




Attributional Triadic Relationships between End-Users, Specifiers, and Vendors: Evidence from Building Supply Retailers

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Abstract

Purpose – This study proposes to evaluate product attributes in an unusual triad of actors: end-users, vendors, and specifiers. The differences in perceptions of product attributes between these triadic actors can bias strategic marketing decisions for functional and aesthetic products in a building supply retailer, which is understudied in the retail literature.

Theoretical framework – The study uses the attribution theory approach and provides a new perspective to explain differences in attribute evaluations in this triad (end user-specifier-vendor).

Design/methodology/approach – The hypotheses are tested in two countries' functional and aesthetic building material categories. Attribute evaluations were performed using the ranking method and Borda count. We used ANOVA, linear discriminant analysis (LDA), and the Mahalanobis squared distance (MSD) for the estimations.

Findings – The hypothesis tests confirmed the difference in attribute evaluations between end-users, vendors, and specifiers for functional products; however, as we hypothesized, no difference was found for aesthetic products.

Practical & social implications of research – Our discussion will help retail practitioners avoid bias in marketing strategy. In the development of new products, manufacturing companies should consider differences between actors, especially in collaborative product developments.

Originality/value – This study contributes to the literature by using an attribution theory approach and provides a new perspective to explain differences in attribute evaluations in this triad (end-user-specifier-vendor). We provide insights into allocating causes and responsibility in product attribute selection.

Keywords: Attribution theory, attribute, vendor-end-user-specifier, assortment strategy.

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1 Introduction

The selection of product assortment is a strategic decision for retailers, and managers address it by evaluating product attributes; product attributes can be relevant in motivating consumers' buying behavior, such as satisfaction and loyalty (Garton, 1995). In addition, for retailers to create and enhance strong customer relationships to promote customer satisfaction, they can influence purchase intention and WOM (word of mouth) through the mediation of product category involvement (Menidjel et al., 2019). In addition, customer satisfaction can mediate the relationship between retail attributes and patronage intentions (Nair, 2018). Consequently, for retailers, managing product attributes is strategic for consumer purchase behavior, customer satisfaction, and loyalty.

Product attribute perceptions are equally important in today's sustainable environment for private label management, a central issue in sustainable development, as it eliminates over-packaging (Monnot et al., 2015) and consumer desire for aesthetic attributes for sustainability (Rombach et al., 2018). Furthermore, attribute perceptions can be relevant not only in traditional channels; the Internet can be a significant sales channel for some specialty products with specific attributes (Canavan et al., 2007). Equally important is the fact that users with a hedonic motivation can differ from those with a utilitarian motivation in the relationship with retail satisfaction and repurchase intention (Munaro et al., 2020). Therefore, this difference must be considered in this study.

Marketing and retail channels account for approximately one-third of global gross domestic product (Watson et al., 2015). Specifically, the retail market for building materials has been scarcely studied despite its considerable value. The estimated overall size of the global building materials market was 800 billion US dollars in 2019 (S&P Global, 2019), which is more substantial than the global grocery market (Nair, 2018). Moreover, it is highly relevant to both developed and emerging countries.

The typical retail market model involves the interaction between vendor and end-user; however, there are situations in which a specifier can influence purchase decisions, changing this dual relationship. Some examples of the typical tripartite trade model are when a doctor prescribes a medicine and the patient buys it at a pharmacy, when an electrician specifies electric cables and the consumer buys them at a hardware store, or when a

teacher suggests a book and the student must purchase it at a bookstore. In these cases, we have three actors: the end-user, the specifier, and the vendor. We also have three relationships: vendor-end-user, specifier-end user, and specifier-vendor.

Therefore, the research questions addressed to advance this literature stream are as follows: What is the difference between end-users, specifiers, and vendors in attribute selection? How can these differences be theoretically explained? What are the differences between hedonic and utilitarian products?

The volume of studies using dyadic designs remains relatively low compared to studies using non-dyadic designs (Krafft et al., 2015). Studies with triadic designs involving consumers are scarce in the marketing literature. Wuyts et al. (2004) studied investors' preferences in vertical marketing systems for patterns of relationships among the triad of end-users, intermediaries, and suppliers. Recently, Benoit et al. (2017) presented a conceptual framework that explained the roles of a triad of actors: platform providers, peer service providers, and customers.

Despite the fact that the study of the relationships between end-users, specifiers, and vendors can seem straightforward or obvious, to the best of our knowledge and according to our literature review, there is a lack of research on these relationships. Consequently, there is an opportunity for research using these triadic relationships. With this research, we first contribute by broadening the domain of attribution theory in the context of attribute evaluations outside its boundary condition. Second, in our methodology, we use a triad design of actors that is scarce in the marketing and retail literature and, with attribution theory, try to explain the differences in attribute evaluations. Third, understanding differences, results, and discussions in relation to this triad will help practitioners avoid bias in strategic marketing decisions.

2 Theory and hypotheses

Table 1 presents relevant studies on consumer attribute selection and attribution theory. To the best of our knowledge, none have considered a triad model with an end-user, vendor, and specifier, or the difference in the choice of attributes. This study aims to close this research gap and contribute to broadening the boundaries of attribution theory in a new context to explore how the three actors differ in allocating causes and responsibility in the process of selecting product attributes.

Table 1
Relevant literature on attribute selection and attribution theory in marketing

Reference	Theory	Unit of Analysis	Method	Key Findings
Ellen et al. (2000)	Attribution theory	Consumer	Lab experiment	In two retail contexts, grocery and building supply stores, consumer evaluations were more favorable for disaster-related compared to ongoing causes.
Chernev (2001)	Differentiation-consolidation theory	Consumer	Lab experiment	Established preferences moderate the effect of attractive and unattractive common attributes on consumer preferences.
Vaidyanathan and Aggarwal (2003)	Attribution theory	Consumer and vendor	Lab experiment	Manipulation of the seller responsibility; cost-justified price increases can be perceived as less fair.
Rifon et al. (2004)	Attribution theory	Consumer	Lab experiment	A good fit between a firm and the cause affects sponsor credibility; however, altruistic sponsor attitudes mediate this relationship.
Wuyts et al. (2004)	Social network theory	Buyer, vendor, and supplier	Survey	Mixed evidence that buyers value direct access to suppliers when strong ties exist between the vendor and suppliers.
Yang and Raghurir (2005)	Empirical	Consumer	Lab experiment and scanner data	The more elongated a container, the lower its purchase quantity.
Miller and Kahn (2005)	Conversational implicature theory	Consumer	Lab experiment	Consumers will react favorably to unusual color or flavor names because they expect marketing messages may give useful information.
Carlson et al. (2006)	Empirical	Consumer	Lab experiment	Attribute evaluations are biased because of the preference for an installed leader and the resulting over-selection of that leader.
Ersal et al. (2011)	Empirical	Consumer and designer		A designer does not work at the same level of product attribute perception, observed by consumers.
Dubois et al. (2011)	Size as signal of status	Consumer	Lab experiment	Consumers viewed larger-sized food options as having greater status, enhanced when consumption was public.
Lange and Washburn (2012)	Attribution theory	Stakeholders	Conceptual	Attributions of irresponsibility originated from the firm observer's subjective evaluation.
Massara et al. (2014)	Spatial biases in shopping behavior	Consumer	Lab experiment	In retail displays, the consumer's perceptual bias in recognizing partially stocked shelves is significantly faster and more accurate when responding to images presented in the left than in the right visual field.
Falkowski et al. (2015)	Deese-Roediger-McDermott paradigm	Consumer	Lab experiment	Look-alike brands were falsely recognized at a higher rate than original brands.
Pinar et al. (2016)	Three promises theory	Customers, managers, and contact personnel	Survey	Branding gaps between the perceptions of managers, customers, and contact personnel.
Benoit et al. (2017)	Capabilities approach	Platform provider, peer service provider, and customer	Conceptual	Presents a framework explaining the actors' roles across three dimensions: motives, activities, and resources and capabilities.
Kennedy (2017)	Attribution theory	Consumer	Lab and online experiments	A post asking for consumer feedback on a brand can increase brand commitment and purchase intention compared to a celebrity-endorsed message.
Lin and Wang (2017)	Numerical cognition process	Consumer	Lab experiment	Distorting the perceived magnitude of the price toward the leftmost digit.
Moser et al. (2018)	Attribution theory	Consumer	Lab experiment and data set	The flat-rate bias shows that consumers will choose flat rates even if a pay-per-use tariff would be less expensive.
Grandi et al. (2020)	Need for cognition perspective	Consumer and retailer	Online experiment	In-store marketing stimuli influence the purchase behavior for healthy products, in consumers low in self-control.

Attribution theory helps explain and understand how ordinary people assign causes and responsibilities to events (Dixon et al., 2001). Explanatory thinking is a fundamental psychological process in which individuals make inferences about an event's underlying causes rather than using a passive process (He & Bond, 2015). Attribution theory helps understand how people make causal inferences about others' behaviors (Ellen et al., 2000). This theory has been used to explain a variety of consumers' behaviors and their inferences related to responses to product endorsements (Dixon et al., 2001), salespeople's performance, self-perception, and decision-making (Vaidyanathan & Aggarwal, 2003), as well as the effect of color and flavor names on consumer choice (Miller & Kahn, 2005). Asymmetrical preferences and compromises are determinants of the decision-making process in attribution preference and strength (Yoon & Simonson, 2008). The dispersion of online word of mouth (He & Bond, 2015) and co-creation of posts increases purchase intention and brand commitment when celebrity-endorsed (Kennedy, 2017).

The difference in perceptions between buyers has been previously studied as perception distortion. The relevant marketing literature on attribution distortion in the seller and end-user relationship shows the distortion of price discounts and price fairness (Vaidyanathan & Aggarwal, 2003; Lin & Wang, 2017). This literature covers the impact of standard features on consumer preferences (Chernev, 2001); the distortion of how consumers evaluate corporate social responsibility efforts (Ellen et al., 2000; Rifon et al., 2004; Lange & Washburn, 2012); leader-driven primacy bias over consumer choice (Carlson et al., 2006); the distortion effect of package shape (Yang & Raghuram, 2005) and product size (Dubois et al., 2011) on purchase decisions; the perceptual bias in recognizing partially stocked shelves (Massara et al., 2014); consumer confusion between the original brand and look-alike brands (Falkowski et al., 2015); and flat-rate bias even if the pay-per-use rate is cheaper (Moser et al., 2018).

According to attribution theory, actors (users, vendors, or specifiers) are exposed to a selection process, and this becomes an observable event in which people assign causes based on the cause-and-effect process (Kennedy, 2017). Weiner (1991) conceptualized a multidimensional view of attribution and employed three attributional dimensions (Tsiros et al., 2004). The first locus of causality is the one responsible for the action. The cause can be internal or external. In the case of a price

increase, the cost from the end-user's perspective is that the vendor controls the increase, not their responsibility. The second is controllability: the action is volitional or unavoidable. In this case, a vendor can perceive that the specifier can control the type of product with a specific attribute that can be used to recommend the user buys it. Stability refers to whether the cause remains stable over time (Vaidyanathan & Aggarwal, 2003). In the case of a construction project, the user's perception should be different, depending on whether it is temporary or endures over time.

Prior research has identified the connection between attribution theory and the attribute-selection process (Carlson et al., 2006; Yoon & Simonson, 2008; He & Bond, 2015). Consequently, our proposed mechanism is based on grounded theory. Our attribution theory approach provides a new perspective on studying the actors involved in products, where specifiers influence end-user decisions. This new view helps to understand the different attribute choices between specifiers, final users, and sellers. Thus, causal inferences can be made about another person's behavior.

According to attribution theory, we posit that specifiers influence user attribute evaluations related to functional products. User perception means that specifiers can control the choice of attributes to get a job done (controllability, according to attribution theory). Moreover, it is responsible for this specification (responsibility from an attributional approach). In addition, there is empirical evidence of perceived differences between users and specifiers for functional attributes. In the automobile industry, vehicle interior craftsmanship designers, who are specifiers, usually perceive product attributes differently from consumer-observed attributes (Ersal et al., 2011); in practice, most cases align the design process with consumer preference as a complex process (Mousavi et al., 2001). In pharmaceutical markets, specifiers and end-users exhibit behavioral differences, where medical doctors who act as specifiers have an average advertising elasticity of 0.326, which is above the patient's elasticity of 0.123; consequently, attributional reactions differ (Kremer et al., 2008; Palomino-Tamayo et al., 2020). In the customization strategy, users tend to question the motive for specifier recommendations (Coker & Nagpal, 2013) because of the difference in attribute perceptions between end-users and specifiers. Based on similar empirical evidence and the proposed theoretical mechanism, we propose the following hypothesis:

H_{1a} : End-users and specifiers evaluate attributes differently in functional products.

For functional product behavior, the cognitive dimension has been shown to have a high impact on purchase intention (Anaya-Sánchez et al., 2020). According to this cognition in the supply chain structure, the attribution theory that users perceive controllability (locus of control) depends on the firm's influence over specific problems (Hartmann & Moeller, 2014). Consequently, in technical issues where cognition is prevalent over emotions, users perceive vendors as not being a locus of control for recommendations, especially for products that require professional recommendations or specifications and are boosted by the user perception of vendor interest in sales and margin, which is their main interest (Koul & Jasrotia, 2019). We thus propose that users perceive that the vendor is not the locus of control in selecting the product attributes in functional products, which are external to them. In the presence of another actor who specifies, the vendor also perceives that the final user is not the locus of control and that their interest is in generating sales volume and profit. Based on this, we propose the following hypotheses:

H_{2a} : End-users and vendors differ when evaluating attributes in functional products.

Theoretically, specifiers perceive vendors as being without a locus of control and responsibility for the quality of the job, and because the specifier is not the end-user, the vendor should infer the attribute choice according to specifiers. However, their main interest is sales volume, profit maximization, and lack of responsibility and control, the attributes of which are the specifier's decision. Therefore, the vendor will evaluate attributes according to their economic interest and perception of a lack of control and responsibility, which differs from the specifier's interest. The vendor's economic interest is well known in the retailing literature with its different analytical models to solve the profit maximization problem (Kazemi & Zhang, 2013). Retail margin is the most critical criterion in product mix selection, and store design affects the number of categories kept in the store because of limited shelf space (Koul & Jasrotia, 2019). Specifiers are aware of this, and technicians understand the economic forces that affect the market and do not observe prices as a function of product attributes (Pauwels & D'Aveni, 2016). In this sense, specifiers perceive the use of vendors' arguments

about product attributes as being without any technical evidence, which is a usual sales tactic that may be perceived as puffery because of a lack of expertise (Chakraborty & Harbaugh, 2014) and technical knowledge. As a result, specifiers' technical perceptions in attribute evaluations can differ from those of vendors because vendors lack technical knowledge and economic interest. Based on this empirical evidence and the theoretical mechanism, we propose the following hypothesis:

H_{3a} : Specifiers and vendors evaluate attributes differently in functional products.

Purchasing utilitarian products in the retail environment tends to be more rational than buying hedonic products; utilitarian products/services require longer evaluation times and detailed online reviews. By contrast, the evaluation of hedonic products is shorter in duration (Zhu et al., 2019). Multichannel customers are the most valuable segment only for hedonic product categories; it takes more effort to change the channel (Kushwaha & Shankar, 2013). Mobile coupon redemption depends on the type of product offered; when the retailer offers a hedonic product, consumers' redemption intention is higher than it would be for a functional product (Khajehzadeh et al., 2015), showing that hedonic products in a retail setting are promotional and for impulse shopping. Aesthetic attributes of hedonic products, such as styling, can compensate for minor flaws in functionality (Hagtvedt & Patrick, 2014); consequently, the importance of the specifier in the buying process is reduced.

However, in the absence of technical factors in aesthetic products, each actor perceives that they have control over the decisions (controllability according to attribution theory), for which we propose that aesthetic subjectivity prevails (emotional connection). Specifiers and vendors act according to their tastes and preferences, behaving as users. This emotional connection in responsibility attribution has been previously established (Hartmann & Moeller, 2014). Therefore, each one controls the selection with no difference in selection. Thus, we posit the following hypothesis:

H_{1b} : End-users and specifiers do not evaluate the attributes in aesthetic products differently.

H_{2b} : End-users and vendors do not evaluate the attributes in aesthetic products differently.

H_{3b} : Specifiers and vendors do not evaluate the attributes in aesthetic products differently.

3 Study I

A random sample was obtained of traditional building supply retailers in Lima, Peru. These retailers are the only way to contact the final users and specifiers currently using building materials in this country. We used a convenience sample of end-users and specifiers. A professional market research firm conducted the field survey. They also provided information about the attributes relevant to the market, as found in prior studies, and we corroborated this in a pilot sample of 45 participants, 15 for each actor. A supervisor from the research agency conducted a second control survey of 30% of the questionnaires for quality checks.

3.1 Participants

The market research company used a sampling frame from a census of approximately 4000 hardware retailers. A sample of 201 retailers was randomly selected from this database, and participants were contacted at the point of sale. At the end of the survey, each participant received a small gift (a promotional pen). In the first part of the questionnaire, the objective of the filter questions was to separate the actors (end-users, specifiers, and vendors) to assign them to each group. The final sample of volunteers was composed of 201 vendors from different stores (66% male, average age=43), 79 end-users (76% male, average age=43), and 127 specifiers (88% male, average age=46). The difference between the number of the types of participants was because at each point of sale, a vendor was interviewed without any problems; however, the random arrival of end-users or specifiers involves considerable waiting time, thus the difficulty in achieving a balanced sample since they do not reach the points of sale in the same proportion, although they represent the original mix of the market.

3.2 Procedure

First, the interviewer told the participants that this study was for academic purposes and focused on the nature of the attributes or characteristics, and not on a brand or company (Ellen et al., 2000). The participants were then exposed to a cover story, where the interviewer asked them to imagine that they were on a construction

project and had to buy/recommend/sell (depending on the actor's role) building materials based on their characteristics. Next, eight cards with attributes were given to the participants, and they were asked to rank them according to importance for copper electrical cables (see a detailed list of the attributes in Appendix A. Supplementary Data 1 – Study 1 Questionnaire). We used this procedure because the judging process is relative to the alternatives and is not absolute (Evangelidis & van Osselaer, 2018); consequently, a joint evaluation is recommended to evaluate these attributes. Then, demographic questions were asked.

Finally, we used the Borda count (Ng & Nudurupati, 2010; Marine-Roig & Anton Clavé, 2015), which involves giving points to each attribute in reverse proportion to their ranking. The highest-ranked attribute receives the highest points corresponding to the number of attributes, whereas the lowest-ranked attribute receives only one point (Emerson, 2013). We selected this method because it is easy to understand and, for practitioners, it is a conventional method for evaluating attributes. The Borda count is intended to provide a broadly acceptable or consensus-based option rather than a majority preference, similar to real choice scenarios. In addition, the Borda count is the best method for ranking attributes that are not subject to statistical problems, similar to other pairwise voting procedures (Saari, 2000; Dym et al., 2002) (Appendix A. Supplementary Data 2 – Study 1).

3.3 Study I results

Based on the mean ranking of attributes by agent, the univariate analysis involved ANOVA estimations and Duncan's adjusted t-test. Figure 1 shows the significant differences in the ranking of attributes between end-users and specifiers for the five attributes.

In addition, for users and specifiers, the difference is significant for the five attributes. Equally, a difference in ranking between vendors and specifiers occurred in six attributes. Duncan's adjusted t-test was used for multiple comparisons and estimates to protect against false negative (Type II) errors. As a robustness check, we re-estimated Bonferroni's adjustment (Holland & Copenhaver, 1988) because this method does not require equal sample sizes and is more conservative. There was no change in the conclusions of the first analysis, and the results were as expected. However, we needed confirmation with an estimation at a multivariate level, because outcomes can

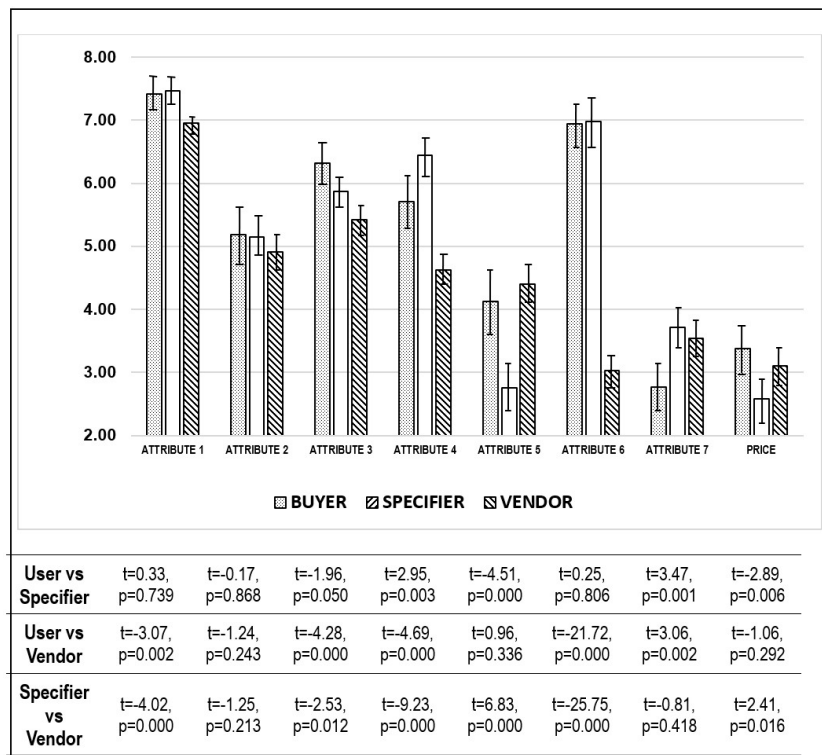


Figure 1. Study 1 results of univariate analysis of mean ranking of attributes by the actors (Duncan’s adjusted t-test) - (I95% confidence interval)

change based on the interaction of all attributes (Appendix A. Supplementary Data 3 – Study 1: Stata results).

For the multivariate analysis, we carried out a linear discriminant analysis (LDA) to calculate whether the differences were significant and the calculated the Mahalanobis squared distances (MSDs) between groups (Mahalanobis, 1936). The LDA for all attributes showed an adequate classification for each group: 64.6% for users, 62.2% for specifiers, and 95.0% for vendors. For the MSD test, the results show that final users and specifiers differ in their evaluation of attributes (MSD=1.10, F=6.55, p=0.000), supporting hypothesis H1a. Hypothesis H2a is supported, where users and vendors evaluate differently, with a significant difference between the MSD groups (MSD=21.63, F=150.69, p=0.000). Finally, the MSD estimation shows that the specifier and seller groups are significantly different in their evaluations (MSD=21.68, F=207.28, p=0.000), supporting hypothesis H3a (Appendix A. Supplementary Data 3 – Study 1: Stata results).

4 Study 2

Study 2 aimed to replicate the effects observed in Study 1 and emphasize external validity. Study 2 extended

Study 1 using a sample from another country, namely Chile, to demonstrate the difference in selection between functional and aesthetic categories.

4.1 Pretest

The objective of the pre-test was to verify whether a significant difference exists in the perception of aesthetic and functional products. The design involved two actors: the end-user and specifier. They evaluated seven product categories for functional products (bricks, water piping, roofing, and electric wiring) and aesthetic products (floors, luminaries, and faucets). In exchange for credits, 68 postgraduate students were used as convenience samples (34 in Peru and 34 in Chile). We used a database of two large universities in each country, and the participants were invited and recruited. The study was conducted in laboratories, and a computer questionnaire was administered (see Appendix A. Supplementary Data 4 – Study 2 pretest questionnaire). First, filter questions differentiated end-users from specifiers and ensured that end-users were making some home improvements or doing building work, and the specifiers were actively recommending building materials, to ensure that they were part of the

target audience. After undergoing the filter, the participants were assigned to a specifier or user group. Later, using a 7-point semantic scale, we asked them to characterize the “product category” mainly as a functional or aesthetic product, according to the following scale: 1 for “mainly functional” and 7 for “mainly aesthetic.” The scale was back-translated into Spanish and adapted from Klein and Melnyk (2016) (Appendix A. Supplementary Data 5 – Study 2 pretest data).

The results from the users confirmed the following for the functional products: wiring mean=2.09 (SD=1.14), piping mean=2.03 (SD=1.34), and bricks mean=2.74 (SD=1.71). Then, the users confirmed their aesthetic perception for floors, with a mean=4.91 (SD=1.46), and luminaries, with a mean=4.18 (SD=2.07). For roofing, the mean=3.65 (SD=1.72) was perceived as near to aesthetic products, and for faucets, the mean=3.59 (SD=1.89) did not confirm them as aesthetic products. Similarly, the specifiers confirmed the following for the functional products: wiring mean=1.18 (SD=.58), piping mean=1.38 (SD=1.02), and bricks mean=2.32 (SD=1.70). For roofing, the mean=3.74 (SD=1.64) meant it was perceived as aesthetic. For the aesthetic categories, the specifiers confirmed the following: flooring mean=4.94 (SD=1.67), faucets mean=4.12 (SD=1.91), and luminaries mean=3.74 (SD=1.64). Finally, we selected two functional products for study, wiring and piping, and flooring and luminaries as aesthetic products. Significant differences were found between the selected product categories, confirming that we have different perceptions and allowed manipulation (Appendix A. Supplementary Data 6 – Study 2 pretest Stata results).

4.2 Participants

Similarly to Study 1, a census sample frame of approximately 4,000 hardware stores in Lima was used, from which the market research agency randomly selected a sample of 40 retailers, in which all participants were contacted in person. First, the interviewer applied filter questions to separate actors. The final sample of volunteers comprised 40 consumers (61% male, average age=43), 40 specifiers (90% male, average age=48), and 40 vendors (53% male, average age=42).

For the Chilean sample, we used a database of 505 postgraduates from a top university, of which 40 were randomly selected to meet the requirements of having been involved in a building project (60% male, average age=35). We used a database of 45 professionals from a

building material store chain as specifiers and randomly selected 40 respondents (60% male, average age=41). For vendors, we used a database from a building material distributor with 450 employees across Chile and randomly selected 40 respondents (80% male, average age=33).

4.3 Procedure

For the Peruvian sample, we followed the same procedure as in Study 1. First, the interviewer provided the participants with a cover story. The interviewer gave them five cards with the attributes of the first product category, and they were asked to rank them by importance (see the detailed list of attributes in Appendix A. Supplementary Data 7 – Study 2 questionnaire). After this, the interviewer randomly gave them the next set of cards from the other categories, and so on, for this study’s four categories. We sent an online questionnaire to the three Chilean sample databases. The questionnaire had filters, and the questions were closed-ended ranking types (Appendix A. Supplementary Data 7 – Study 2 questionnaire). Finally, we use the Borda count (Ng & Nudurupati, 2010; Marine-Roig & Anton Clavé, 2015) to rank the answers and estimate differences between attributes as in Study 1. For the LDA calculations, we used four attributes for each product tested.

4.4 Study 2 results

For the wiring category, we did not find a significant difference between the mean Borda count scores for each attribute of the Peruvian and Chilean samples. Similarly, we did not find any significant differences between the piping categories. However, in the flooring category, we found differences in the Borda count scores between the Peruvian and Chilean samples. For specifiers, we found significant differences in attribute 1 ($t=3.87$, $p=0.000$), attribute 2 ($t=-1.70$, $p=0.046$), attribute 3 ($t=2.15$, $p=0.018$), and price ($t=-4.57$, $p=0.000$). In the case of the vendor samples, the differences were in attribute 1 ($t=5.53$, $p=0.000$) and price ($t=-4.12$, $p=0.000$). Similarly, for the luminaries category, the user samples showed significant differences between countries for attribute 2 ($t=-2.66$, $p=0.005$), attribute 4 ($t=3.60$, $p=0.000$), and price ($t=-2.05$, $p=0.022$). The specifiers showed differences in attributes 1 ($t=1.75$, $p=0.042$), 2 ($t=-3.34$, $p=0.001$), 3 ($t=3.86$, $p=0.000$), and price ($t=-2.76$, $p=0.004$). Finally, for the vendors in this category, the significant differences were in

attribute 1 ($t=3.37, p=0.001$) and price ($t=-4.27, p=0.000$) (Appendix A. Supplementary Data 8 – Study 2).

The results for the functional products are shown in Figure 2. According to the LDA, the classification for wiring was as follows: users 47.5%, specifiers 73.8%, and sellers 58.8%, which is adequate. Table 2 shows the MSD tests for users vs. specifiers ($MSD=1.39, F=13.73, p=0.000$), users vs. vendors ($MSD=0.63, F=6.26, p=0.000$), and specifiers vs. vendors ($MSD=1.99, F=19.68, p=0.000$); the LDA classification for piping products: users 43.8%, specifiers 56.3%, and vendors 43.8%, which was adequately classified; and the MSD tests for users vs. specifiers ($MSD=0.31, F=3.01, p=0.019$), users vs. vendors ($MSD=0.59, F=5.80, p=0.000$), and specifiers vs. vendors ($MSD=0.71, F=7.00, p=0.001$) (Appendix A.

Supplementary Data 9 – Study 2: Stata results). In summary, these results support hypotheses H1a, H2a, and H3a in that attribute evaluations are significantly different for functional product users, specifiers, and vendors.

In the case of aesthetic products, the results are presented in Figure 3. The LDA classification for floors is as follows: user 37.5%, specifiers 36.3%, and vendors 42.5%, which is not adequately classified and will be reflected in the MSD test (Table 2). The MSD test was used for users vs. specifiers ($MSD=0.07, F=0.72, p=0.579$), users vs. vendors ($MSD=0.09, F=0.87, p=0.484$), and specifiers vs. vendors ($MSD=0.11, F=1.06, p=0.376$). The results in the case of floors support hypotheses H1b, H2b, and H3b, in that for aesthetic product users, specifiers, and vendors, there is no significant difference in the evaluation

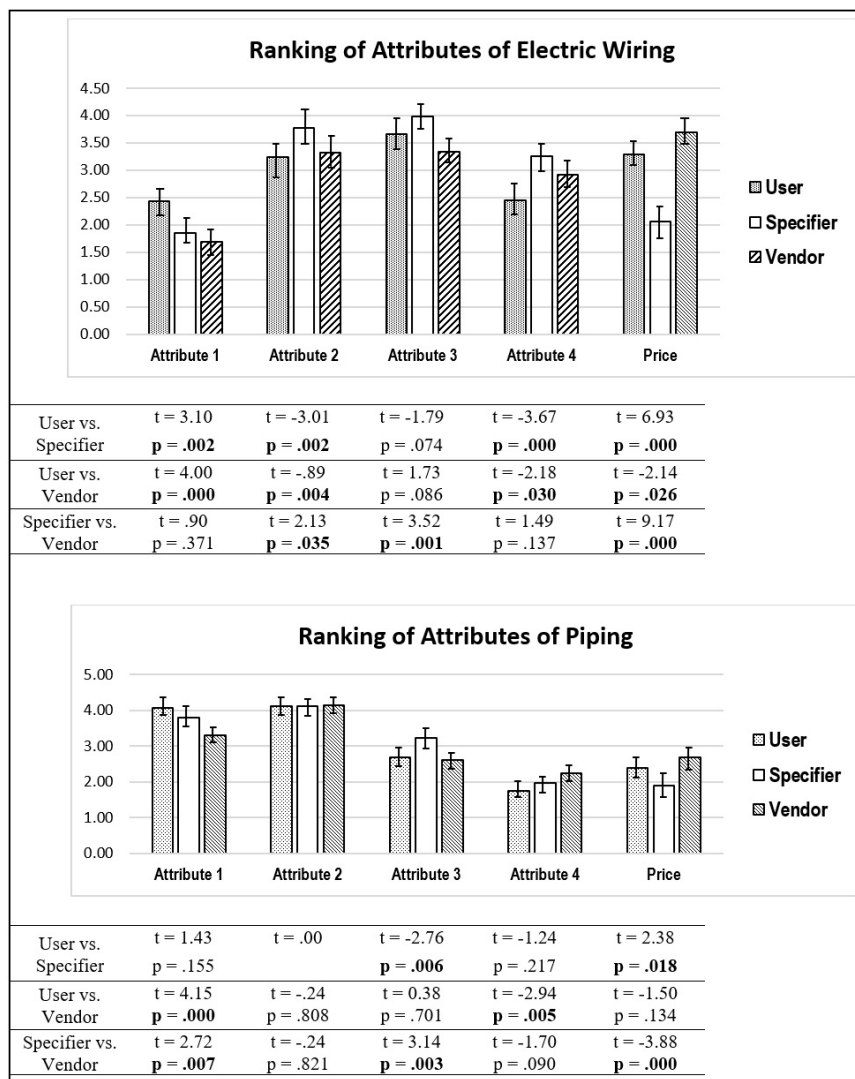


Figure 2. Study 2 results of univariate analysis of mean ranking of attributes by the actors for functional products (Duncan’s adjusted t-test) – (I 95% confidence interval)

of attributes. The LDA classification for luminaries was as follows: users 37.5%, specifiers 51.3%, and vendors 60.8%, which is adequately classified for specifiers and vendors but not for users. The MSD test was used for users vs. specifiers (MSD=0.16, F=1.62, p=0.169), users vs. sellers (MSD=0.49, F=4.89, p=0.001), and specifiers vs. vendors (MSD=0.51, F=5.00, p=0.001).

In conclusion, these results support hypothesis H1b for aesthetic products, because users and specifiers did not evaluate attributes significantly differently. In one case (flooring), we confirmed support for H2b and H3b.

For luminaries, we cannot confirm hypotheses H3b and H3c because end-users versus vendors and specifiers versus vendors evaluated attributes differently, contrary to what we posit in our hypotheses. A plausible explanation is that this category, as observed in the pretest, is classified as very slightly aesthetic (luminaries mean=3.74, SD=1.64), very close to the midpoint of 3.5, compared to the flooring category, which is classified as aesthetic (floor mean=4.94, SD=1.67); therefore, this category does not generate an emotional connection, as hypothesized (Hartmann & Moeller, 2014). The luminaries classification, together

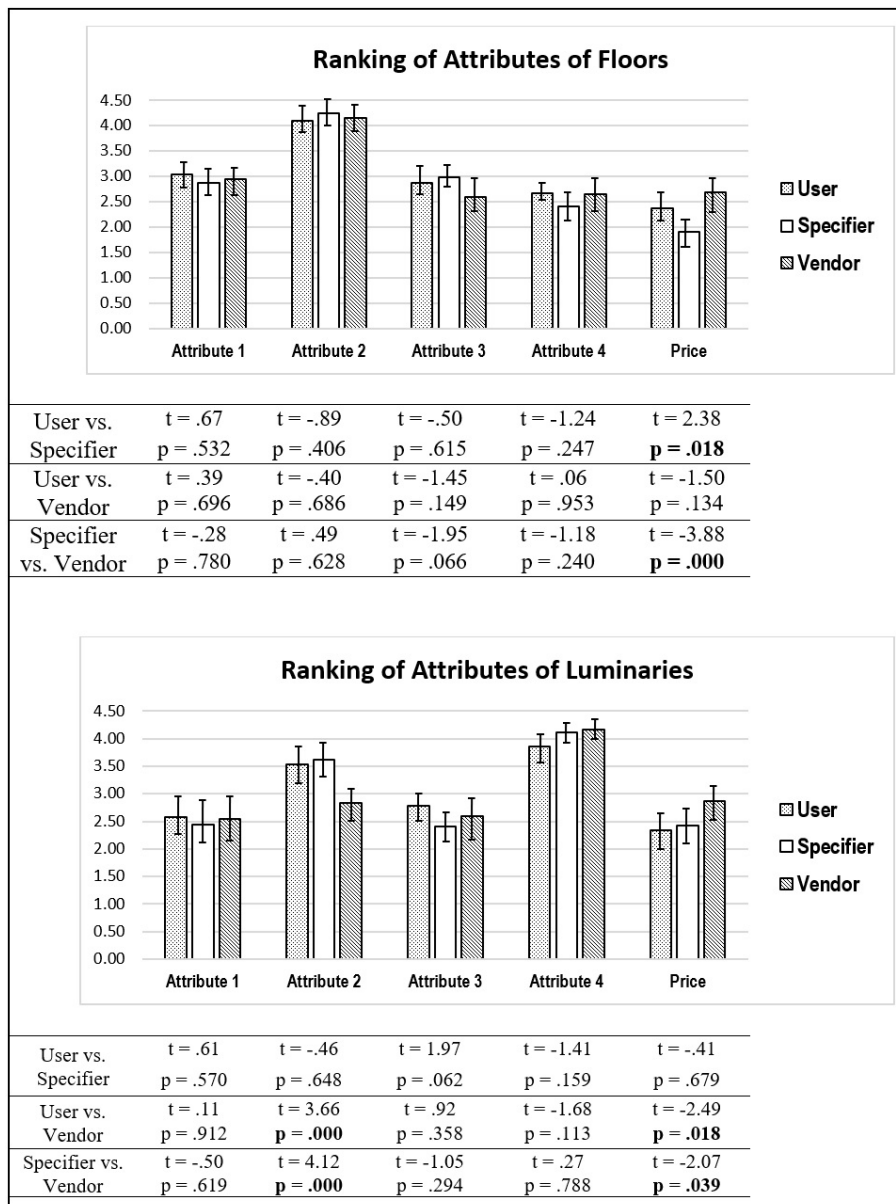


Figure 3. Study 2 results of univariate analysis of mean ranking of attributes by the actors for aesthetic products (Duncan’s adjusted t-test) – (I 95% confidence interval)

Table 2
Multivariate analysis: Mahalanobis squared distances between groups for all attributes

		Study 1	Study 2			
		Wiring	Wiring	Piping	Floors	Luminaries
User vs. Specifier	MSD	1.10	1.39	.31	.07	.16
	F	6.55	13.73	3.01	.72	1.62
	p	.000	.000	.019	.579	.169
	H	H1a	H1a	H1a	H1b	H1b
		supported	supported	supported	supported	supported
User vs. Vendor	MSD	21.63	.63	.59	.09	.49
	F	150.69	6.26	5.80	.87	4.89
	p	.000	.000	.000	.484	.001
	H	H2a	H2a	H2a	H2b	H2b
		supported	supported	supported	supported	not supported
Specifier vs. Vendor	MSD	21.68	1.99	.71	.11	.51
	F	207.28	19.68	7.00	1.06	5.00
	p	.000	.000	.001	.376	.001
	H	H3a	H3a	H3a	H3b	H3b
		supported	supported	supported	supported	not supported

MSD= Mahalanobis squared distance; F=F-statistic; p=p-value; H=hypothesis.

with the price attribute, which is mainly functional in retail environments (Munaro et al., 2020), allows the evaluation to be different concerning vendors, just like a functional category. In addition, vendors evaluate all products higher than specifiers and users; specifiers tend to evaluate the price as less important than users and vendors and give more importance to technical attributes (Figures 2 and 3).

5 General discussion

Previous research has investigated product attributes, missing attributes, irrelevant attributes, number of attributes, the effect of colors (Miller & Kahn, 2005), common attributes (Evangelidis & van Osselaer, 2018), perceptual mechanisms, and their impact on choice. However, the unit of analysis was consumers or final users and the studies did not consider the context of these three actors. Marketers and designers must routinely rank attributes and choose between alternatives (Dym et al., 2002). Frequently, managers make strategic decisions about products and communications, and the results of our study show that they consider only the end-user's perception of attribute selection in a context where the three actors are an over-generalization that can bias strategic marketing decisions.

5.1 Theoretical implications

Our results show that when evaluating attributes, end-users, specifiers, and vendor groups assign different orders of preference as attribution theory previously predicted. The results of this study corroborate our hypothesis. First, the final user's perception is that specifiers control decisions and are responsible for functional attributes that influence the differences in attribute evaluations between end-users and specifiers. These differences in evaluations are in line with prior studies in the automotive industry (Ersal et al., 2011) and retailing (Kremer et al., 2008). Earlier research shows that end-users in co-branding crises attribute the locus of causality and stability to focal brands (Paydas Turan, 2022).

Second, in selecting attributes, end-users and specifiers assign vendors no control of this event, so they differ in their evaluations. These results support earlier studies on the assignment of controllability where end-users attribute more controllability to larger firms than to other supply chain members (Hartmann & Moeller, 2014). Similarly, external factors can distort customer decisions about attribute-price because of controllability (Pauwels & D'Aveni, 2016). Thus, when customers cannot find a specific item at a retailer because of their unique style, they will not assign control to the vendor (Lee & Ko, 2021), which is similar to the presence of a

specifier. Similarly, this study confirms prior research on the influence of stressors and external customer attribution of controllability (Hampson et al., 2020).

Third, we corroborate the idea that, in the absence of technical factors for aesthetic products, each actor perceives that they have decision-making control; specifiers and vendors act according to their tastes and preferences, behaving like users. This conclusion is theoretically aligned with earlier literature on consumers' emotional reactions to responsibility attributions (Hartmann & Moeller, 2014) and the effect of non-monetary attributes eliciting emotional feelings (Langan & Kumar, 2019).

Consequently, there was no difference in attribute selection. However, a product with technical attributes influences the perceptions and differences between the actors in attribute evaluations. This study contributes to the literature by extending the generalization of attribution theory, outside its boundary conditions, to a new context of attributive selection with three actors: end-users, specifiers, and vendors.

5.2 Practical implications and limitations

This research has practical implications for marketing strategies because marketers who consider that the actors in this triad make the same evaluation of attributes can bias strategic marketing decisions on positioning, communications, and product development.

Retailers acting as vendors must define which attributes are relevant according to their target audience, end-users or specifiers, and whether they are functional or aesthetic. Defining this will allow them to develop a clear and effective communication strategy for their audience. Bias in selecting attributes prevents the creation of an accurate and differentiating value proposal. Aligning attributes relevant to end-users, specifiers, and vendors and communicating with unique positioning is a marketing challenge in this triadic context.

A manufacturing company developing new products should consider differences in the selection of attributes. This selection can include irrelevant characteristics for the end-users but which are relevant for the vendors. This creates a dilemma for manufacturers by including attributes that could increase costs and prices; therefore, it is necessary to align the development strategy of vendors and end-users. They must consider that vendors tend to prioritize price, and specifiers tend to downplay prices to effectively communicate the company's pricing strategy.

Another important consideration for the collaborative models (crowdsourcing) for the development or improvement of products and services should be the contributing actors, because each could bias the development of their perception and not necessarily value the contribution by the other actors of the triad.

One limitation of this study is that the data focused on only two markets from one region, so there could be cultural differences among other countries and continents. These external validity concerns can be addressed in future studies in other countries.

Furthermore, as a methodological limitation, we restricted the number of attributes to be evaluated. Although the most important attributes of each category were included in the study, and up to eight attributes were included in Study 1, adding other attributes could modify the results in some cases. An alternative would be to conduct specific studies of each category with a greater number of attributes. Likewise, in the case of the Chilean sample, this was a convenience sample and not necessarily representative of the entire country; in this sense, future studies are required to increase external validity.

This study refers only to the building materials category, but in other categories such as pharmacies or bookstores, actors could behave differently in selecting attributes. Therefore, we suggest further research to test other categories.

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Supplementary Material

Supplementary material accompanies this paper.

Appendix A

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3rd author: Development of theoretical propositions (theoretical work); Definition of methodological procedures; Data collection; Literature review; Analysis and interpretation of data; Critical revision of the manuscript.