

Consumer Perceptions on Wooden Multistory Houses: Segmenting International Markets.

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Abstract

During the past years, the usage of wood as construction material in multistory applications has increased. In Germany and Sweden, various activities have been, and are about to be performed, to accentuate and improve the position of wooden multistory houses. In line with that, this study tries to contribute to the understanding of how consumers perceive durable products; in the contextual frame of how German and Swedish consumers perceive wooden multistory houses.

It was hypothesized that consumers' perceptions on durable products differ, depending on various socio-economic background factors. In this study, the background factor "national habitation" is investigated. Based on the Means-End Chain Theory, the Association Pattern Technique has been further developed to collect and analyze data for two samples. In Germany and Sweden, 31 respectively 34 laddering interviews have been carried out, which formed the base for a survey-study in each country. Here, 229 surveys were received from German, and 503 from Swedish respondents.

The results show that "national habitation" has significant impact on consumers' perceptions of wooden multistory houses. Moreover, the extension of the Association Pattern Technique was validated. It allowed for additional data to be gathered, which can be regarded as rather important, since it appeared in the most dominant Means-End Chains of the respondents in both Germany and Sweden. This helps to understand consumers' underlying reasons why one product is favored over another.

Keywords: Means-End Chain Theory, Means End Theory, laddering technique, laddering, Association Pattern Technique, end use analysis, wooden multistory houses, timber construction, wood construction, wooden housing.

Introduction

In 1994, regulations on the Swedish construction market changed and were adjusted towards functional requirements (Näringsdepartementet, 2004). This modification implies that wood, after 120 years, can be considered as the bearing material in multistory buildings again. In 2004, the Swedish government implemented a national strategy for more wood in constructions, striving to further develop industrialized production processes (Serrano, 2008) and to improve the position of wooden multistory houses. It was argued that this was of major importance in order to trigger competition, since the construction market was, and mostly still is, equipped for conventional materials like concrete, steel, brick or stone (Schauerte, 2007).

Over the duration period of the strategy, from 2004 to 2008, wooden multistory houses were built in more than half of the 290 Swedish municipalities. Consequently, this development led to an increased market share of about 10 % until 2005 and further up to about 14.5 % in 2009 (Svensson, 2009). In addition to that, wooden multistory houses are more and more accepted by end-users as well (Schauerte, 2008). After the completion of the national strategy for more wood in construction, follow-up strategies have been launched by the Swedish ministry of Environment, which will continue triggering the positive trend of wood applications (Miljödepartementet, 2008).

In Germany, the construction market for wooden houses looks different. Even though the use of wood on the construction market is increasing, it had not been considered as an alternative material for multistory houses in larger applications until 2002. Then, a modification of the Musterbauordnung (MBO) was adopted as an attempt to align the construction regulations from all German federal states, which are autonomous and may differ among national states.

Yet, the MBO is not a strict construction regulation, but has to be regarded as a recommendation guideline for the federal regulations (Deutscher Städte- und Gemeindebund, 2002). Construction projects that are developed according to the MBO, and planned to be built in a certain federal state, have to be approved by the Ministry for Construction in the respective federal state. Since the MBO became operative, several projects have been carried out in different federal states. Even if wooden multistory houses had only gained about 1.9 % of the market share by 2008, attempts can already be seen on the market to better utilize the advantages of wood in bearing constructions in order to upgrade the quality of the final product (Informationsdienst Holz, 2008).

Summing up, it can be said that in both Sweden and Germany various activities have been, and are about to be, performed in order to accentuate and improve the position of multistory houses made of wood, even if these activities differed in their magnitude. Yet, working with positioning issues of a product entails far more than changing construction regulations, developing production processes or improving technical characteristics (Schauerte, 2008). Positioning is how consumers' minds are affected (Ries & Trout, 1981).

The position of a product is its place in the mind of the consumer, i.e., how the target group perceives the product in question. Perceiving a product is a cognitive process that, on the one hand, entails all product knowledge that is stored and organized in human memory (Grunert & Grunert, 1995). On the other hand, consumers assess the product in question by evaluating its personal relevance, i.e. why the product is personally relevant for the consumer to choose (Olson & Reynolds, 2001). Perceiving a product happens not only through its attributes, but also through its level of performance on each of these attributes. Investigating this helps to understand consumers' current knowledge about the product in question (Grunert & Grunert, 1995), as well as why consumers favor certain products over others (Gutman, 1982).

Means-End Chain Theory and the Association Pattern Technique

According to the Means-End Chain Theory on consumer behavior, consumers link product attributes with certain consequences that are the result of the performance of these attributes. These consequences are in turn related to the consumers' personal values and hence, product attributes and their consequences have to be matched with personal values (Vriens & Ter Hofstede, 2000). Such a chain, where attributes are linked with consequences and further with values, is called a Means-End Chain.

Since consumers regard products as a set of utility components (Herrmann & Huber, 2000), a product's perceived performance, i.e. the consequences of product attributes, constitutes the important link between the product and the consumer. Many studies even show that linkages between different consequences are perceived by the consumer, constituting important parts of their product knowledge (a.o. Gengler & Reynolds, 1995; Pieters et al., 1995).

Most of the studies investigating in Means-End Chains use personal one-on-one interviews called laddering. Due to its qualitative form, one weakness of the laddering technique is its difficulty to be applied in large-scale representative samples, since this would require too much time and involve skilled qualitative interviewers, which makes such a study too expensive. However, in 1998, Ter Hofstede et al. proposed and validated a quantitative approach to gather Means-End Chain data, the Association Pattern Technique, as an enhancement of the laddering technique. This survey-based method comprises two matrices; one attribute-consequence matrix and one consequence-value matrix. Nevertheless, by doing so they neglected potential linkages between consequences, as they have been revealed in various other laddering studies (a.o. Leppard et al., 2004; Skytte and Bove, 2004; Henneberg et al., 2009). Since consequences are the crucial connection between the product and the consumer, this non-consideration may lead to results that do not mirror consumer's perceptions as a whole, i.e. important parts of consumer's product knowledge may not be detected (Schauerte, 2006).

The Association Pattern Technique, as presented by Ter Hofstede et al. (1998), should therefore be extended by an additional consequence-consequence matrix to elicit potential linkages between different consequences to detect consumers' product knowledge as a whole.

Method

Using the Extended Association Pattern Technique to uncover Means-End Chains implies a two-stage study. It starts with the exploratory stage, to elicit attributes, consequences and values. These are used to develop association pattern matrices to gather data from larger samples (Vriens & Ter Hofstede, 2000).

In this first stage of this study, 31 personal laddering interviews were carried out in Germany and 34 in Sweden. Thereby, no purposive selection was performed, except for representative geographical reasons. Therefore it can be said that respondents in both countries were chosen randomly. The interviews followed the suggested guidelines by Reynolds and Gutman (1988) and were analyzed accordingly; however some changes were applied in accordance with Schauerte (2006, 2009).

The second stage of the investigation comprised the matrix-survey study. In Germany, 2900 surveys were equally distributed over three regions, north-west (800 surveys), south-west (1000 surveys) and east (1100 surveys). Differences in the numbers of surveys in each region are due to different numbers of federal states in these regions. In Sweden, 3900 surveys were handed out in the three lands Götaland (1600 surveys), Svealand (1400 surveys) and Norrland (800 surveys). As in Germany, the number of surveys in each land corresponds to the number of counties in each land. In Germany, 229 individuals responded, which corresponds to a response rate of 7.9 %. The Swedish survey was returned by 503 respondents, equaling a response rate of 13.2 %.

All survey responses were entered into SPSS 16.0 for Windows and the data analysis was performed according to recommended instructions by various authors (a.o. Pieters et al., 1995, Reynolds & Gutman 2001). First, a Summary Implication Matrix (SIM) was developed. In a SIM, the accumulated observations of a certain group of respondents are presented. Then a cut-off level was elaborated on, and finally Hierarchical Value Maps (HVMs) were created to display the results. In a HVM, all linkages that passed the cut-off level are graphically presented in a tree diagram of structural, hierarchical nature (Reynolds & Gutman 2001). Every pathway from attributes to values within a HVM represents one perceptual orientation, i.e. a Means-End Chain. Since a HVM often consists of numerous perceptual orientations with different importance, the most dominant perceptual orientations or Means-End Chains are of interest. These can be identified by looking for the strongest relations between elements on different levels of abstraction (de Ferran & Grunert, 2007).

For a more detailed description of all mentioned stages read Schauerte (2009).

Empirical Data, Analysis and Results

The German sample

Regarding German respondents, figure 1 reveals the three most dominant MECs in the order as described below.

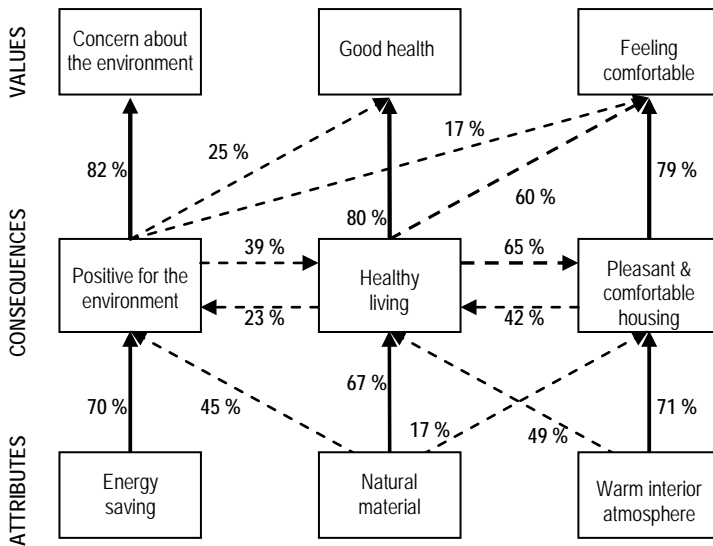


Figure 1: Hierarchical Value Map as central perceptual frame of Means-End Chains of German respondents.

Energy saving' is perceived by 70 % as being 'positive for the environment', which is associated with 'concern about the environment' (82 %). 'Natural material' is seen as causing 'healthy living' (67 %), which in turn 80 % of the respondents connect to 'good health'. Finally, 71 % comprehend that 'warm interior atmosphere' leads to 'pleasant & comfortable housing', being one premise for 'feeling comfortable' (79 %).

These three MECs are connected by several inter-chain relationships. The attribute 'natural material' is additionally linked to the consequences 'positive for the environment' (45 %) and 'pleasant & comfortable housing' (17 %). 'Healthy living' has reciprocal relationships with the two other two consequences, 'positive for the environment' (39 % and 23 %) and 'pleasant & comfortable housing' (65 % and 42 %) and leads additionally to the value 'feeling comfortable' (60 %).

Moreover, 49 % of the respondents perceive 'warm interior atmosphere' as a cause for 'healthy living'. Finally, 'positive for the environment' is considered as being connected to 'good health' (25 %) and 'feeling comfortable' (17 %).

The Swedish sample

Investigating all the Swedish respondents, the following three most dominant MECs can be found, compare figure 2. First, 'higher construction costs' are seen as causing 'financial disadvantages' (51 %). This again leads to 'insecure housing', as an undesired consequence, whereby 'secure housing' instead is associated with 'need of security' by 74 % of the Swedish respondents. Secondly, 'healthy interior' is by 57 % linked to 'healthy living', which 65 % in turn regard as contributing to 'good health'. Thirdly, 'warm interior atmosphere' is seen as

adding to ‘pleasant & comfortable housing’, which is further linked to ‘feeling comfortable’ (54 %).

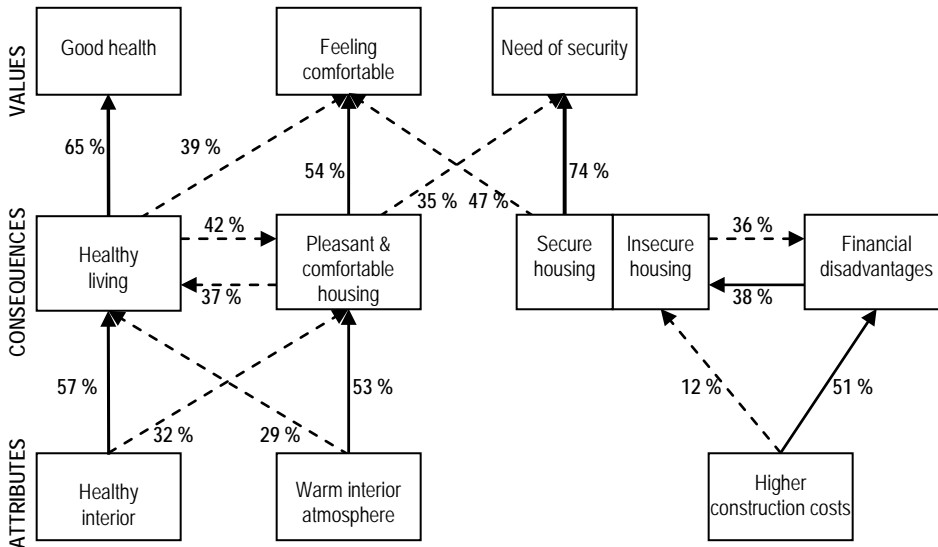


Figure 2: Hierarchical Value Map as central perceptual frame of Means-End Chains of Swedish respondents.

Here, several inter-chain relationships can be observed as follows. ‘Higher construction costs’ are perceived to lead to ‘insecure housing’ (12 %), which in turn is connected to ‘financial disadvantages’ (36 %). Moreover, ‘warm interior atmosphere’ is linked to ‘healthy living’ (29 %), and ‘healthy interior’ to ‘pleasant & comfortable housing’ (32 %). While the latter shows a reciprocal relationship with ‘healthy living’ (37 % and 42 %), the value ‘feeling comfortable’ is regarded to be achieved by means of ‘secure housing’ (47 %) and ‘healthy living’ (39 %). Finally, ‘pleasant & comfortable housing’ is also associated with the ‘need of security’ by 35 % of the respondents.

Comparing and analyzing the German and Swedish data

Investigating in the most dominant MEC for German and Swedish respondents, it turns out that these differ completely. While German respondents perceive ‘energy saving’ as being ‘positive for the environment’, which in turn is associated with ‘concern about the environment’, Swedish respondents regard ‘higher construction costs’ as generating ‘financial disadvantages’ and further ‘insecure housing’. The latter is considered undesired, since ‘secure housing’ is perceived as being linked to the ‘need of security’. This means that no negative attributes and consequences dominate the German respondents’ perceptions of wooden multistory houses, while this does appear to be the case for the Swedish respondents.

Further, Germans accentuate the importance of environmental issues related to wooden multistory houses. The attribute 'energy saving' is seen as being the most important one leading to 'positive for the environment'. This aspect could not be found in the Swedish data-set and it can be concluded that environmental issues do not play such an important role in the Swedish respondents' perceptions of wooden multistory houses, while this is most dominant for German respondents.

Concerning the second and third most dominant MEC among German and Swedish respondents, it can be observed that these comprise the same elements, except one attribute. Germans perceive the attribute 'natural material' as the main cause for 'healthy living', while it is 'healthy interior' for the Swedes. The MEC from 'warm interior atmosphere' to 'pleasant & comfortable housing' and further to 'feeling comfortable' is the third most dominant MEC for both German and Swedish respondents.

Inter-chain relationships between the second and third most dominant MEC indicate that their elements are tightly connected. In particular, the reciprocal connection between 'healthy living' and 'pleasant & comfortable housing' can be detected in both the German and Swedish data-set and should therefore be regarded as rather important as well.

Remarkably, German respondents perceive all the depicted linkages as more important than Swedish respondents do, which shows that Germans have a more firm conviction about certain circumstances surrounding wooden multistory houses, compared to Swedes.

As shown above, differences exist among German and Swedish consumers in how they perceive wooden multistory houses. Although only marginal differences can be observed in terms of elements that are included in the second and third most dominant MECs, the importance of linkages between these attributes, consequences and values are statistically significant at $\alpha=0.01$ level. For example, the perception of the importance of the link between 'warm interior atmosphere' and 'pleasant & comfortable housing' reveals a difference of $z=5.2$ (critical value: $z=2.576$) and a difference of $z=7.1$ exists concerning the perceived importance of the connection between 'pleasant & comfortable housing' and 'feeling comfortable'. In addition to that, the most dominant MEC of both nations' respondents differs completely, as described above.

These findings show a difference in how Germans and Swedes perceive wooden multistory houses. Thus it can be stated that the perception of this product is affected by different national habitation.

Evaluating and discussing the extension of the Association Pattern Technique

As described above, Ter Hofstede et al. (1998) used attribute-consequence (AC) and consequence-value (CV) matrices in their original work introducing the Association Pattern Technique. Thereby, they neglected potential consequence-consequence (CC) linkages, even though these were found to be crucial in various Means-End Chain studies (a.o. Leppard et al., 2004; Skytte and Bove, 2004; Henneberg et al., 2009). In the present study, an additional CC-matrix was applied and looking at the empirical results, one can see that there are several cases

where CC-linkages appear in the three most dominant MECs in the German and Swedish data-sets.

German respondents perceive 'healthy living' as being mutually connected to both 'positive for the environment' and 'pleasant & comfortable housing'. Further, a mutual connection between the consequences 'financial disadvantages' and 'insecure housing' as well as between 'pleasant & comfortable housing' and 'healthy living' could be found in the Swedish data-set. These linkages would not have been revealed without the additional CC-matrix as an extension of the Association Pattern Technique. Since every single MEC is to be regarded as one possible perceptual orientation of the respective respondents, the additional data can be regarded as rather valuable. Thus, the use of a CC-matrix for extending the Association Pattern Technique can be seen as validated for the case of the product category wooden multistory houses.

Therefore, and to further validate its usefulness, it is suggested that CC-matrices should be applied to any kind of product category when it is planned to collect data by means of the Association Pattern Technique.

Conclusions

The empirical results of this study can be used to better understand the perceptions of consumers in Germany and Sweden regarding wooden multistory houses. This can make a valuable input when developing marketing campaigns, where different target groups of potential consumers can be addressed. Since the perception of wooden multistory houses is expected to vary with different national habitations, different sets of attributes and consequences should be communicated towards the respective groups or defined market segments.

Existing negative perceptions, like e.g. the ones among Swedish consumers, could be revised by informing about the actual consequences of existing product attributes, which do not necessarily have to correspond with the ones perceived. Proceeding in this manner, possible mismatches between actual product attributes and their consequences, and those ones perceived by consumers, could be overcome. Thus, marketers can find much useful information about how different consumers in Germany and Sweden perceive wooden multistory houses, if further positioning strategies of this product are planned or existing strategies are thought to be revised and adjusted.

Since the application of an additional CC-matrix could be validated, such a matrix can be recommended to be applied in other investigations where the Association Pattern Technique is planned to be used. This extension of an existing method can contribute to finding improved ways of gathering data of this kind from larger samples. It reveals useful information that can be central in the perception of a product.

References

- De Ferran, F. and Grunert, K.G. (2007). French fair trade coffee buyers' purchasing motives: An exploratory study using means-end chain analysis. *Food Quality and Preference*, Vol. 18, pp. 218-229.
- Deutscher Städte- und Gemeindebund (2002). *Neue Muster-Bauordnung verabschiedet*, Kommunalrapport Berlin.
<http://www.dstgb.de/homepage/kommunalreport/archiv2002/newsitem00531/index.html> version current as of 2009-01-30.
- Gengler, C.E. and Reynolds, T.J. (1995). Consumer understanding and advertising strategy: analysis and strategic translation of laddering data. *Journal of Advertising Research*, July/August 1995, pp. 19-32.
- Grunert, K.G. and Grunert, S.C. (1995). Measuring subjective meaning structures by the laddering method: Theoretical considerations and methodological problems. *International Journal of Research in Marketing*, Vol. 12, pp. 209-225.
- Gutman, J. (1982). A means-end chain model based on consumer categorization processes. *Journal of Marketing*, Vol. 46, No. 3, pp. 60-72.
- Henneberg, S.C., Gruber, T., Reppel, A., Ashnai, B. and Naudé, P. (2009). Complaint management expectations: An online laddering analysis of small versus large firms. *Industrial Marketing Management*, Vol. 38, pp. 584-598.
- Herrmann, A. and Huber, F. (2000). Value-oriented brand positioning, *International Review of Retail, Distribution and Consumer Research*, Vol. 10, No. 1, pp. 95-112.
- Informationsdienst Holz (2008). Baustoff Holz: nachhaltig. In *aktuell*, Dezember 2008, p.7, Bonn: Holzabsatzfonds.
- Leppard, P., Russel, C.G. and Cox, D.N. (2004). Improving means-end chain studies by using a ranking method to construct hierarchical value maps. *Food Quality and Preference*, Vol. 15, pp. 489-497.
- Miljödepartementet (2008). *Delegationen för hållbara städer*, Uppdrag 2008-09-05, Regeringskansliet. <http://www.regeringen.se/sb/d/10905/a/110855> version current as of 2009-02-01.
- Näringsdepartementet (2004). Mer trä i byggandet – underlag för en nationell strategi att främja användningar av trä i byggandet, Ds 2004:1, Regeringskansliet.
- Olson, J.C. and Reynolds, T.J. (2001). The Means-End Approach to Understanding Consumer Decision Making. In Reynolds, T.J. Olson, J.C. and (eds.). *Understanding consumer decision*

making: the means-end approach to marketing and advertising strategy, pp. 3-20, Mahwah, NJ: Erlbaum.

Pieters, R., Baumgartner, H. and Allen, D. (1995). A means-end chain approach to consumer goal structures. *International Journal of Research in Marketing*, Vol. 12, pp. 227-244.

Reynolds, T.J. and Gutman, J. (1988). Laddering Theory, Method, Analysis and Interpretation. *Journal of Advertising Research*, February/March, pp. 11-31.

Reynolds, T.J. and Gutman, J. (2001a). Laddering Theory, Method, Analysis and Interpretation. In Reynolds, T.J. and Olson, J.C. (eds.), *Understanding consumer decision making: the means-end approach to marketing and advertising strategy*, pp. 25-62, Mahwah, NJ: Erlbaum.

Ries, A. and Trout, J. (1981) *Positioning, The battle for your mind*, New York: Warner Books - McGraw-Hill Inc.

Schauerte, T. (2006). *Perceptions of Wooden Multifamily Houses in Germany – Applying an Extended Association Pattern Technique*. Licentiate Thesis, Report No. 34, School of Technology and Design, Växjö University.

Schauerte, T. (2007). Schaufenster in eine bessere Zukunft – Holzbau und mehr für eine ganzheitliche und nachhaltige Stadtentwicklung. In: Hochschule für Architektur, Bau und Holz – HSB (eds.) (2007). 13. Internationales Holzbau-Forum, *Holzbau aus der Praxis – für die Praxis*, No. 2, Biel: Fraunhofer IRB Verlag.

Schauerte, T. (2008). Önskat och upplevt kundvärde – är Limnologens slutanvändare nöjda? In: Serrano, E. (ed.) (2008). *Uppföljnings- och dokumentationsprojektet Limnologen – översikt och delprojektrapporter i sammanfattning*, pp. 57 – 62, Växjö University, School of Technology and Design, Report No. 47.

Schauerte, T. (2009). Investigating Consumer Perceptions by applying the Extended Association Pattern Technique – A Study on Wooden Multistory Houses. Acta Wexionensia No: 194/2009, ISSN: 1404-4307, ISBN: 978-91-7636-689-9, Doctoral Thesis, Växjö university.

Serrano, E. (2008). Inledning och bakgrund, p. 1 – 10 in: Serrano, E. (eds.) (2008). *Uppföljnings- och dokumentationsprojektet Limnologen – översikt och delprojektrapporter i sammanfattning*. Växjö University, School of Technology and Design, Report No. 47.

Skytte, H. and Bove, K. (2004). The Concept of Retailer Value: A Means-End Chain Analysis. *Agribusiness*, Vol. 20, No. 3, pp. 323-345.

Svensson, N. (2008). Trähusbyggande på hög nivå – Nyheter om industriellt trähusbyggande. Träbyggnadskansliet, sep. 2008.

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United Nations Economic Commission for Europe – Timber Committee
October 11-14, 2010, Geneva, Switzerland*

Svensson, N. (2009). *Modernt träbyggande - ett nytt sätt att bygga*, <http://trabyggnadskansliet.se>
version current as of 2009-01-23.

Ter Hofstede, F., Audenaert, A., Steenkamp, J-B.E.M. and Wedel, M. (1998). An investigation into the association pattern technique as a quantitative approach to measuring means-end chains. *International Journal of Research in Marketing*, Vol. 15, pp. 37-50.

Vriens, M. and Ter Hofstede, F. (2000). Linking Attributes, Benefits and Consumer Values, *Market Research*, Fall, pp. 5-10.