pragmatists”.

vative products. Indeed, and even if the technologies behind innovative products are invisible to consumers, the latter can base their judgment of the innovative character of products on patent marking, which constitutes, as we have suggested, a costly and certified signal. This perception can then influence their intention to pay a premium price. Third, our results respond to researchers' calls to explore how firms can control the contrasting effects (positive and negative) of PPI by showing that the effect of patent marking on perceived meaningfulness is greater than the effect on novelty (Cantalone *et al.*, 2006; Rubera *et al.*, 2011; Stock and Zacharias, 2013; Szymanski *et al.*, 2007). Fourth, and more broadly, our results respond to the call by Lowe and Alpert (2015) to analyze the influence of communication strategies on consumers' perception and adoption of innovative products. Our research responds to this call by showing the benefits of mobilizing patent branding in advertising campaigns for innovative products.

Second, and concerning the “who?”, our results show that the effects of patent marking on the adoption of innovations vary according to the consumers' profile in terms of risk-taking and innovativeness. Indeed, patent marking has a more pronounced effect on the perception of the usefulness of innovative products among pragmatists, risk-averse and less innovative consumers, which translates into a higher purchase intention. This is an original contribution to the theory of innovation diffusion by showing the role of patent marking as a strategy to cross the chasm between the niche and mass markets (Moore, 1991; Muller and Yogev, 2006). This result adds to existing work that has focused on strategies for avoiding market chasms. To overcome the pitfall of not diffusing the innovation, the use of opinion leaders (Arts *et al.*, 2011; Béji-Bécheur and Gollety, 2007), interpersonal communication and “word of mouth” (Ram, 1989; Rogers, 2003) and finally the use of segmentation and com-

munication of specific benefits to each use/segment in the case of generic innovations with multiple uses (Fautrero *et al.*, 2017) are recommended. We enrich this work by showing how patent branding can win over pragmatic consumers by highlighting the utility and benefits of innovation and thus cross the chasm to raise the level of adoption.

Beyond these two contributions to the innovation marketing literature, our results improve the understanding of patent marking by highlighting its effects on consumer behavior. They thus enrich the work of legal scholars and economists who have focused on the treatment of this practice by national and international jurisdictions as well as the characteristics of firms that adopt it, but without analyzing its impact on consumer choices (de Rassenfosse, 2018; McCaffrey, 2011). Our research is the first to shed light on this gray area of patent marking.

From a practical point of view, our results propose levers for managers and entrepreneurs in charge of introducing innovative products on the market. They suggest that decision-makers can use their patents when launching new products to convince consumers of their functional benefits and technical superiority. Thus, these product benefits become more observable and attractive to pragmatic consumers. This suggests that patent marking is an appropriate strategy for accelerating adoption by the latter and can be used in a complementary way with other levers to foster adoption by visionary consumers, for whom patent marking has no effect. Furthermore, the effect of patent marking on a company's ability to capitalize on its innovations is twofold, as it not only promotes consumer adoption but also opens up new markets by differentiating the company from competitors and keeping them at bay. Indeed, patent marking signals the existence of solid legal barriers established by the company around its technologies and thus blocks competitors. If competitors want to enter this market with

identical offerings, they risk being in a situation of deliberate patent infringement. To be effective, we recommend that managers who wish to adopt this strategy emphasize the customer benefits of innovative functional attributes related to the patent. Patent marking has a positive effect on pragmatic consumers but not on visionary consumers.

This strategy is adapted to companies that base their commercial advantage on R&D activities in many sectors (cosmetics, automotive or even ready-to-wear such as GEOX). In addition, it is important to specify the legal differences of patent marking. This practice is not mandatory in France, but it is necessary in many countries (the United States of America, the United Kingdom, or Spain) where the ability of a patent holder to claim compensation in case of infringement requires the implementation of patent marking in physical or virtual form. Consequently, entrepreneurs and managers in charge of introducing innovative products to foreign markets must be aware of the advantages and requirements of patent marking according to the countries concerned. Furthermore, the benefits of patent marking, in terms of the adoption of innovative products and protection against imitation, depend not only on the company's patent endowments but also on the collaboration between new product launchers and IP managers. The latter have detailed knowledge of the strengths and weaknesses of the company's patent portfolio and its competitors, as well as the regulatory differences of the markets in which it operates. They are therefore a valuable source of information and can actively contribute to the success of innovative products. In this sense, our results invite better collaboration between marketing and intellectual property departments.

Our research naturally has limitations that provide opportunities for future research. First, the results apply only to firms with a patent portfolio and to technological inventions that can be protected by patents. Several studies show that firms do not systematically use patents to protect their inventions because of the limitations of patents (e.g., disclosure of information to competitors, costs of filing and maintaining the patent, etc.) and that not all inventions can be protected by patents. This is therefore an important boundary condition. In the same vein, our study is based on the hypothesis that firms use patent marking to signal central functionalities of innovative products that are directly relevant to consumers (cleaning formula, whitening formula, etc.). However, patent marking can be applied to an invention that is less central or indirectly creates value for the consumer (e.g., packaging). Future work can study the effects of patent marking according to the importance of functionalities for consumers³. Second, our conclusions were drawn from an experiment on three types of B2C products (cell phones, toothpaste and shower gel). These results should be replicated for other types of B2C products (e.g., electric bicycles, food supplements, etc.) as well as for B2B products (e.g., professional cameras). Third, our study focused on three products without considering the technological intensity level of the products. Future research can therefore analyze how the influence of patent marking varies with technological intensity by comparing low-tech products (e.g., a toothbrush) and high-tech products (e.g., a drone). Finally, the study of the influence of patent marking on consumers' perception of the brand is another promising avenue of research.

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3/ The authors would like to thank reviewer number 1 most warmly for this comment.

References

- Anderson E., Lin S. and Simester D. (2015), Harbingers of failure. *Journal of Marketing Research*, 52(5): 580-592.
- Arts J.W.C., Frambach R.T. and Bijmolt T.H.A. (2011), Generalizations on consumer innovation adoption: A meta-analysis on drivers of intention and behavior. *International Journal of Research in Marketing* 28(2): 134-144.
- Béji-bécheur A. and Gollety M. (2007), Lead user et leader d'opinion: deux cibles majeures au service de l'innovation. *Décisions Marketing*, 48: 21-35.
- Boulding W. and Kirmani A. (1993), A Consumer-Side Experimental Examination of Signaling Theory: Do Consumers Perceive Warranties as Signals of Quality?, *Journal of Consumer Research*, 20(1), 111-123.
- Calantone R.J., Chan K. and Cui A.S. (2006), Decomposing Product Innovativeness and Its Effects on New Product Success. *Journal of Product Innovation Management*, 23(5): 408-421.
- Connelly B.L., Certo S.T. and Ireland R.D., (2011), Signaling theory: A review and assessment. *Journal of Management*, 37(1): 39-67.
- de Rassenfosse G. (2018), Notice Failure Revisited: Evidence on the Use of Virtual Patent Marking. *National Bureau of Economic Research Working Paper*, No 24288.
- Dean D.H. and A. Biswas (2001), Third party organization endorsement of products: An advertising cue affecting consumer pre-purchase evaluation of goods and services. *Journal of Advertising*, 30(4): 41-57.
- Deb P. (2013), Signaling type and post-IPO performance. *European Management Review*, 10(2): 99-116.
- Erdem T. and Swait J. (1998), Brand Equity as a Signaling Phenomenon, *Journal of Consumer Psychology*, 7(2): 131-57.
- Erdem T. and Swait J. (2004), Brand credibility, brand consideration, and choice. *Journal of Consumer Research*, 31(1): 191-198.
- Fautrero V., Lejealle C. and Rayna T. (2017), Le rôle du positionnement et de la communication dans l'adoption d'une innovation technologique : le cas de la fibre optique en France. *Décisions Marketing*, 88: 51-70.
- Franke N., Reisinger H. and Hoppe D. (2009), Remaining within-cluster heterogeneity: A meta-analysis of the 'dark side' of clustering methods. *Journal of Marketing Management* 25(3-4): 273-293.
- Fu F. and Elliott M. (2013), The moderating effect of perceived product innovativeness and product knowledge on new product adoption: An integrated model. *Journal of Marketing Theory and Practice*, 21(3): 257-272.
- Gatignon H. and Robertson S. (1985), A propositional inventory for new diffusion research, *Journal of Consumer Research*, 11(4): 849-67.
- Goldsmith R.E., d'Hauteville F. and Flynn L.R. (1998), Theory and measurement of consumer innovativeness. *European Journal of Marketing*, 32(3/4): 340-353.
- Goldsmith R. E. and Newell S. J. (1997), Innovativeness and price sensitivity: Managerial, theoretical, and methodological issues, *Journal of Product and Brand Management*, 6(3): 163-174.
- Hayes A.F. (2017), Introduction to Mediation, Moderation, and Conditional Process Analysis Findings In addition *the Guilford Press* (March): 3-5. Available at: www.guilford.com/ebooks (accessed 11 June 2021).
- Hirunyawipada T. and Paswan A.K. (2006), Consumer innovativeness and perceived risk: implications for high technology product adoption, *Journal of Consumer Marketing*, 23(4): 182-198.
- Hurmelinna-Laukkanen P. and Yang J. (2022), Distinguishing between appropriability and appropriation: A systematic review and a renewed conceptual framing, *Research Policy*, 51(1).
- Lansing J., Siegfried N., Sunyaev A. and Benlian A. (2019), Strategic signaling through cloud service certifications: Comparing the relative importance of certifications' assurances to companies and consumers, *The Journal of Strategic Information Systems*, 28(4), 101579.
- Lowe B. and Alpert F. (2015), Forecasting consumer perception of innovativeness, *Technovation*, 45/46, 1-14.
- McCaffrey C. (2011), The Virtues of Virtual Marking in Patent Reform, *Northwestern University Law Review*, 105(1): 367-400.
- Moore G.A. (1991), *Crossing the Chasm*. Business H (ed.). New York.
- Midgley D.F. and Dowling G.R. (1978), Innovativeness: the concept and its measurement, *Journal of Consumer Research*, 4(4): 229-42.
- Miric M., Boudreau K. J. and Jeppesen L. B. (2019), Protecting their digital assets: The use of formal & informal appropriability strategies by App developers, *Research Policy*, 48(8), 10.1016/j.respol.2019.01.012
- Muller E. and Yogev G. (2006), When does the majority become majority? Empirical analysis of

the time at which main market adopters purchase the bulk of our sales, *Technological Forecasting and Social Change*, 73(9): 1107-1120.

Ram S. (1989), Successful Innovation Using Strategies to Reduce Consumer Resistance: An Empirical Test, *Journal of Product Innovation Management*, 6(1): 20-34.

Rao A.R., Qu L. and Ruekert R.W. (1999), Signaling unobservable product quality through a brand ally, *Journal of Marketing Research*, 36(2): 258-268.

Rogers E. (2003), *Diffusion of innovations*. 5^e edition. The Free Press (ed.). New York.

Rubera G., Ordanini A. and Griffith D.A. (2011), Incorporating cultural values for understanding the influence of perceived product creativity on intention to buy: An examination in Italy and the US, *Journal of International Business Studies*, 42(4): 459-476.

Sadik-Rozsnyai O. and Bertrandias L. (2019), New technological attributes and willingness to pay: the role of social innovativeness, *European Journal of Marketing*, 53(6): 1099-1124.

Spears N. and Singh S.N. (2004), Measuring attitude toward the brand and purchase intentions. *Journal of Current Issues and Research in Advertising*, 26(2): 53-66.

Spence M. (1974), *Market Signaling: Informational Transfer in Hiring and Related Screening Processes*, Cambridge, MA: Harvard University Press.

Stock R.M. and Zacharias N.A. (2013), Two sides of the same coin: How do different dimensions of product program innovativeness affect customer Loyalty?, *Journal of Product Innovation Management*, 30(3): 516-532.

Szymanski D.M., Kroff M.W. and Troy L.C. (2007), Innovativeness and new product success: Insights from the cumulative evidence, *Journal of the Academy of Marketing Science*, 35(1): 35-52.

Victory K., Nenycz-Thiel M. and Dawes J. (2021), How common is new product failure and when does it vary? *Marketing Letters*, 32(1): 17-32.

Zeithaml V.A., Berry L.L. and Parasuraman A. (1996), The Behavioral Consequences of Service Quality, *Journal of Marketing*, 60(2): 31-46.

Appendices

Appendix 1: Description of the stimuli

Without Patent Marking



TRIXERA NUTRITION NETTOYANT NUTRI-FLUIDE

Le gel nettoyant nutri-fluide est basé sur une formule biodégradable sans savon qui nettoie en douceur et nourrit même les peaux les plus sensibles. À base d'eau thermale, il aide à protéger la peau tout en hydratant et apaisant les peaux sèches à très sèches.

With Patent Marking



TRIXERA NUTRITION NETTOYANT NUTRI-FLUIDE

Nouvelle formule brevetée
Le gel nettoyant nutri-fluide est basé sur une formule biodégradable sans savon qui nettoie en douceur et nourrit même les peaux les plus sensibles. À base d'eau thermale, il aide à protéger la peau tout en hydratant et apaisant les peaux sèches à très sèches.
La nouvelle formule est inventée par nos équipes de recherche et est protégée par des brevets déposés dans de nombreux pays. Cette page Web est destinée à fournir plus d'informations sur notre formule brevetée.

https://patentscope.wipo.int/search/en/detail.jsf?docId=EP12427445&_cid=P22-KGJI46-38193-8



Yotuel Classic

Notre dentifrice repose sur une formule originale destinée aux personnes ayant les dents et les gencives sensibles. Dépourvue de détergents, sa formule est blanchissante, anti-plaque, antitartre et peu abrasive.



Yotuel Classic

Nouvelle formule brevetée
Notre dentifrice repose sur une formule originale destinée aux personnes ayant les dents et les gencives sensibles. Dépourvue de détergents, sa formule est blanchissante, anti-plaque, antitartre et peu abrasive.
La nouvelle formulation a été inventée par nos équipes de recherche et est protégée par des brevets déposés dans de nombreux pays. Cette page Web est destinée à fournir plus d'informations sur notre formule brevetée.

https://patentscope.wipo.int/search/en/detail.jsf?docId=US39753774&_cid=P22-KG9D3D-95050-1

ARCHOS

ARCHOS Access 57 5G

Le smartphone Access 57 est équipé d'une batterie résistante au feu et ininflammable. Cette batterie est basée sur un système original où les nouveaux électrolytes sont ininflammables même dans des conditions extrêmes tout en offrant une performance comparable aux électrolytes hautement inflammables existants.



ARCHOS

ARCHOS Access 57 5G Nouvelle batterie brevetée

Le smartphone Access 57 est équipé d'une batterie résistante au feu et ininflammable. Cette batterie est basée sur un système original où les nouveaux électrolytes sont ininflammables même dans des conditions extrêmes tout en offrant une performance comparable aux électrolytes hautement inflammables existants.

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<https://worldwide.espacenet.com/publicationDetails/biblio?CC=US&NR=2016093895A1&KC=A1&FT=D&ND=&date=20160331&DB=&locale=>

Appendix 2: Constructs and scale development

Latent constructs	Loadings	Composite Reliability	Indicator Reliability	AVE
Perceived Product Innovativeness (PPI)				
Meaningfulness (adapted from Rubera et al., 2011)				
This product is relevant to my needs and expectations	0.810	0.801	0.656	0,574
This product is adapted to my needs and expectations	0.658		0.487	
This product is useful for me	0.795		0.632	
Newness (adapted from Rubera et al., 2011)				
This product is truly “out of the ordinary”	0.876	0.928	0.767	0,820
This product can be considered revolutionary	0.932		0.869	
This product is radically different from other products in the same category	0.895		0.801	
Purchase Intention (adapted from Spears and Singh, 2004)				
How likely would you be to purchase this company’s products in the future?	N/A	N/A	N/A	N/A
Intention to Pay a Price Premium (adapted from Zeithaml et al., 1996)				
I am willing to pay a higher price for this brand than for other brands	0,833	0,819	0,512	0,603
I am willing to pay a lot more for this brand than for other brands	0,701		0,732	
I am willing to pay a lot more for this brand than for other brands	0,797		0,659	
Controls				
Expertise (adapted from Fu and Elliott, 2013)				
How would you rate your expertise in [product category] Soft expertise/strong expertise	N/A	N/A	N/A	N/A
Perceived Risk (adapted from Erdem and Swait, 2004)				
For me, buying this type of product...Is not at all risky/ Is extremely risky	0.783	0.834	0.613	
For me, buying this type of product...Is very important/ Is not very important	0.747		0.558	
For me, buying this type of product...Does not worry me at all/ Does worry me	0.662		0.439	
Consumer Innovativeness (adapted from Goldsmith et al., 1998)				
Overall, I am interested in the latest innovations in x	0.824	0,897	0.679	0,764
I often visit the x department of a store.	0.908		0.825	
I like to buy x before anyone else.	0.882		0.777	
If I needed to buy x, I would buy the latest product.	0.817		0.668	

na : non applicable

Appendix 3: OLS regression results

Variables	Model 1 MN	Model 2 NO	Model 3 PI	Model 4 IPP
Patent Marking (PM)	0,185*	0,191*	-0,127	-0,054
Perceived Product Innovativeness				
Meaningfulness (MN)			0,650***	0,146**
Newness (NO)			0,376***	0,356***
Controls				
Consumer Innovativeness (CI)	0,727***	0,560***	0,519***	0,486***
Expertise (EX)	0,145***	0,154***	-0,032	-0,034
Perceived Risk (PR)	-0,116**	-0,041	-0,041	0,118*
Age (AG)	0,004	0,011***	0,000	-0,002
Gender (GE)	-0,003	-0,014	0,065	-0,199**
R ²	0,633	0,512	0,779	0,721
F (p value)	156,878***	94,421***	236,369***	173,207***

*p < 0.05; **p < 0.01; ***p < 0.001.

Appendix 4: Indirect effects of utility and newness (bootstrapping)

Chemin	Effect	boot. SE	Boot. 95% IC
PM→NO→PI	0,142	0,068	[0,002 ; 0,277]
PM→MN→PI	0,159	0,075	[0,001 ; 0,308]
PM→NO→IPP	0,084	0,039	[0,005 ; 0,162]
PM→MN→IPP	0,064	0,033	[0,001 ; 0,133]

PM: patent marking, NO: newness, MN: Meaningfulness, IPP: intention to pay a price premium

Appendix 5: Descriptive statistics (mean, standard deviation a correlation)

	M	SD	1	2	3	4	5	6	7	8	9	10
1. MN	4,379	1,723	–									
2. NO	4,382	1,438	0,804									
3. PM	N/A	N/A	0,034	0,051								
4. IC	4,082	1,643	0,787	0,695	-0,021							
5. EX	4,658	1,547	0,602	0,543	0,005	0,678						
6. RP	3,332	1,046	-0,261	-0,204	0,106	-0,247	-0,191					
7. AG	46,652	15,09	-0,250	-0,150	0,003	-0,368	-0,282	0,030				
8. GE	N/A	N/A	-0,044	-0,047	-0,007	-0,051	0,021	0,062	-0,082			
9. PI	5,870	2,510	0,846	0,774	-0,008	0,801	0,581	-0,250	-0,251	0,037		
10. IPP	3,570	1,650	0,758	0,759	0,003	0,797	0,555	-0,149	-0,274	-0,100	0,814	

Note: M=mean, SD=standard deviation, MN= meaningfulness, NO=newness, PM=patent marking, CI=consumer innovativeness, EX=expertise, PR= perceived risk, AG=age, GE=gender, PI=purchase intention, IPP= intention to pay a price premium, values in bold type represent significant correlation coefficients at the p value<0,05, N/A=not applicable.

Appendix 6: Description of the two hierarchical classes

	k-means cluster classes*	
	Visionary class	Pragmatic class
Consumer innovativeness	6,02	3,51
Perceived risk	2,24	3,66
Population (N=547)	125 (22%)	422 (78%)

* The means of the same rows differ significantly at $p < 0.05$ in the two-tailed test of equality for column mean.

Appendix 7: Bootstrapped path coefficients of the PM influence in the pragmatics group

Latent Variables	Values	t	Pr > t	LCI (95%)	UCI (95%)
PM → NO	0,144	3,083	0,002	0,051	0,216
PM → MN	0,076	2,409	0,035	0,002	0,179
Controls*					
Expertise (EX)	0,300	6,376	0,000	0,205	0,385
Age (AG)	-0,202	-4,080	0,000	-0,296	-0,122
Gender (GE)	0,001	0,017	0,986	-0,372	0,110
R ²	Bootstrapped (NO)		Bootstrapped (UT)		
	0,417		0,595		

PM = patent marking; MN= Meaningfulness, NO=newness, * Results for the dependent variable 'NO' only

Appendix 8: Bootstrapped path coefficients of the PM influence in the visionary group

Latent Variables	Values	t	Pr > t	LCI (95%)	UCI (95%)
PM → NO	0,033	0,320	0,730	-0,218	0,181
PM → MN	-0,010	-0,090	0,929	-0,227	0,186
Controls*					
Expertise (EX)	-0,048	-0,298	0,766	-0,352	0,214
Age (AG)	0,030	0,241	0,800	-0,143	0,362
Genre (GE)	-0,218	-1,449	0,150	-0,395	0,021
R ²	Bootstrapped (NO)		Bootstrapped (UT)		
	0,399		0,480		

PM = patent marking; MN= Meaningfulness, NO=newness, * Results for the dependent variable 'NO' only