How do involvement and product knowledge affect the relationship between intangibility and perceived risk for brands and product categories?

Michel Laroche and Marcelo Vinhal Nepomuceno
Concordia University, Montreal, Canada, and

Marie-Odile Richard
University of Montreal, Montreal, Canada

Abstract

Purpose – Intangibility has long been studied in marketing, especially its physical aspect. This paper seeks to verify whether a branding strategy is efficient in reducing the risk perceived by customers.

Design/methodology/approach – A sample of university students answered the measurements considering both perspectives (brands and product categories). The paper uses a three-dimensional approach of intangibility and explores its relationships with evaluation difficulty (ED) and perceived risk (PR). These relationships were tested in two different perspectives: brands and product categories.

Findings – Two analyses were made to test the hypotheses which were generally supported. Several relationships between the variables were found, but three should be highlighted. First, it was shown that brands are more mentally intangible than product categories, which may lead to a difficulty to evaluate. Second, it was found that evaluation difficulty increases the perceived risk in the product category perspective. Third, it was found that higher involvement generates a stronger relationship between evaluation difficulty and perceived risk for the product category perspective.

Practical implications – Theoretical and managerial implications to the literature are discussed along with examples of how managers could use the findings.

Originality/value – The research incorporates prior knowledge and involvement as moderating variables of the proposed framework and reinforces their relevance to the field. The results not only show the importance of branding, but also support the argument of considering evaluation difficulty in future research.

Keywords Risk assessment, Knowledge management, Brands

Paper type Research paper

An executive summary for managers and executive readers can be found at the end of this article.

Introduction

With the development of new communication technologies, the tangibility of products (i.e. goods and services) is becoming more important. Many products can be acquired through the web, from laptops to sofas, or from food to movie tickets. This has motivated several authors to review the concept of intangibility and reconsider its dimensions. According to Kotler and Bloom (1984) intangibility describes "what cannot be seen, tested, felt, heard or smelled." In other words, an intangible product is one that cannot be perceived by the five senses. However, this definition does not take into account all the dimensions of this construct. For instance, some authors characterize an intangible object as something that is unable to be grasped mentally, highlighting the mental dimension of intangibility (Bateson, 1979; McDougall and Snetsinger, 1990; Hirschman, 1980). A third dimension was introduced by Breivik *et al.* (1998) and also studied by Featherman and Wells (2004) and Eggert (2006), and it describes if the product is perceived as general or specific. A general product is one whose definition, features or outcomes cannot be referred to precisely. For instance, a "safe car" is constituted of features and attributes that cannot be easily defined, but in the other hand, an "air-bag" has a clearly expected outcome. These three dimensions were developed as a new scale by Laroche *et al.* (2001) who established the discriminant and convergent validities of the dimensions and defined them as: physical intangibility (if it is accessible to the senses); mental intangibility (if it can be mentally grasped) and generality (if it is specific or not).

This paper tests a broader model based on previous findings. As in Laroche *et al.* (2003), we also test the relationship between intangibility, evaluation difficulty and

perceived risk. However, two moderators are considered: involvement and prior knowledge. Until now, past studies use either the brand perspective (e.g., Levi's Jeans) or the product category perspective (e.g., jeans). No study has compared the appropriateness of this model for both perspectives; therefore this is another contribution of this study. Thus, our two major objectives are to test the role of involvement and knowledge and to verify if the model is equally applicable to brands and product categories.

This paper is organized as follows. First, the model is presented along with its conceptual framework. Next, it is tested using two analyses and six different products. Hypotheses are developed prior to each test followed by the findings, interpretation and discussion. Finally the managerial implications, research limitations and future research agenda are presented.

Conceptual framework

Intangibility and evaluation difficulty

McDougall (1987) defines evaluation difficulty (ED) as the perception of the cognitive and behavioral difficulties and efforts required to judge and discriminate among alternatives. Prior studies looked at the relationship between ED and intangibility. Breivik *et al.* (1998) show that physical intangibility is negatively related to ED, which goes against the traditional belief that services are more difficulty to evaluate (McDougall, 1987), and is based on the logic that a physically intangible product would be easier to evaluate because it would depend more on previous experience than on the physical attributes of the product. These finding differs from previous ones because the traditional view does not distinguish between the three dimensions of intangibility. In other words, the positive relationship between intangibility and ED occurs with the mental intangibility dimension, which is usually not distinguished from the other two. This positive relationship between ED and mental intangibility is found by Laroche *et al.* (2005) who contrary to Breivik *et al.* (1998) do not find a relationship between physical intangibility and ED. Therefore, this relationship needs further investigation.

Previous research finds that generality and mental intangibility have positive relationships with ED. Breivik *et al.* (1998) identify a positive relationship between generality and ED and conclude that a more general product will be evaluated with more difficulty because it lacks a mental representation generating high levels of uncertainty. A similar argument justifies the positive relationship found between mental intangibility and ED, because if a product is difficult to be mentally grasped it will also generate more difficulty to evaluate due to higher uncertainty (Finn, 1985). Laroche *et al.* (2005) also confirm the positive influence of mental intangibility and generality on ED. Therefore, the following hypothesis is tested:

H1. Generality and mental intangibility are positively related to evaluation difficulty in both the brand and the product category perspectives.

Intangibility and perceived risk

Perceived risk is defined as a subjective expectation of loss (Peter and Ryan, 1976). Studies show that perceived risk (PR) is central to consumers' evaluation and purchasing behavior (Dowling, 1999; Dowling and Staelin, 1994;

Mitchell, 1999). Past research on PR identifies several different types of risk. Cox and Rich (1964) identify two types of risk, social-psychological and financial risks. Jacoby and Kaplan (1972) argue that PR includes five types of risk: performance, time, social, psychological and financial risks. We use this approach and the types of risk are defined as: social risk is the potential loss of esteem, respect and/or friendship by other individuals; time risk is the potential loss of time and effort associated with purchasing the item; psychological risk is the potential loss of self-image or self-concept resulting from the purchase; financial risk is the potential loss of money for purchasing the item; and performance risk is the potential loss occurred by the item failure to perform as expected (Murray and Schlacter, 1990).

According to Taylor (1974), once a PR is identified it is possible to determine purchase behavior. For example, Boze (1987) shows that when risk is higher, consumers more likely compare alternatives and ask friends and relatives for advice. Also, the context of the purchase may make certain types of risks more salient. For instance, Laroche *et al.* (2005) and Eggert (2006) show that PR is stronger in an online environment compared to an offline one. Similarly, Cox and Rich (1964) show that buying by phone is perceived as riskier than in retail stores. Also, involvement and knowledge are relevant in understanding PR (Alba and Hutchinson, 1987; Chaudhuri, 2000; Cowley and Mitchell, 2003; Murray and Schlacter, 1990). However, we focus on their effects on Analysis 2.

Previous research shows that intangibility is positively related to perceived risk (De Ruyter *et al.*, 2001; Finn, 1985; Mitchell and Greatorex, 1993), but only recently have studies related the dimensions of intangibility to the dimensions of risk. Featherman and Wells (2004) find a positive relationship between mental intangibility and risk; a positive relationship of generality with risk; and no relationship of physical intangibility with any PR dimension. Based on this review and taking into account the five dimensions of PR, the next hypothesis is tested:

H2. Mental intangibility is positively related to the five dimensions of perceived risk in both the brand and the product category perspectives.

Perceived risk and evaluation difficulty

Since PR is a subjective expectation of loss and ED is the perception of the cognitive and behavioral difficulties and efforts required to judge and discriminate among alternatives, it is expected that a higher difficulty to evaluate products generate a higher expectation of loss because this difficulty increases the level of uncertainty. This expectation is confirmed by Laroche *et al.* (2005) who show a strong positive relationship of ED on PR in offline and online settings.

As stated before, products can be perceived under a product category perspective (e.g., pizzas) or under a brand perspective (e.g., Pizza Hut). The use of a brand name facilitates the consumers' decision process (Alba and Hutchinson, 1987; Erdem, 1998) and reduces PR (Erdem, 1998; Montgomery and Wernerfelt, 1992). Because brands have lower uncertainty and risk perceptions (Mitchell and Greatorex, 1993) and are also less abstract (Johnson and Fornell, 1987), it is expected that evaluation difficulty will have a higher influence on PR in the product category

situation because a product which is harder to evaluate generates a higher perception of risk (Mitchell and Greatorex, 1993). Based on these findings the following hypothesis is tested:

H3. Evaluation difficulty is positively related to perceived risk in both brand and product category perspectives, but the relationship is stronger for the later one.

Analysis 1

General model: brand versus product category perspectives

Previous research shows that intangibility impacts PR less when brands are considered, because a brand leads to a lower perception of risk (Mitchell and Greatorex, 1993). This may not be true in special cases where brands names are used to define a product category (e.g., Scotch tape for adhesive tape). Moreover, Laroche *et al.* (2004) find that brands reduce risk only for the relationship between generality and PR and that the relationship between mental intangibility and PR is stronger in the brand perspective. Therefore:

H4. The intangibility-perceived risk relationship is stronger for product categories than for brands when considering the generality dimension.

Methodology

To enhance generalizability, more than one product is chosen as stimuli based on the following criteria: suitability to sample population; variability of degree of intangibility, evaluation difficulty and perceived risk; an equal number of goods and services. According to researchers' judgment and pre-tests with subjects using these criteria, the following brands are chosen: Levi's jeans; IBM computer; Beatles' CD; Netscape internet browser; Pizza Hut restaurant; Royal Bank's checking account. To compare between brands and product categories, the following categories are used: jeans; computer; music compact disc; internet browser; pizzeria dinner; checking account.

The questionnaire has two parts: first, items measuring the constructs. To reduce fatigue, respondents do not evaluate all six products. In each version they consider only one tangible good, one less tangible good and one service. Nevertheless, categories and brands are equally used. A total of sixteen versions are created: four versions for the brands and four for general products; to further reduce fatigue and control for order effects, eight other versions are created where the general goods/services and brands are in reverse order. The items are the same for all versions and only the names of the good/service change. All versions are identical in terms of constructs and demographic variables, only the products studied and their orders are different.

With the exception of demographics, all items are measured with nine-point likert scales. The intangibility scale developed by Laroche *et al.* (2001) is used along with the evaluation difficulty scale adapted from Breivik *et al.* (1998). For measuring PR we use the instrument developed by Stone and Gronhaug (1993). The knowledge and experience constructs are measured with items adapted from Park *et al.* (1994) and Oliver and Bearden (1983). Finally, involvement is measured from an adapted version of Zaichkowsky's (1985) involvement scale. The items for

each construct are presented in Table I. Also, Cronbach alphas are above 0.75 for all dimensions, showing an acceptable reliability. For the brand perspective the factor loadings of the items are all above 0.63, with the exception of item 1 of mental intangibility and item 3 of social risk, whose loading are equal to 0.50 and 0.36. A similar pattern is found in the product category perspective: only three items have loadings below 0.63: item 1 of mental intangibility (0.58); item 3 of social risk (0.43); and item 1 of performance risk (0.51).

A pretest is made on the questionnaire with a small sample of students to provide feedback on the wording and test their familiarity with the selected products. After minor modifications it is concluded that the products selected are appropriate since the participants perceive jeans and computers as highly tangible goods and CD as a less tangible good. They also perceive the restaurant as a tangible service, whereas checking account and internet browser are less tangible. The selected products are also perceived differently on the levels of risk and evaluation difficulty.

Next, 800 questionnaires are distributed in classes to students in a business school of a Northeastern university. There was a total of 50 questionnaires for each version and these versions are randomly distributed amongst the students. 783 questionnaires are returned, giving a response rate of 97.9 percent. The researchers approached the professors for permission to distribute the questionnaires in classes and once allowed they went to classrooms at specified times and made a brief self-introduction. The purpose of the research was kept blind and explained only after the questionnares were collected. Participants were told that the participation was voluntary, but in a few classes, professors encouraged participation by giving extra course credit.

The student convenience sample was chosen because it represents part of the consumer total population and they are also engaged on evaluating and purchasing the products listed in this study. Also, students sample can be used when testing a theory (Calder *et al.*, 1981). Because the objective was to test the aggregated responses to products, that became the unit of analysis and the sample size was increased to 2,349, where 1,176 were related to the brands and 1,173 were related to the product categories. We discarded 89 cases because they were considered as outliers or because they had more than 5 percent of blank answers. An outlier had to meet the following conditions simultaneously:

- it gave the largest contribution to normalized multivariate kurtosis; and
- it changed the estimations of the model after its deletion.

Results

The model presented in Figure 1 is tested and the results can be seen in Table II. A satisfactory fit is found for both perspectives, all being above the cutoffs proposed in the literature: CFI > 0.90 (Bentler, 1992), $\chi^2/df < 5$ (Taylor and Todd, 1995), and RMSEA < 0.05 (Browne and Cudeck, 1989). The product category has a slightly better fit $\chi^2(314, n = 1,127) = 892$, $\chi^2/df = 2.84$, CFI = 0.99, RMSEA = 0.04, but for both perspectives the model is appropriate. Some causal paths are significant for both perspectives; consequently a test of path invariance is conducted as proposed by Byrne (2006) with all factors loadings, structural paths coefficients and error covariances constrained to be equal for both groups. Note that for this

Table I Results of the exploratory factor analysis

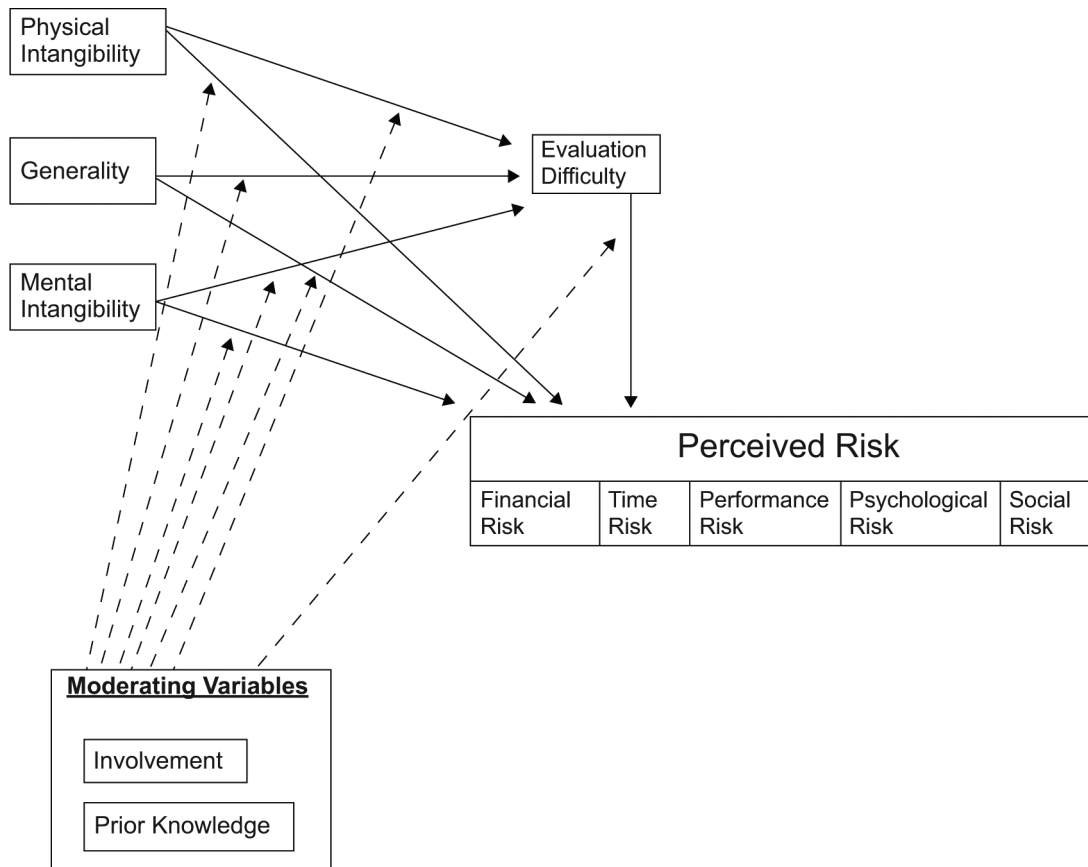| Factors[a]	Measures[b]		Alpha (B/PC)[c]
Physical intangibility[d]	1.	This item is very easy to see and touch	(0.941/0.953)
	2.	I can physically grasp this item	
	3.	This item is very physically tangible	
Generality[d]	1.	I could easily explain many features associated with this item	(0.922/0.905)
	2.	It is not difficult to give a precise description of this item	
	3.	It is easy to describe many features related to this item	
Mental intangibility	1.	I need more information about this item to get a clear idea (image) of what it is	(0.793/0.808)
	2.	This is a difficult item to think about	
	3.	This is not the sort of item that is easy to picture	
Evaluation difficulty[d]	1.	It is very easy for me to choose this item	(0.956/0.947)
	2.	Choosing this item amongst others is not very complicated	
	3.	It is not very difficult to find the item that is best for me	
	4.	I feel very confused when choosing this item amongst others	
Financial risk	1.	If I bought an item for myself within the next 12 months, I would be concerned that the financial investment I would make would not be wise	(0.900/0.893)
	2.	Purchasing this item could involve important financial losses	
	3.	If I bought this item for myself within the next 12 months, I would be concerned that I would not get my money's worth	
Time risk	1.	Purchasing an item could lead to an inefficient use of my time	(0.915/0.927)
	2.	Purchasing an item could involve important time losses	
	3.	The demands on my schedule are such that purchasing an item concerns me, because it could create even more time pressures on me that I do not need	
Performance risk	1.	If I were to purchase an item within the next 12 months, I would become concerned that the item will not provide the level of benefits that I would be expecting	(0.876/0.888)
	2.	As I consider the purchase of an item soon, I worry about whether it will really "perform" as well as it is supposed to do	
	3.	The thought of purchasing an item causes me to be concerned for how really reliable that product will be	
Psychological risk	1.	The thought of purchasing an item gives me a feeling of unwanted anxiety	(0.954/0.959)
	2.	The thought of purchasing an item makes me feel psychologically uncomfortable	
	3.	The thought of purchasing an item causes me to experience unnecessary tension	
Social risk[d]	1.	If I bought an item, I think I would be held in higher esteem by my friends	(0.812/0.845)
	2.	If I bought an item, I think I would be held in higher esteem by my family	
	3.	Purchasing this item within the next 12 months would cause me to be considered foolish by some people whose opinion I value	
Involvement[d]	1.	I perceive this item as: Very important (1) → Very unimportant (9)	(0.931/0.930)
	2.	I perceive this item as: Very significant (1) → Very insignificant (9)	
	3.	I perceive this item as: Very valuable (1) → Not valuable at all (9)	
	4.	This item: Matters a lot to me (1) → Does not matter to me (9)	
	5.	This item: Means a lot to me (1) → Means nothing to me (9)	
Knowledge	1.	I use this item	(0.773/0.759)
	2.	The information search I have performed on this item is: Very weak (1) → Very strong (9)	
	3.	I do not have much experience purchasing this item	
	4.	In general, my knowledge of this item is: Very weak (1) → Very strong (9)	
	5.	Would you consider yourself uninformed or informed about this item? Very uninformed (1) → Very informed (9)	
	6.	Compared with my friends and acquaintances, my knowledge of this item is: Weaker (1) → Stronger (9)	
	7.	Compared with experts in this area, my knowledge of this item is: Weaker (1) → Stronger (9)	

Notes: [a]The scales are measured on a 9-point Likert-scale (strongly disagree to strongly agree); [b]The term "item" is replaced with the appropriate term (good or service) in the questionnaires; [c]B/PC: Brand sub-sample/Product category sub-sample; [d]The items of this factor are reversed

analysis each PR dimension is considered as a unique dependent variable which is related independently to the remaining constructs. The results of this test are also shown in Table II.

In the brand perspective, physical intangibility does not impact significantly ED or any of the perceived risk constructs. On the other hand, mental intangibility has a positive impact on ED and on all perceived risk constructs. The results also show that generality has a positive impact only on ED (0.268, $p < 0.001$) and that ED has a strong positive relationship, ranging from 0.213 to 0.318, with almost all the perceived risk dimensions except social risk.

Figure 1 The relationships among intangibility, evaluation difficulty and perceived risk

In the product category perspective, the results are different. Physical intangibility has negative relationships with financial risk (-0.111, $p < 0.001$), performance risk (-0.118, $p < 0.001$) and social risk (-0.123, $p < 0.001$), but the invariance test found a difference only in the case of performance risk (0.036 v. -0.118, $p = 0.02$). The role of mental intangibility is different for two constructs: its relationship with ED is not significant supporting a stronger relation in the brand perspective (0.196 v. 0.01, $p = 0.01$), and the test of path invariance shows a stronger positive relationship between mental intangibility and social risk (0.115 v. 0.198, $p = 0.00$). The role of generality is similar in this perspective, it does not predict significantly any dimension of perceived risk and it impacts ED positively; however; the test of path invariance does not indicate a significant difference between the two groups. When ED is considered as a predictor, a similar pattern of relationships is found, but the invariance test shows that the product category perspective has stronger positive relationships with financial risk (0.318 v. 0.445, $p = 0.02$), performance risk (0.282 v. 0.461, $p = 0.00$) and psychological risk (-0.251 v. -0.341, $p = 0.01$).

These findings show partial support for *H1*, strong support for *H2* and *H3* and no support for *H4*. The next section will discuss these results and their implications.

Discussion

As in Laroche *et al.* (2005), our findings disconfirmed previous research which evaluated intangibility as a global concept, and concluded that intangibility increases ED and PR (Murray, 1991; Murray and Schlacter, 1990; Zeithaml and Bitner, 2000). In fact, our findings indicate that these relationships are true only for some dimensions of intangibility; and demonstrate that in some contexts a negative relationship is found, as in the case of physical intangibility with performance risk in the product category perspective. This disconfirmation is due to the use of the three dimensions of intangibility and of the five dimensions of PR.

H1 stated that generality and mental intangibility are positively related to ED for both perspectives. For generality, the results show that the hypothesis is confirmed for the brand and product category perspectives; and there is no significant difference between the two perspectives. For mental intangibility, the results support the hypothesis in the brand perspective but not in the product category perspective, indicating that when a brand is considered mental intangibility leads to a bigger evaluation difficulty. However, with a product category the mental intangibility does not lead to the same difficulty. According to Johnson and Fornell (1987) specific product attributes are associated with brands while generic attributes are associated with a product category. Once a brand is more specific it becomes harder to visualize mentally leading to a higher difficulty of evaluation. For instance, to imagine a Volkswagen a person need to have previous information about this brand and the characteristics associated to it. On the other hand, when the same person is asked to imagine any car (product category) the visualization becomes much simpler and faster. Therefore,

Table II Results of invariance tests for the intangibility-evaluation difficulty-perceived risk model

Causal paths[a]	Brand v. Product category			
	Standardized β values		Invariance test[b]	
	Brand	Product category	χ^2	p
PHYS-INT Eva-DIF.	− 0.04	0.06		
PHYS-INT Fin.RISK	− 0.01	− 0.111 *	1.26	0.13
PHYS-INT Tim.RISK	0.00	− 0.08		
PHYS-INT Per.RISK	0.04	− 0.118 *	8.29	0.00
PHYS-INT Psy.RISK	− 0.05	− 0.06		
PHYS-INT Soc.RISK	− 0.06	− 0.123 *	0.98	0.16
MEN-INT Eva-DIF.	0.196 *	0.01	5.66	0.01
MEN-INT Fin.RISK	0.155 *	0.112 *	0.65	0.21
MEN-INT Tim.RISK	0.104 *	0.11 *	0.01	0.46
MEN-INT Per.RISK	0.14 *	0.108 *	0.56	0.22
MEN-INT Psy.RISK	0.127 *	0.13 *	0.02	0.45
MEN-INT Soc.RISK	0.115 *	0.198 *	6.71	0.00
GENERAL Eva-DIF.	0.268 *	0.326 *	1.11	0.14
GENERAL Fin.RISK	− 0.07	0.037		
GENERAL Tim.RISK	0.04	0.035		
GENERAL Per.RISK	− 0.02	− 0.008		
GENERAL Psy.RISK	0.00	0.035		
GENERAL Soc.RISK	− 0.05	0.094		
Eva-DIF. Fin.RISK	0.318 *	0.445 *	3.78	0.02
Eva-DIF. Tim.RISK	0.213 *	0.328 *	2.43	0.06
Eva-DIF. Per.RISK	0.282 *	0.461 *	5.91	0.00
Eva-DIF. Psy.RISK	0.251 *	0.341 *	4.91	0.01
Eva-DIF. Soc.RISK	0.06	0.069		

Notes: Fit indexes −Baseline model (Product category): χ^2 (314, $n = 1,127$) = 892.6, χ^2/df = 2.84, CFI = 0.99, RMSEA = 0.04; Baseline model (Brand): χ^2 (314, $n = 1,133$) = 60.8, χ^2/df = 3.06, CFI = 0.98, RMSEA = 0.04; Invariance test: χ^2 (683) = 2,818, χ^2/df = 4.13, CFI = 0.96, RMSEA = 0.04; [a]Numbers with a * indicate significant causal paths ($p < 0.05$); [b]Small p values ($p < 0.05$) indicate significant invariance between the pair of causal paths

because the brand is harder to be mentally grasped it will generate some difficulty of evaluation.

Second, *H2* and *H3* stated that mental intangibility and ED are significantly related to perceived risk. Our findings show that only mental intangibility is a significant predictor of all risk dimensions for both perspectives, confirming *H2*. Generality is an unexpressive construct to predict PR for both perspectives. Physical intangibility is relevant to financial, performance and social risks, but only for the product category perspective. Also, ED is a relevant predictor of all risk dimensions, except social risk, and this relationship is stronger for the product category perspective, supporting *H3*. This result confirms previous research and indicates that the product category is harder to evaluate which makes it perceived as riskier. This result supports the argument that brands are easier to evaluate because people rely on their knowledge of the brand to support their evaluation. Nevertheless, the results also show that mental intangibility leads to difficulty in evaluating brands. Therefore, brands lead to less PR but they may be perceived as riskier for those who have difficulty to mentally grasping them. Analysis 2 will test

these arguments as it will compare the moderating effect of knowledge on these constructs.

The results also show no support for *H4*, which is an interesting finding. This hypothesis states that the relationship between generality and perceived risk is stronger for product categories than for brands. However, after adding ED into the model a different pattern of relationship is found. The results show that ED acts as a mediator of the relationship between generality and PR. The direct relationship of generality and PR is not significant but there is a significant relationship of generality and ED which in turn significantly influences PR. It is interesting to note that even though the hypothesis was not supported, its idea is still correct, because the influence of ED on PR is stronger for financial, performance and psychological risks in the product category perspective which were the same dimensions and relationships identified by Laroche *et al.* (2004). Therefore, this supports the argument that the risks involved in the product category perspective are based on their being more general and intangible than for a specific brand. Moreover, it also shows that this perception of risk occurs because of a difficulty to evaluate the product.

The results also show other discrepancy with Laroche *et al.* (2004) who identify physical intangibility as an unimportant dimension in predicting the risk perception for the product category and brand perspectives. We find that the influence of physical intangibility on performance risk is different for the product category perspective, indicating that in this case the physically intangible product leads to a smaller perception of risk. Once a product category is perceived as harder to be physically grasped, consumers rely more on their prior knowledge instead of assessing the physical attributes of the product. According to Laroche *et al.* (2005, p. 256) "this will make the evaluation process easier and improve the consumers" confidence in their ability to make a correct purchase'. Eggert (2006) found a similar result for the online setting and it is interesting to note that it is a setting noticeably riskier. Therefore, this pattern may indicate that this negative relationship may occur only in settings perceived as riskier. Brady *et al.* (2005) found similar pattern of result and showed that brands are more important in a purchase of highly intangible services than more tangible goods. Hence, when a good/service is harder to be grasped the consumer trusts more on prior knowledge, such as brand, to make a final choice.

Mental intangibility is more positively associated with PR in more intangible settings (McDougall and Snetsinger, 1990; Mitchell and Greatorex, 1993; Murray and Schlacter, 1990). Also, Laroche *et al.* (2005) found that mental intangibility is more related to PR for the brand perspective. Once again we show that the inclusion of ED and the analysis of PR as a five dimensional construct improves the understanding of the relationships among the constructs. In the brand perspective, the relationship between intangibility and PR is positively mediated by ED. Therefore, the higher relationship between mental intangibility and PR found by Laroche *et al.* (2005) is in fact the result of the absence of ED in that study. Confirming this argument, we found that the relationship between mental intangibility and social risk is stronger in the product category perspective.

Involvement and product knowledge

According to Dowling and Staelin (1994) involvement and knowledge are variables frequently used for studying

perceived risk. McDougall (1987) argued that those variables should be considered to determine the relative importance of intangibility on PR. Engel *et al.* (1993) define prior knowledge as "the information stored within memory". This construct is considered as an important variable to influence consumer behavior and in many cases as a moderator. For example, Josiassen *et al.* (2008) found that the importance given to the image of the product's country of origin is moderated by the level of knowledge that consumers have about the products. Consumers with low knowledge rely more on the country of origin image to evaluate the product, because they have less information on how to evaluate product's performance. Also, Shehryar and Hunt (2005) show that the degree that a consumer relies on procedural fairness is related to the consumer's level of familiarity with the product. They show that consumers less familiar with a product are more likely to rely on procedural fairness to form a purchase intention. Similarly, Cowley and Mitchell (2003) show that higher knowledge consumers are more selective and also have a better comprehension of the attributes that will lead to an optimal choice. This finding indirectly supports Alba and Hutchinson's (1987) results that these same consumers can categorize information with less effort, which by itself might be a cause of risk reduction. Therefore, it is expected that knowledge impacts the relationship between intangibility and PR and this variable is considered as a moderator.

According to Cox and Rich (1964), additional knowledge and information lead to a reduction in perceived risk through reducing the uncertainty of the outcome. According to Zeithaml *et al.* (1993) prior product knowledge allows its clearer representation, which in turn can lower its mental intangibility. Also, Laroche *et al.* (2005) found that mental intangibility is more related to PR in an offline purchase environment with high level of prior knowledge and the same research showed no variance of the importance of mental intangibility over PR in the online setting. Similarly, Eggert (2006) shows that in the online environment the relation between mental intangibility with financial, performance and psychological risks are reduced. Imagining that a product category setting is also considered as riskier than a brand setting, the following hypothesis will be tested:

H5. In the product category perspective, higher knowledge does not generate a more significant relationship of mental intangibility on perceived risk.

H5.1 In the brand perspective, higher knowledge generates a more significant relationship of mental intangibility on perceived risk.

Involvement is defined by Zaichkowsky (1985, p. 342) as "the personal relevance of an object based on inherent needs, values and interests." Therefore, involvement is understood as the importance, interest, attachment and/or motivation manifested toward an object. Several studies have shown the importance of involvement to perceived risk (Celsi and Olson, 1988; Chaudhuri, 2000; Dowling, 1986). McDougall (1987) found that involvement is significantly related to product evaluations. Also, several researchers used involvement as a moderating variable to explain consumer behavior. For example, Xue (2008) found that when consumers are not highly involved with the product they make a decision merely based on situational variables, but when highly involved the self-concept and consumption situation are determinant factors for the brand choice. In other words, highly involved

consumers are more likely to consider the congruence between brand image and self-concept. Also, Bauer *et al.* (2006) show that the decision making style is also influenced by the involvement level of the consumer. The role of involvement may occur due to the different route used to process information whether in high or low involvement. According to Petty *et al.* (1983), people with low involvement use a peripheral route for evaluating products. Similarly Charters and Pettigrew (2006) show that even in the case of wine evaluation, lower-involvement individuals base their judgments on sensory dimensions, like flavor of smoothness (peripheral), while high-involvement drinkers used more cognitive dimensions such as interest or complexity.

Once brands are recognized as important to reduce PR, the following hypotheses are created:

H6. In the product category perspective, higher involvement generates a stronger relationship of evaluation difficulty with perceived risk.

H6.1 In the brand perspective, higher involvement does not generate a significant relationship of evaluation difficulty with perceived risk.

Analysis 2

Moderating effects of product knowledge and involvement

The data used in Analysis 1 were analyzed to test the moderating effects of product knowledge and involvement. The sample was separated twice into two groups: low and high product knowledge; and low and high involvement. This generated a total of eight samples four for the brand perspective and four for the product category perspective. The purpose of these analyses was to test the importance of product knowledge and involvement for both perspectives. The model in Figure 1 was retested with these subsamples and the same procedure was used for the path invariance test.

Results – product category perspective

Table III presents the results of the model testing for the product category perspective. Again an acceptable fit was found for the baseline model for high and low levels of involvement and high and low levels of product knowledge. All the scores met the cutoffs presented before, since the CFI ranged from 0.98 and 0.99, the χ^2/df was between 1.43 and 1.94 and the RMSEA was either 0.03 or 0.04.

The moderating effect of involvement reveals that for the high involvement group there is a negative relationship between physical intangibility and financial risk (-0.165, $p < 0.001$); psychological risk (-9.139, $p < 0.001$), which is supported by the invariance test (-0.139 v. 0.075, $p = 0.03$); and social risk (-0.187, $p < 0.001$). On the other hand, for the low involvement group, physical intangibility is related only to ED (0.24, $p < 0.001$), also supported by the invariance test (-0.079 v. 0.24, $p < 0.00$). We did not find a relationship of mental intangibility with ED for both levels of involvement. Moreover, mental intangibility was related to PR only for the low involvement group but with all PR dimensions: financial risk (0.17, < 0.001), time risk (0.152, $p < 0.001$), performance risk (0.118, $p < 0.001$), psychological risk (0.176, $p < 0.001$) and social risk (0.29, $p < 0.001$), but the invariance test does not reveal any difference between the two groups. Also generality has a

Table III Results of invariance tests for the intangibility-evaluation difficulty-perceived risk model for the product category perspective

| Causal paths[a] | Product category – Moderating effects of involvement | | | | Product category – Moderating effects of knowledge | | | |
| | Standardized β values | | Invariance test[a] | | Standardized β values | | Invariance test[a] | |
	High involvement	Low involvement	χ^2	p	High knowledge	Low knowledge	χ^2	p
PHYS-INT Eva-DIF.	−0.079	24[*]	18.40	0.00	0.028	0.117		
PHYS-INT Fin.RISK	−0.165[*]	−0.05	0.58	0.22	−0.127	−0.103		
PHYS-INT Tim.RISK	−0.11	−0.012			−0.092	−0.06		
PHYS-INT Per.RISK	−0.089	−0.107			−0.139[*]	−0.086	0.437	0.26
PHYS-INT Psy.RISK	−0.139[*]	0.075	3.35	0.03	−0.092	−0.046		
PHYS-INT Soc.RISK	−0.187[*]	−0.048	0.72	0.20	−0.158[*]	−0.108	0.352	0.28
MEN-INT Eva-DIF.	0.044	−0.041			−0.041	0.054		
MEN-INT Fin.RISK	0.039	0.17[*]	1.17	0.14	0.033	0.178[*]	3.06	0.04
MEN-INT Tim.RISK	0.025	0.152[*]	1.93	0.08	0.096	0.104		
MEN-INT Per.RISK	0.073	0.118[*]	0.17	0.34	0.043	0.175[*]	2.66	0.05
MEN-INT Psy.RISK	0.048	0.176[*]	2.45	0.06	0.149[*]	0.10	0.768	0.19
MEN-INT Soc.RISK	0.085	0.29[*]	2.43	0.06	0.254[*]	0.117	4.39	0.02
GENERAL Eva-DIF.	0.314[*]	0.301[*]	0.64	0.21	0.243[*]	0.274[*]	0.37	0.27
GENERAL Fin.RISK	−0.004	0.099			0.079	−0.037		
GENERAL Tim.RISK	−0.047	0.046			0.035	−0.022		
GENERAL Per.RISK	−0.063	0.038			0.057	−0.10		
GENERAL Psy.RISK	0.035	−0.006			0.062	0.02		
GENERAL Soc.RISK	0.149[*]	0.06	1.14	0.14	0.125[*]	0.102	0.229	0.36
Eva-DIF. Fin.RISK	0.478[*]	0.377[*]	1.13	0.14	0.375[*]	0.485[*]	3.24	0.03
Eva-DIF. Tim.RISK	0.373[*]	0.296[*]	0.08	0.39	0.251[*]	0.375[*]	1.79	0.09
Eva-DIF. Per.RISK	0.544[*]	0.37[*]	12.30	0.00	0.421[*]	0.473[*]	2.03	0.07
Eva-DIF. Psy.RISK	0.416[*]	0.247[*]	3.69	0.02	0.271[*]	0.397[*]	2.3	0.06
Eva-DIF. Soc.RISK	0.113[*]	−0.006	2.99	0.04	0.009	0.16[*]	1.63	0.10
Fit indices	Baseline model (High): χ^2(314, n = 565) = 487.3, χ^2/df = 1.55, CFI = 0.99, RMSEA = 0.03. Baseline model (Low): χ^2(314, n = 398) = 430.3, χ^2/df = 1.43, CFI = 0.99, RMSEA = 0.03. Invariance test: χ^2(683) = 1,843, χ^2/df = 2.70, CFI = 0.96, RMSEA = 0.04				Baseline model (High): χ^2(314, n = 563) = 600.9, χ^2/df = 1.91, CFI = 0.98, RMSEA = 0.04. Baseline model (Low): χ^2(314, n = 561) = 609.1, χ^2/df = 1.94, CFI = 0.98, RMSEA = 0.04. Invariance test: χ^2(683) = 1,879, χ^2/df = 2.75, CFI = 0.96, RMSEA = 0.04			

Notes: [a]Small p values ($p < 0.05$) indicate significant invariance between the pair of causal paths

positive relationship with ED for the low (0.301, $p < 0.001$) and the high involvement (0.314, $p < 0.001$) groups, but the invariance test does not reveal a significant difference. Only one significant relationship is found between generality and PR, namely with social risk (0.149, $p < 0.001$) for the high involvement group, but again the invariance test has not reveal a significant difference. Finally, the relationship between ED and PR is significantly positive for all dimensions of PR, except social risk for the low involvement sample. For the high involvement sample, the invariance test identified a significantly stronger relationship of ED on performance risk (0.544 v. 0.370, $p < 0.001$), psychological risk (0.416 v. 0.247, $p < 0.05$) and social risk (0.113 v. −0.006, $p = 0.04$).

Table III shows the moderating effect of knowledge for the product category perspective. A relationship is found between physical intangibility and performance risk (−0.139, $p < 0.001$) and with social risk (−0.158, $p < 0.001$) but only for the high knowledge group. For the low knowledge group we did not find a relationship between physical intangibility and PR or ED. Also, the invariance test has not identified a significantly different relationship in performance and social risks. Again, a relationship of mental intangibility with ED is

not found for both high or low knowledge groups. However, for the high knowledge sample, we found a positive relationship of mental intangibility with psychological risk (0.149, $p < 0.001$) and social risk (0.254, $p < 0.001$), which was supported by the invariance test (0.254 v. 0.117, $p = 0.02$); for the low knowledge group mental intangibility is related to financial risk (0.178, $p < 0.001$) and performance risk (0.175, $p < 0.001$) and this relation was also considered to be different by the invariance test which detected a difference in the relationship for both dimensions with scores of (0.178 v. 0.033, $p = 0.04$) and (0.175 v. 0.043, $p = 0.05$), respectively. Similar to the moderating effect of involvement, we found that generality has a positive relationship with ED in the low and high knowledge groups, but the invariance test does not reveal a significant difference (0.243 v. 0.274, $p = 0.27$). Only one significant relationship is found between generality and PR, namely with social risk (0.125, $p < 0.001$) in the high knowledge group, which again the invariance test has not reveal a significant difference. Finally the relationship between ED and PR is significant with almost all dimensions of PR, but the invariance test did not identify a significant difference unless for the relation with

financial risk which is more significant for the low knowledge population (0.375 v. 0.485, $p = 0.03$).

Results – brand perspective

Table IV presents the results of the same analyses for the brand perspective. Again acceptable fit indexes are found for both high and low level of involvement and high and low level of knowledge. The CFI was 0.98 for all models, the χ^2/df was between 1.78 and 2.04 and the RMSEA was of 0.04.

For the brand perspective, the role of involvement is smaller since it is related only to performance risk (0.148, $p < 0.001$) for the low involvement group, whose difference was supported by the invariance test (0.079 v. 0.148, $p = 0.03$). However, mental intangibility is more relevant since it is related to financial risk (0.188, $p < 0.001$), time risk (0.182, $p < 0.001$) and performance risk (0.228, $p < 0.001$) for the high involvement group and also to psychological risk (0.139, $p < 0.001$) and social risk (0.152, $p < 0.001$) for the low involvement group. However, the invariance test has supported the difference presented only in the case of performance risk (0.228 v. 0.069, $p = 0.01$). We also found a relationship of mental intangibility with ED for both levels of involvement but the invariance test does not show a

significant difference. Generality is only related to ED, for both levels of involvement, and this difference is not significantly different. Finally, ED is positively related to all dimensions of PR, except social risk, for both levels of involvement. The invariance test revealed a significant difference on the relationship of ED on performance risk showing that it is stronger for the high involvement group (0.305 v. 0.266, $p = 0.02$).

The role of knowledge in the brand perspective shows that physical intangibility has no relationship with ED and PR. For the high knowledge group, mental intangibility is related to financial risk (0.204, $p < 0.001$), time risk (0.237, $p < 0.001$), performance risk (0.234, $p < 0.001$), psychological risk (0.305, $p < 0.001$) and social risk (0.258, $p < 0.001$). For the low knowledge group, mental intangibility is related only to ED (0.244, $p < 0.001$) and no relation is found with PR. The invariance of path test has detected a difference in the relationship for time risk (0.237 v. 0.016 $p = 0.03$), psychological risk (0.305 v. -0.024 $p = 0.01$) and social risk (0.258 v. 0.007 $p = 0.00$). Again, generality is not related to PR for both groups and we found a relationship with ED for high and low knowledge groups, but the invariance test did not reveal a significant difference. Finally, ED is positively

Table IV Results of invariance tests for the intangibility-evaluation difficulty-perceived risk model for the brand perspective

Causal paths[a]	Brands – Moderating effects of involvement				Brands – Moderating effects of knowledge			
	Standardized β values		Invariance test[1]		Standardized β values		Invariance test[a]	
	High involvement	Low involvement	χ^2	p	High knowledge	Low knowledge	χ^2	p
PHYS-INT Eva-DIF.	-0.07	-0.027			-0.033	-0.032		
PHYS-INT Fin.RISK	0.062	0.052			-0.034	0.029		
PHYS-INT Tim.RISK	0.004	0.027			-0.018	0.017		
PHYS-INT Per.RISK	0.079	0.148[*]	3.29	0.03	-0.024	0.078		
PHYS-INT Psy.RISK	-0.097	-0.005			-0.113	-0.026		
PHYS-INT Soc.RISK	-0.12	-0.039			-0.093	-0.059		
MEN-INT Eva-DIF.	0.241[*]	0.159[*]	0.51	0.24	0.104	0.244[*]	2.07	0.07
MEN-INT Fin.RISK	0.188[*]	0.127	0.51	0.23	0.204[*]	0.099	1.04	0.16
MEN-INT Tim.RISK	0.182[*]	0.043	2.06	0.07	0.237[*]	0.016	3.37	0.03
MEN-INT Per.RISK	0.228[*]	0.069	4.72	0.01	0.234[*]	0.06	1.73	0.09
MEN-INT Psy.RISK	0.117	0.139[*]	0.13	0.36	0.305[*]	-0.024	5.27	0.01
MEN-INT Soc.RISK	0.11	0.152[*]	0.10	0.38	0.258[*]	0.007	7.72	0.00
GENERAL Eva-DIF.	0.248[*]	0.294[*]	0.10	0.37	0.23[*]	0.204[*]	0.37	0.27
GENERAL Fin.RISK	-0.074	-0.077			-0.085	-0.068		
GENERAL Tim.RISK	-0.04	0.046			-0.125	0.069		
GENERAL Per.RISK	$-,007$	-0.067			-0.057	-0.006		
GENERAL Psy.RISK	0.05	-0.049			-0.062	0.049		
GENERAL Soc.RISK	0.005	-0.045			-0.035	0.015		
Eva-DIF. Fin.RISK	0.321[*]	0.316[*]	0.07	0.39	0.26[*]	0.368[*]	0.49	0.24
Eva-DIF. Tim.RISK	0.198[*]	0.241[*]	1.65	0.10	0.18[*]	0.225[*]	0.18	0.33
Eva-DIF. Per.RISK	0.305[*]	0.266[*]	4.35	0.02	0.27[*]	0.294[*]	0.40	0.26
Eva-DIF. Psy.RISK	0.211[*]	0.29[*]	1.56	0.11	0.188[*]	0.314[*]	3.10	0.04
Eva-DIF. Soc.RISK	0.079	0.038			0.045	0.101		
Fit indices	Baseline model (High): χ^2(314, $n = 562$) = 613.3, χ^2/df = 1.95, CFI = 0.98, RMSEA = 0.04. Baseline model (Low): χ^2(314, $n = 378$) = 639.6, χ^2/df = 2.04, CFI = 0.98, RMSEA = 0.04. Invariance test: χ^2(683) = 1930, χ^2/df = 2.83, CFI = 0.96, RMSEA = 0.04				Baseline model (High): χ^2(314, $n = 558$) = 560.3, χ^2/df = 1.78, CFI = 0.98, RMSEA = 0.04. Baseline model (Low): χ^2(314, $n = 563$) = 635.8, χ^2/df = 2.02, CFI = 0.98, RMSEA = 0.04. Invariance test: χ^2(607) = 1,097, χ^2/df = 1.81, CFI = 0.97, RMSEA = 0.03			

Notes: [a]Small p values ($p < 0.05$) indicate significant invariance between the pair of causal paths

related to all dimensions of PR, except social risk, for high and low levels of knowledge, but the invariance test reveal a significant difference only in the case of psychological risk (0.188 v. 0.314 $p = 0.04$).

The results described above show partial support for *H6.1* and strong support for *H5*, *H5.1* and *H6*. The next section will discuss these results and their implications.

Discussion

According to Zeithaml *et al.* (1993) past product knowledge allows it to be clearly represented in the consumer mind which in turn can lower its mental intangibility. However, as shown by Laroche *et al.* (2005), this relationship is stronger in a less intangible environment (offline). Our results show strong support for this belief as both hypotheses were supported (*H5.1* and *H5*). As seen in Table IV, in the brand perspective the direct relationship between mental intangibility and time, psychological and social risks are stronger for those with high levels of prior knowledge. Therefore, for those with high brand knowledge PR is not generated by the difficulty of evaluating the product but from the mental intangibility associated with it. In the other hand, it was found that a low level of knowledge is marginally more associated to ED ($p = 0.07$) and that could indicate that brands can be perceived as more mentally intangible for those that do not have enough information about them which will lead to an ED and an increase of PR. Nevertheless, it is interesting to note that this finding confirms the rationale provided when discussing *H3* and that future research will need to confirm this argument.

The support of *H5* also clarifies this rationale. The product category perspective is mentally less intangible than the brand because, for example, it is easier to imagine a car, but harder to imagine a given brand of car. Once that mental intangibility is lowered in the product category perspective prior product knowledge is not as relevant as with brands because even people who have little knowledge about a product category might still imagine it easily. However, for those who have little information about a brand, the level of knowledge is important, because it helps mentally grasp the product. We found that high knowledge leads to a stronger relationship of mental intangibility with social risk, while low knowledge leads to a stronger relationship with financial and performance risks. These opposite relationships support *H5*.

Tables III and IV also provided interesting findings on the role of knowledge for both perspectives. The level of product knowledge is a relatively less important factor in the relationship between ED and PR, since the invariance test revealed a significant difference between the paths only for financial risk. However, the scores indicate that PR may have a stronger influence on ED in the case of low knowledge, since they are consistently higher and with p-values close to significant. Also, it is logical to think that a person who has less information about a product category or brand will also have more difficulty to evaluate it and a different perception of risk.

The tests of *H6* and *H6.1* bring important findings on the moderating effects of involvement. Previous research provide support for the idea that involvement would be positively associated with evaluation difficulty and perceived risk (Xue, 2008; Bauer *et al.*, 2006) due to the tension that involvement provokes in people. Thus *H6* states that in the product category perspective the relationship between ED and PR is

stronger for the high involvement group. The idea is that high involvement leads to higher levels of ED and PR; in the case of a product category this difficulty is even higher since it is naturally harder to evaluate. The findings show that this argument is true for social, performance and psychological risks. Conversely, for the brand perspective we hypothesized (*H6.1*) that the ED-PR relationship is not different even in the case of high involvement, because brands can reduce the perceived risk. The findings partially support this hypothesis because the ED-PR relationship is not different for high and low involvement groups except for performance risk which has a stronger role in high involvement. This difference may indicate that general brands can reduce PR but not the concern about the product's performance, therefore, when a person is highly involved with a certain brand, the difficulty of evaluation can generate a higher perception of risk.

The research also found other interesting findings on the role of involvement. For instance, we found a negative relationship between physical intangibility and PR for the product category perspective for those with high levels of involvement. This finding expands the previous conclusion that the product category group not only trusts their prior knowledge to evaluate the product but also depends on involvement. Moreover, the positive relationship found between physical intangibility and only one PR dimension, namely performance risk for those with low involvement, in the brand perspective, also contributes to the conclusion that physical intangibility generates less PR for those with high involvement, especially in the product category perspective.

For the brand perspective mental intangibility is found to be more related to performance risk when people are more involved with the product, suggesting that it can catalyze this relation. The idea is that once people are involved, a product perceived as mentally intangible will provoke more concern. Finally the results also indicate that generality is similarly related to ED in the brand and product category perspectives in a high or low level of involvement demonstrating that a product perceived as generic is hard to be evaluated even when there is high involvement with it.

Managerial implications

Companies have long searched for strategies to reduce the customers' perceived risk on their products. From all our findings three deserves to be highlighted for further discussions on their managerial implications. First, we showed that brands are more mentally intangible which may lead them to be more difficulty to evaluate. This result supports the idea to expand more efforts to make the brand better known by their customers, especially because this difficulty of evaluation is stronger for those with low knowledge. Therefore, one important implication is the demonstration that brands can reduce risk, but only when they are well known to customers, otherwise they will be mentally intangible and harder to evaluate.

A second finding is that for a product category, when the product is physically intangible the customers rely more on their involvement to evaluate the risk. Therefore, companies should focus on increasing the impact of these factors with their products in order to make them seem as less risky. For example, they could offer a certain service for free during a period making their customer more involved with it.

Finally, we found that higher involvement generates a stronger ED-PR relationship for the product category

perspective. Therefore, involvement makes people perceive the product as riskier when they have difficulty in evaluating it. For that reason, companies should increase channels of communications so that highly involved customers can obtain information that will make the evaluation easier. For example, a car company could organize meetings with their prospective customers in order to answer some questions related to their products and ways to deal with problems and limitations so far found with them.

Research limitations and future research

Despite the contributions and findings of this research, one should always remember its limitations before applying the results. First, the goods and services used in the study might have affected its results, even though they were pre-tested. Future research should consider different sets of goods and services, not only to add validity to this research but also to test if these relationships would still occur in the case of services that are extremely risky, such as a surgery, or with a highly intangible good, such as a movie.

Second, this research supported the idea that moderating variables are important for the relationship between intangibility and PR. However others should also be considered such as the strategies used by consumers to reduce risk (e.g. word-of-mouth, asking for extra warranties, search for information, allow extra time to think before making a purchase, etc.). Therefore, future research should include such variables to help marketers create strategies for reducing the risks related to their products.

Third, Taylor (2007) shows that a multi-dimensional view of involvement is promising and should be used in future research. He distinguishes cognitive from affective involvement showing that each dimension can influence differently decision making processes. However, his operational definition of involvement is very similar to our definition of knowledge, because it describes the motivational process of searching for information about the product. Nevertheless, future research should consider this distinction and incorporate the idea of distinguishing between cognitive and emotional involvements.

The use of a convenience sample is also an issue. This method is acceptable for testing theory (Calder *et al.*, 1981), but one should be careful to generalize these results to a broader population. Therefore, future research should focus on collecting data with a more representative sample. Moreover, it would also be interesting to verify how the constructs will be related for populations coming from different cultures.

Nevertheless, this research understands intangibility and PR as multiple dimensions and actually considers each as a single factor. This strategy has proven to be very efficient since it clarified the relationship between the constructs indicating that it should be used as a basis for future research on intangibility and perceived risk.

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About the authors

Michel Laroche is the Royal Bank Distinguished Professor of Marketing at the John Molson School of Business. He is a Fellow of the Royal Society of Canada, the APA, AMS and SMA and he has received numerous research awards. He has published over 250 articles, numerous books and book chapters. He is serving as the Managing Editor of the *Journal of Business Research* and as member of the BOG of the Academy of Marketing Science. His main research interests are in the areas of services marketing, retailing, communication and internet marketing. Within consumer behaviour topics, he is mostly interested in the role of culture and the brand decision processes. Michel Laroche is the corresponding author and can be contacted at: laroche@jmsb.concordia.ca

Marcelo Vinhal Nepomuceno is a PhD Student at the John Molson School of Business. He holds an MSc (2007) in Psychology from the University of Brasilia. In Brazil, he has worked in the advertisement and banking industries, in both public and private sectors. He has published papers on *Estudos de Psicologia (Natal)* and *Revista Psicologia Organizações e Trabalho,* with forthcoming papers at *Revista de Administração Mackenzie* and *Educar em Revista*. His research interests are in social psychology, consumer behaviour and evolutionary psychology.

Marie-Odile Richard is a Post-doctoral Fellow in neuroscience at the University of Montreal. She received her MSc (2003) from Concordia and her PhD (2008) from HEC-Montreal Business School. She has won numerous awards including the Jane Fenyo prize of the AMS. She has published 15 articles in journals and proceedings, including one in the *Journal of the Academy of Marketing Science* and one in the *Journal of Social Psychology*. Her research interests are in the areas of services marketing, marketing communication (including internet marketing), cultural effects on individual responses and the emerging field of neuromarketing.

Executive summary and implications for managers and executives

This summary has been provided to allow managers and executives a rapid appreciation of the content of this article. Those with a particular interest in the topic covered may then read the article in toto *to take advantage of the more comprehensive description of the research undertaken and its results to get the full benefits of the material present.*

The drop in sales of heating, ventilation and air-conditioning (HVAC) systems has been attributed mainly to fewer new homes being built. Manufactures have responded by promoting their higher-priced ultra-efficient systems as the answer to soaring energy costs. Government agencies and public utility companies have also tried to stimulate demand by providing rebates and tax credits to homeowners who purchase these systems. However, growing market competitiveness has made dealers cautious about offering more expensive HVAC systems in the belief that they risk overpricing themselves. Based on consumer feedback that price is the main or even sole factor, many are therefore promoting lower cost packages. That manufactures are consequently focusing more on base models has further eroded sales and margins.

Key issues

Brand equity may become even more influential in such circumstances. Scholars divide customer-based brand equity into brand awareness and brand image. Exposure creates the former, whereas enhancement of the latter can be achieved through marketing activities, credible spokespersons and product performance. Consumer perception of product quality can likewise contribute. Brand loyalty and consumer willingness to pay premium prices are among the benefits brand equity can secure.

Previous research in the HVAC market found awareness of all brands to be below 35 percent. No correlation was found between brand awareness and market share either. And even though results indicated that consumers buying replacement systems were likelier to research equipment brands rather than dealers, the researchers deduced that dealer branding was more important than HVAC equipment branding.

Given these findings, it is likely that consumer purchase decisions relating to HVAC products are influenced more by brand image than brand awareness. Such purchases are characterized by their complexity and high consumer involvement spanning the problem recognition, solution search and evaluation stages that occur prior to decisions being made. Analysts note that customers who are replacing their system may opt for the same brand if they have been happy with its features and performance. Where discontentment has occurred or additional benefits are sought, a search for information about substitute brands is likely.

Previously, most consumers would have possessed little or no knowledge about HVAC systems and would rely heavily on dealer guidance. But information about consumer durables has become easier to attain since the internet has emerged. Even though certain individuals might now make purchase decisions prior to dealer contact, research has shown that dealer influence continues to be significant for two-thirds of those buying replacement HVAC systems. That most manufacturers do not market directly to the public is a key reason for this.

In addition to past experience, brand image, design, features and price are typical drivers of consumer choice. Statistics reveal that buyers of residential air conditioners are likelier to switch brands when the product needs replacing earlier than anticipated. Brand loyalty, on the other hand, is more common when lengthy product lifespan has ensued.

Perceived quality is a key factor for many buyers of durable goods. Research has identified ease of use, versatility, performance, durability, prestige and serviceability as quality dimensions. It has also discovered that brand name is far more powerful than price when it comes to perceived quality. As a result, few manufacturers of high quality durable consumer goods market through price. Different scholars have, however, noted that marketing can impact on perceived quality and brand equity even more than actual product performance. One study found that advertising positively impacted on the perceived quality, brand awareness, brand image and brand loyalty dimensions. Negative previous experiences can, however, considerably negate this marketing effect.

Survey and results

Seitz *et al.* explored these issues in a survey of homeowners in Southern California, USA. Gender representation in the random sample was almost equal and 72.2 percent of the 147 respondents were aged between 31 and 60. A self-

administered questionnaire was distributed and participants were asked to consider their response to a scenario that involved replacing their failed air conditioning system.

A core aim was to ascertain consumer attitudes and behaviors during the decision-making process. Respondents were asked to indicate how important they considered a range of attributes that included reliability, ease of use, reputation of brand, energy efficient features, serviceability, discounts or promotions, prior brand experience, price and salesperson recommendation. Statements also explored brand equity and likelihood of using various impersonal and personal information sources during the decision making process.

Respondents indicated reliability, energy saving features and serviceability to be the most important attributes, while sales person recommendations, brand reputation and prior experience with the brand were the lowest ranked. The majority indicated an indifference to brand name and this elicited author speculation that limited awareness of brand names in this product category could be a factor. That brand loyalty cannot exist without brand awareness is also pointed out. A fraction over 40 percent associated brand name with quality and virtually all of these would pay more for a HVAC brand with a good reputation in this respect. Almost two-thirds of the total sample indicated likewise. The apparent significance of this particular finding is, however, clouded by the low rating of the brand reputation attribute.

Friends and family followed by manufacturer's website and manufacturer's brochures were listed as the information sources most likely to be used, while yellow pages, sales persons and social networking sites were the least considered. Age was not found to significantly determine information source preference, thus questioning assumptions about older people using traditional media and younger consumers the internet. Essentially, demographic differences were inconsequential with regard to all responses.

Marketing suggestions

The survey indicates consumer belief that certain features communicate quality and a willingness to pay more for HVAC system that contain such attributes. Seitz et al. therefore suggest that marketers should target end users more in order to better inform them about the key attributes of their brand. Although the role of dealers in conveying such information is noted, the survey revealed that few consumers regard them as a preferred information source.

Making consumers better informed about air conditioning systems could help reduce assumptions that brands are homogenous and transform the tendency to use price as the main choice determinant. A pull strategy involving media placement is a recommended means of boosting brand awareness. Marketers should utilize manufacturer's websites and brochures supplemented with frequent and seasonal messages conveyed by broadcast media, further reinforced through print media and cheaper outdoor advertising such as billboards. Manufacturer websites should provide homeowners with information pertaining to brand attributes and benefits and all advertising forms need to direct consumers there. Emphasizing key attributes will enable differentiation from other systems and further raise the importance of brand name. The positive impact on brand equity will then enable manufacturers and dealers to charge premium prices. Dealers are advised to forge closer relations with consumers to ascertain their exact needs and offer any relevant extras such as filtration or humidifiers. Providing quality service to consumers can boost revenues and lead to repeat business and positive word-of-mouth recommendations. Maintaining telephone and email contact and seeking feedback are other ways to fortify the connection. Additional suggestions are for dealers to use outdoor advertising and include the manufacturer's logo on their sign to profit from the HVAC system's brand equity.

(A précis of the article "How do involvement and product knowledge affect the relationship between intangibility and perceived risk for brands and product categories?". Supplied by Marketing Consultants for Emerald.)