Understanding Innovation - Values Fit from the Consumer Perspective: A New Mixed-Model Approach

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Abstract

Innovations that are perceived to be the means to realizing important personal values have a greater likelihood of success than those that clash with or impede value fulfillment. The concept of innovation-values fit (or value compatibility) explains broad patterns of consumer adoption across diverse product categories. However, the simple “poor-neutral-good” scales typically used to measure innovation-values fit are incapable of providing the kinds of fine-grained insights considered necessary to support decisions for marketing a particular new product. This research contributes an analytic framework based on the Means-End approach to understand innovation-values fit from the consumer perspective with the goal of informing new product commercialization strategy. The article revisits old practices and initiates new work that probes more deeply, directly, and specifically into how consumers evaluate new products and perceive links between distinctive product features and personal values. Using data from 160 personal “laddering” interviews in a national field study, we examine consumer reaction to a next-generation cell phone and discover seven innovation-values themes that drive consumer preference and price expectations in the product category. Implications are discussed for marketers who commercialize innovations and need to understand the incremental benefits that consumers associate with adopting a new product over its rivals.

Key words: Consumer adoption, New product marketing, Innovation management, Consumer decision making, Personal values, Means-end model
It’s new, but will people want it? Many innovations have failed not because of technical deficiencies, but due to incompatibility or a lack of fit with personal goals and values. The idea of achieving congruence between an innovation and the values of the target users is among the most important and widely reported generalizations in the extensive innovation-adoption literature. Accordingly, innovation managers are advised to research how targeted users perceive a given innovation and the extent to which it clashes or coincides with their personal values.

In the early years of innovation adoption research, researchers rarely measured the perceptions of the potential adopter, opting instead to infer the level of value compatibility. The persistent lack of direct measurement in the literature led to advocate a survey measure of innovation-values fit, defined as “the extent to which targeted users perceive that use of the innovation will foster (or, conversely, inhibit) the fulfillment of their values.” While the popular “low-medium-high” innovation-values fit scale proved useful in predicting success in adoption processes, alone this measure does not provide guidance on how to improve and to make smart choices in the commercialization process. We posit that the measure lacks fidelity with how consumers actually evaluate innovations and is too granular to discern the specific values that foster an innovation’s desirability to the individual.

The primary aim of this paper is to propose a new analytic framework for discovering and evaluating user perceptions of innovation-values fit. Our approach is based on two key assumptions. First, the concept of innovation-values fit is more variegated and complex than normally assumed. Impression formation may involve multiple perceptual dimensions that are used as choice criteria in consumer adoption decisions. Second, the best way to discover innovation-values fit is directly from users, in their own words. We favor generative research that encourages consumers to express the motivationally significant values used in their evaluations over using traditional values scales that may not correspond with consumers’ perceptions. Simply put, our method solicits qualitative data that provides a more nuanced and precise accounting of the specific personal values implicated when individuals evaluate innovations.

Building on established means-end models for studying consumer decision making, we develop an analytical framework to map and measure the means-end chains of logic that describe consumer perceptions of an innovation’s relevance to personal values. Our approach combines established qualitative methods for developing insights into consumer perceptions with quantitative evaluations of products to gain deeper insights on both what is important and measure of the degree of importance.

Existing perceptual and preference mapping techniques help managers see how their own product compares to rivals through the eyes of their customers. With a plethora of sophisticated data analysis tools at their disposal, researchers can produce concise visual representations of the competitive landscape with great psychometric precision. Notwithstanding methodological developments in modeling brand/product attribute performance or importance, these maps do not tell us much about why consumers form certain perceptions or preferences.

In contrast, the laddering interview technique probes more deeply, directly, and specifically into how brand /
product aligns with higher-level customer needs, goals, and values. It asks and seeks to answer the question “What matters, or what might matter, to potential customers?” by eliciting consumers’ reasons for choosing a product over its competitors. Laddering study results discover the dimensions that matter most to consumers and are therefore widely used by managers to identify positioning options, develop commercialization strategy, and design marketing communications.

Despite substantial research, the two approaches for studying consumer perceptions have rarely, if ever, been combined in one study. Given the complementary perspectives offered by perceptual mapping and laddering techniques, there exists a missed opportunity to merge these two approaches to create a more accurate and comprehensive view of how consumers evaluate innovations. We contend that consumers construe the reasons why an offering has value (form their own qualitative means-end chains of logic) and use these dimensions to evaluate the performance of an offering relative to the available alternatives (assign ratings that reflect relative performance on the dimensions). Our approach is unique as it gathers the qualitative dimensions and quantitative ratings in a single study as opposed to the arduous multi-study data collection process that is typically used. Consequently, we can perform multi-dimensional scaling analysis by comparing offerings (brand, model, etc.) using objective attributes and perceived dimensions of value.

Our objective is combine existing methods in an original way to generate novel insights into the role of consumer perceptions of innovation-values fit in the adoption process. Our analytical framework enriches our knowledge of consumer adoption perceptions and produces more exact, actionable, and timely insights than offered by either of the established methods alone. The benefits offered by our approach are greatly appreciated in volatile markets with increasingly short life cycles, and where the introduction of an innovative feature could be a game-changer.

The remainder of the article is organized as follows: First, we review the theoretical underpinnings and measurement issues surrounding consumers’ evaluations of innovations and discuss the suitability of the means-end approach and laddering technique to measure consumer perceptions of innovation-values fit. Second, we outline our procedure for studying the linkages between consumer preferences, price expectations and product evaluations, and present the results of an application of our approach to a large-scale field study of consumer reaction to a next-generation product (a cellular phone handset). Finally, we discuss the implications for managers aiming to develop timely and effective strategies for marketing innovations and managing other products, brands and models in the company’s portfolio.

New Product Evaluation and Innovation-Values Fit

The findings of a meta-analysis reviewing 35 years of academic research confirms the influence of “relative advantage” and “compatibility” on consumer innovation adoption (Arts et al., 2011). Relative advantage refers to customers’ perceptions of the comparative performance of the innovation versus established products in the market (Rogers, 1995). Compatibility “reflects the degree to which the innovation matches the potential adopter’s needs and values” and is “therefore an important aspect of the
innovation’s desirability to the individual.” (Arts et al., 2011, p. 136). Following Klein and Sorra (1996, p. 1064), our research focuses on the perceptual piece of compatibility known as “innovation-values fit” defined as “the extent to which targeted users perceive that use of the innovation will foster (or, conversely, inhibit) the fulfillment of their values.” Next, we review three approaches for studying consumer perceptions of innovation-values fit: (a) innovation-values fit scales, (b) product feature and performance, and (c) the proposed means-end approach.

**Innovation-Values Fit Scales**
In general, the literature uses parsimonious scales to measure the extent of innovation-values fit. The concept of innovation-values fit, however, is more variegated and complex than normally assumed (e.g., Bunker, Kautz, & Nguyen, 2007; Harrington & Ruppel, 1999; Klein & Sorra, 1996). Though simple “poor-neutral-good” innovation-values fit measures are useful for certain research purposes, we believe that a more nuanced and precise accounting of the specific personal values implicated in consumer evaluations of innovations could greatly enrich our understanding of consumer adoption decisions. As evidenced by seminal research by Rokeach (1973), Schwartz and Bilsky (1987) and Kahle, Beatty, and Homer (1986), people have multiple values that motivate their behavior. The identification of specific personal values that are salient or in conflict is crucial to the task of developing communications that resonate with consumers’ belief systems and priorities (Olson & Reynolds, 1983). Particular attention should be made to investigate consumer perceptions of the link between means (product features and performance) and ends (satisfaction of needs and important personal values).

**Product Features and Performance**
The management of technology field is interdisciplinary, and it should come as little surprise that engineering-, manufacturing- and product-managers concentrate on what they know and what they can control—product design and production (Levitt, 1960). Many firms seem guided by the view that a superior product will sell itself: “if you build it they will come.” Indeed, gaining market acceptance often depends on the comparative performance of an innovation relative to the established products in the market, and as a result, a good deal of research has focused on measuring the impact of new product attributes and features on purchase intentions.

An innovation may well offer new or higher levels of performance due to distinctive features, but a competitive advantage can only be realized if buyers perceive an improvement over alternative products. Tests of consumer acceptance of new products typically present controlled sets of products or prototypes to respondents and analyze their preference patterns to discern their implicit valuations (utilities or part-worths) for specific product features and combinations thereof (Carroll, Green, & Kim, 1989). Some studies simplify the competitive landscape by assuming that consumers will only consider products along one or two key performance dimensions (Christensen, 1997; D’Aveni, 2007). For example, size and capacity are considered to be the dominant choice criteria for disk drives, or processor speed drives high-end laptop choice. The buyer simply specs the product and buys on price. More elaborate studies investigate the tradeoffs consumers make to discover the optimal set of product attributes. Multi-attribute models provide an accepted and efficient method to estimate consumers’ utility for an innovation. They take into account the relative
advantages among products and make it possible to explore the extent to which these attributes can account for differences in adoption.

Managers responsible for launch strategy decisions should be mindful of certain limitations that restrict the actionability of attribute- and feature-based studies. Though product-centered studies can establish what features offer a relative advantage, they rarely provide insight into the user-centered motivational questions of why consumers perceive an advantage and how the selection satisfies their needs. Marketers who commercialize innovations also need information suited to influence purchase decisions (Slater & Narver, 1998).

The Means-End Approach

Customers are the ultimate arbiters of new product acceptance and success. Customers’ initial exposure to an innovation is followed by knowledge acquisition of its meaning and use (Griffith, 1999; Rogers, 1995), triggering sense-making (Weick, 1995), visualization of product use (Dahl & Hoeffler, 2004), and the development of mental models of how the product works (Hill & Levenhagen, 1995). In turn, these perceptual processes can induce feelings of personal relevance and influence evaluations of the innovation’s potential to satisfy goals and values.

Means-end theory provides an antidote to the prevailing limited focus on product attributes and features. It builds upon work by psychologists (Cartwright, 1949; Tolman, 1932) and economists (Newell & Simon, 1972) who assert that people do not buy a product for the product’s sake, but for what the product can do for them. The underlying idea of the means-end approach is that “decision makers choose courses of action (including behaviors such as purchase of particular brands) that seem most likely to achieve important outcomes” (Reynolds & Olson, 2001, p. 3). Objects have value only because they produce desirable consequences or enable one to avoid negative consequences. Means-end theory asks and answers the question: “What matters, or what might matter, to potential customers?” by mapping the personally-relevant “reasons why” consumers prefer a product to competitors’ products. Managers then can use these insights to develop strategies to influence consumer decision processes.

In marketing, research into how customers think about value has often followed a means-end approach (Gutman, 1982; Reynolds & Gutman, 1988; Zeithaml, 1988). The means-end approach for studying consumer decision making assumes that there will likely be a number of different reasons for engaging in a given behavior, and that consumers can verbalize the reasons for their actions (Parry, 2002; Reynolds & Olson, 2001). Unlike models that presume that value resides in product attributes, the means-end approach “takes no a priori position as to what the key sources of value are for any object or decision” (Reynolds, Dethloff, & Westberg, 2001, p. 392). Rather, the identification of key sources of value is an empirical question.

Means-end logic permeates human discourse as “people use language to express their judgments and provide bases for their judgments” (Bagozzi & Dabholkar, 2000, p. 538). Representations of consumers’ thoughts and feelings become the object of study for researchers who endeavor to map the means-end chains of logic that describe how products gain relevance to consumers. Laddering, the in-depth, one-on-one interviewing technique used in means-end chain research provides a more complete picture
of the motivational reasons for consumer behavior and is prized for its focus and fidelity to the consumer view (Reynolds et al., 2001; Reynolds & Gutman, 1988). Proponents of the means-end approach state: “it represents a more personalized, emotional, more personal, more idiosyncratic vision of how consumers think and make decisions about which products to buy to satisfy their needs” (Howard & Warren, 2001, p. xii).

Over the years, researchers have presented various means-end models to better understand consumer decision-making (see Figure 1). One of the earliest versions, the Grey Benefit Chain (Young & Feigin, 1975), emphasized the important role of intangible benefits and anticipated “emotional payoffs” in consumer choice. Later research introduced and advanced the widely-adopted Attribute-Consequence-Value (ACV) model, which appears in three- four- or six-level versions (Gutman, 1982; Olson & Reynolds, 1983). Means-end chains map the “why of personal relevance” by linking means to ends, where means represent aspects of product knowledge and the ends represent aspects of consumer self-knowledge (Mulvey, Olson, Celsi, & Walker, 1994; Reynolds & Olson, 2001; Walker & Olson, 1991). Others have suggested that the ACV model, though well-suited for product choice, is less-suited for more abstract choices such as services, ideas or behaviors. Accordingly, consumers’ reasons for action are sometimes modeled as “hierarchical goal structures” (Bagozzi & Dholakia, 1999; Gutman, 1997; Ligas, 2000; Pieters, Baumgartner, & Allen, 1995) using different terms to identify the levels of the means-end chain (e.g., Gengler, Howard, & Zolner, 1995; Overby, Gardial, & Woodruff, 2004). The “consumer goal structure” model (Ratneshwar, Mick, & Huffman, 2000) and “levels of consumer thinking” model (Zaltman & Zaltman, 2008) provide more macro- and context-sensitive representations of the interplay between consumers’ lifestyle choices and product choices.
Taken together, the means-end models illustrated in Figure 1 underscore how a myopic focus on product attributes and features (concepts to the left of the means-end chains) provides an incomplete and potentially biased representation of the drivers of consumer choice (by omitting concepts to the right of the means-end chains). In this paper, we adopt the inclusive “levels of consumer thinking” model, which subsumes concepts in the means-end models most commonly used to investigate consumer decision making (Gutman, 1982; Reynolds & Gutman, 1988; Walker & Olson, 1991; Young & Feigin, 1975).

The linkages between attributes, functional consequences, emotional consequences, and personal values are crucial to understanding business decisions. Take for example executives’ laptop computer buying decisions (example based on Parry, 2002; Wildstrom, 2000). Many corporate customers insist on purchasing laptops with “the fastest President.”
Figure 1: Means-end Models of Consumer Decision Making

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The linkages between attributes, functional consequences, emotional consequences, and personal values are crucial to understanding business decisions. Take for example executives’ laptop computer buying decisions (example based on Parry, 2002; Wildstrom, 2000). Many corporate customers insist on purchasing laptops with “the fastest processor Intel makes” (product attribute) to “be more productive” (functional consequence). A computer with these performance characteristics would hold a relative advantage over competitors. However, these product-centered meanings are pretty vacant without the motivationally-significant customer meanings that truly drive that preference. Upon further inquiry, executives reveal that ownership of the newest fastest laptop sends a public message about the importance of that executive (social consequence) and makes them feel confident and capable (psychological consequences), earning status and the respect of others while upholding approval and equality with peers (personal values and life goals). The means-end chain of associated concepts constitutes executives’ judgments of innovation-values fit. Executives’ disposition to acquire the latest laptop models is explained by the bridge between product meanings and customer meanings.

New product evaluation links product performance considerations with personally-relevant motivational concerns. Thus, to advance theory on technology adoption, it is vital to understand the perceptual links consumers form in evaluating new products. The purpose of this research is to provide a more rigorous and actionable approach to studying innovation-values fit and adoption decisions.

Evaluating Consumer Reaction to an Innovation

This research establishes the means-end approach as a complement to the existing body of knowledge on innovation-values fit. The main contribution of this paper is a template of how managers can use the means-end model to understand consumers’ adoption decisions. The framework (Table 1) presents a 5-step process which can be reused and applied to similar situations where managers encounter the common problem of having to evaluate consumer reaction to new products to develop launch strategy. We demonstrate the approach with the results of a study that investigated consumer reaction to a next-generation model of cell phone to gain broad insight into market acceptance of the innovation.
Table 1: An Analytical Framework for Evaluating Consumer Reaction to an Innovation

<table>
<thead>
<tr>
<th>Step</th>
<th>Data</th>
<th>Analysis</th>
<th>Results/Action</th>
</tr>
</thead>
</table>
| **1. Uncover model preferences** | Model preference rankings  
Dominance index (model shares across choice triads) | Use multi-dimensional scaling (MDS) to develop a preference map with ordinal ranking data  
Identify preference tiers (high-medium-low) using K-means cluster analysis of dominance index measures | Understand the focal model’s position relative to competitors; identify near and distal rivals  
The task of subsequent stages is to explain this pattern of preferences |
| **2. Determine feature importance** | Model feature profiles:  
- Nominal properties (have/not) coded as dummy variables (1/0)  
- Metric properties standardized across models | Property fitting (ProFit) regression analysis of the model feature profile ratings onto the MDS model preference coordinates. | Understand the relative importance of product features on preference  
Interpret the underlying performance dimensions that account for differences in preference |
| **3. Specify themes on relevant innovation-values** | Qualitative means-end chains elicted from laddering interviews | Conduct laddering analysis to identify thematic patterns | Each theme represents a unique motivation for preference and choice in the product category  
Use themes to develop communication strategy |
| **4. Determine the importance of themes on innovation-values** | Consumer ratings of model performance along the innovation-values fit themes  
Preference ranking of the models | Property fitting (ProFit) regression analysis of the innovation-values fit model performance ratings onto the MDS model preference coordinates  
Binary logistic regression tests difference in theme salience (mentioned/not) by model preference status (focal model #1/not) | Understand how the themes differentiate models in the preference space  
Examine potential differences in theme salience by “most preferred model” preference status  
Refine communication strategy by identifying the drivers of preference |
| **5. Compare innovation-values themes to price expectations** | Model price tiers (see Table 1)  
Price perceptions of the focal models (determined using price sensitivity meter measures)  
Price premium measure (model price difference) | Regress model price tier designations onto MDS model preference space coordinates  
Compare differences in price expectations by model preference status using ANOVA | Establish convergent validity by showing consistency between the “get” (means-end chains) with the “give up” (reservation prices) components of perceived value  
Results suggest directions for developing pricing strategy |
The Study

In 1997, we conducted a large-scale field study to develop positioning strategy for cell phones in the consumer market. The data set is based on 160 laddering interviews with a randomly-selected sample of consumers. Typically, 20 to 30 laddering interviews are sufficient to reveal the full range of potentially important consumer perceptions. By comparison, the present study sample is exceptionally large to allow sub-group comparisons and to reduce the risk of missing anything important – the stakes of this new product launch were exceptionally high. Though the data is dated, it is ideal for our objective of demonstrating the means-end model of innovation-values fit to explain consumers’ adoption decisions regarding a next-generation product. However, we make no claim to the generalizability of past drivers of choice in the fast-moving telecommunication category to the present.

Participants

We conducted 160 one-on-one interviews with current and potential cellular telephone users. Participants were contacted using a random-digit dialing CATI system and were selected according to pre-specified quotas for behavioral and demographic characteristics. Sampling criteria ensured balanced representation of the following subgroups of the population: gender, usage status (owners and intendees), occupational status (ultra-professionals, blue-collar workers, homemakers, and college students), and geographic location (Chicago, Los Angeles, Miami, Philadelphia, Seattle and Washington DC).

Product Category: Cell Phone Handsets

The set of eleven cellular telephone handset models used in the study spanned the entire spectrum of price and functionality, from entry-level to high-end. Table 2 lists the key handset features. This study focused on consumer reactions to the Motorola StarTAC – a new model that offered an innovative “clamshell” design and unmatched levels of functionality. The StarTAC displaced the MicroTAC as the high-end anchor of Motorola’s handset portfolio. The set of handsets included five models from Motorola’s product line and six competitors’ models. Months later, a Consumer Reports test (1997) would confirm the popularity of eight of the handset models.
Table 2: Cellular Telephone Handset Features

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Motorola</th>
<th>Ericsson</th>
<th>Nameless</th>
<th>Sony</th>
<th>Nokia</th>
<th>Audiovox</th>
<th>NEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>StarTAC 8600</td>
<td>MicroTAC Elite</td>
<td>Populous</td>
<td>AF-738</td>
<td>“Prototype”</td>
<td>CM-RX100</td>
<td>232</td>
</tr>
<tr>
<td>Price tier</td>
<td>high</td>
<td>high</td>
<td>low</td>
<td>low</td>
<td>high</td>
<td>high</td>
<td>mid</td>
</tr>
<tr>
<td>Weight</td>
<td>3.1 oz</td>
<td>6.8 oz</td>
<td>7.7 oz</td>
<td>7.4 oz</td>
<td>8.2 oz</td>
<td>4.8 oz</td>
<td>4.2 oz</td>
</tr>
<tr>
<td>Dimensions (inches)</td>
<td>3½ x 2 x ¾</td>
<td>6 x 2¼ x ¾</td>
<td>6¼ x 1¾ x 2¼</td>
<td>6¾ x 1¾ x 2¼</td>
<td>7½ x 2¼ x 1¼</td>
<td>5½ x 2 x 1</td>
<td>4½ x 2¼ x 1¼</td>
</tr>
<tr>
<td>(# of) batteries</td>
<td>(2) Li-ion</td>
<td>(1) NiMH</td>
<td>(1) NiMH</td>
<td>(1) NiCad</td>
<td>(1) NiMH</td>
<td>(2) Li-ion</td>
<td>(1) Li-ion</td>
</tr>
<tr>
<td>Charge time</td>
<td>1hr</td>
<td>1 hr</td>
<td>6 hr</td>
<td>8 hrs</td>
<td>5 hrs</td>
<td>1¼ hrs</td>
<td>1 hr</td>
</tr>
<tr>
<td>Talk time</td>
<td>170 min</td>
<td>90 min</td>
<td>70 min</td>
<td>70 min</td>
<td>120 min</td>
<td>90 min</td>
<td>90 min</td>
</tr>
<tr>
<td>Standby time</td>
<td>36 hrs</td>
<td>14 hrs</td>
<td>11 hrs</td>
<td>20 hrs</td>
<td>25 hrs</td>
<td>37 hrs</td>
<td>24 hrs</td>
</tr>
<tr>
<td>Display type</td>
<td>LED</td>
<td>LED</td>
<td>LED</td>
<td>LED</td>
<td>LCD</td>
<td>LCD</td>
<td>LCD</td>
</tr>
<tr>
<td># of lines x # of spaces</td>
<td>2 x 7</td>
<td>2 x 7</td>
<td>1 x 7</td>
<td>2 x 10</td>
<td>1 x 7</td>
<td>3 x 10</td>
<td>2 x 11</td>
</tr>
<tr>
<td>Memory locations</td>
<td>99 alphanumeric</td>
<td>99 alphanumeric</td>
<td>20 numeric</td>
<td>20 numeric</td>
<td>9 numeric</td>
<td>99 alphanumeric</td>
<td>99 alphanumeric</td>
</tr>
<tr>
<td>One touch dial locations</td>
<td>9</td>
<td>9</td>
<td>5</td>
<td>20</td>
<td>9</td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td>Digital answering machine</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Active flip</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Vibration alert</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Voice memo recorder</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
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<tr>
<td>Supports caller ID</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Warranty (years)</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Color choices</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>

Analysis and Results
The overall aim of the study was to evaluate consumer reaction to a new product to inform the development of launch strategy and influence market acceptance. Primary and secondary data were collected and qualitative and quantitative analysis techniques used to provide a level of precision and depth of perspective that cannot be achieved by either of the approaches alone. Differences in consumer preference, brand/model performance, and price perceptions are investigated systematically using appropriate statistical methods including MDS, cluster analysis, and regression techniques. For clarity, our research findings are presented in 5 steps; each step focuses on achieving a specific research goal using specific data collection and analysis techniques: 1) uncover model preferences, 2) determine feature importance, 3) ...
Data collection procedure

A professional agency assisted with the field research by booking facilities and providing recruitment and screening services. Participants were paid an incentive of up to $100 to help increase participation rates and reduce non-response bias. Interviews lasted approximately fifty minutes and were conducted by one of six members of a research team that included the authors. Field notes were taken during and after the interviews, which were audio recorded.

To begin, participants examined eleven cellular telephone handset models with product feature cards. They were instructed to focus their interest on the phone that would best serve their needs and were told to assume that they were buying the phone separately from air time and connection charges for service and that the phone would be paid by someone else. Next, they ranked the models according to their preferences.

After that, focused “laddering” interviews were conducted to elicit the means-end relations that constituted the individual’s preferences. Using the triadic sort technique, participants were presented with a set of 3 handsets (determined prior to the interview using a random-number generator) and asked to choose their most preferred model. The interviewer then used the laddering technique to elicit the reasons for their preference. Once the participant had elaborated the basis of his/her choice sufficiently (articulated a coherent means-end chain), the interviewer summarized what was said and asked the person if the summary was correct. Once the accuracy of the means-end chain was confirmed, the participant rated each handset on a seven-point scale (1=does not satisfy the basis at all, 7=satisfies the basis extremely well). Ratings were obtained for each distinct means-end chain. To elicit additional means-end chains, the interviewer repeated the process with two more randomly-selected handset triads.

The final phase of the interview focused on consumers’ price perceptions. In contrast to the previous phase where participants were told that the phone would be paid for by someone else, participants were now asked to assume that they were buying and paying for a phone for themselves. Van Westendorp’s Price Sensitivity Meter (PSM) technique was adapted to measure each individual’s range of acceptable prices for the MicroTAC and StarTAC handsets. For each model, participants were presented with a price scale in $10 increments ranging from $10 to $1200 and were asked to identify the following price points: (a) “The phone is so expensive I would not buy it,” (b) “The phone begins to be expensive,” (c) “The phone begins to be cheap,” and (d) “The price is so cheap that you question the quality of the phone and would not buy it.”

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specify relevant innovation-values themes, 4) determine innovation-values importance, and 5) compare innovation-values themes to price expectations.

**Step 1: Uncover Model Preferences**
The starting point for our research is the focal behavior we aim to influence: consumer model preference. A multi-dimensional scaling approach is used to provide a vivid visual representation of the structure of market preference. Preference maps are a popular way to portray relationships between brands/models and clarify the underlying patterns of consumer tastes. The visual approach is engaging and facilitates communication between researchers and managers.

**Preference Measures.** The ordinal ranking of handsets provided the main measure of consumer preference. Also, using the triadic choice data, a Dominance Index measure of a model’s strength relative to competitive offerings was computed as the frequency the model was selected divided by the expected count. A value of 1.0 means that the brand is on par with its competitors; values above 1.0 reflect dominance and values below 1.0 reflect weakness.

**Multi-dimensional Scaling (MDS).** Preference maps provide useful visualizations of the competitive landscape. The ordinal handset preference ranking data was submitted to the MDS PROXSCAL algorithm in SPSS 17.0 to create a consumer preference map. Whereas MDS reveals the structure of preference, other techniques are used to interpret (label) the underlying dimensions.

An aggregate analysis was conducted after we determined that individual differences scaling models failed to uncover any major discrepancies in preference by source (gender, ownership status, occupation, city). The two-dimensional MDS solution provided a map with both a high degree of fit (dispersion accounted for $[DAF] = 99.6\text{ percent}$) and interpretability. Figure 2 presents this two-dimensional MDS solution and indicates two key factors underlying handset preference. The horizontal axis separates the more basic models on the left (NEC810, MVX401a) from the models offering more advanced functionality on the right (StarTAC, E738). Vertically, there is a distinction between models produced by Motorola (indicated by the solid square markers) and models produced by competing firms (indicated by the hollow circle markers).

![Figure 2: Consumer Preference Map for Cellular Telephone Handsets (1997)](image)
A regression analysis of the overall rankings onto the MDS solution space, illustrated by the overall preference vector, shows the tendency of consumers to prefer handset models located to the top-right of the space ($R^2 = .918$, $F = 44.7$, $p < .001$). A regression of the Dominance Index measures of preference yielded similar results ($R^2 = .837$, $F = 20.6$, $p < .001$). Two Motorola handset models (StarTAC and MicroTAC) occupy the top-right “high preference” quadrant. The stature of these models is evident in the overall Dominance Index measures (StarTAC dominated 10/10 models, Dominance Index = 2.17; MicroTAC dominated 9/10 models, Dominance Index = 1.67).

**K-Means Cluster Analysis.** Clustering methods provide complementary perspectives to MDS by attending to the pair-wise rather than global patterns in object (model) similarity (Mohr, 1998). A K-means cluster analysis of the Dominance Index measures partitioned the handset models into three preference tiers (low, moderate, and high). The allocation of handset models to clusters was based on maximizing between-cluster variance in preference while minimizing within-cluster variance in preference. Two Motorola handset models constitute the “high preference” cluster. This outcome presents an interesting challenge to Motorola, for it must position the StarTAC both against the MicroTAC (the incumbent leader of Motorola’s handset portfolio) and well-liked competitive models in the “moderate preference” cluster.

**Step 2: Determine Feature Importance**

Product features provide an objective and available data source to explore the relationship between the models and consumer preference. Multi-attribute models provide an accepted and efficient method to estimate consumers’ utility for an innovation. Attribute data describing different models or brands are commonly used to generate product positioning maps using multi-dimensional scaling (MDS) techniques (e.g., Adams & Van Auken, 1995; D’Aveni, 2007). Combined with consumer response data, additional insights can be provided about the relationship of innovation attributes on consumer preference or perceived value (e.g., Carroll et al., 1989; DeSarbo, Kim, Choi, & Spaulding, 2002; Sinha & DeSarbo, 1998). Differences among innovations are important variables in explaining consumer adoption decisions. Attribute approaches take into account similarities and differences among innovations and makes it possible to explore the extent to which these attributes can account for differences in adoption.

**Model Feature Scores.** Feature scores were calculated for each model using the information in Table 2. Metric measures were standardized across models and nominal properties (have/not) were coded as dummy (1/0) variables.

**ProFit (Property Fitting) Regression Analysis.** Regression analysis is frequently used to determine what attributes of a product are driving preferences along with the task of identifying any underlying dimensions that reflect attribute co-variation (Schiffman, Reynolds, & Young, 1981; van Kleef, van Trijp, & Luning, 2006). Specifically, we wanted to identify the features that people seem to use to structure their phone model preferences. Using ProFit

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1 There are numerous methodologies and modifications to clustering algorithms. The K-means algorithm was chosen because of its long established history and because its effectiveness versus hierarchical clustering algorithms. K-means will attempt to begin clustering by defining k centroids maximally distant apart, whereas hierarchical algorithms define a cluster for each observation and iteratively combine clusters to reach an eventual conclusion. The K-means is more effective in our particular situation because of the content of the data. When many of the clusters have some overlap, the hierarchical algorithms tend to aggregate clusters based on small overlaps that do not accurately reflect the meaning structures in the data, and tend to over-aggregate. This could be a topic of future research.
regression analysis (Carroll & Green, 1997; Chang & Carroll, 1969), we fit each of the features to the brand coordinates in the two-dimensional MDS preference space by regressing uni-dimensional ratings onto the dimensional coordinates. Table 3 provides the correlation coefficients, F values, and property vectors (beta weights) that can be fitted to the spatial map and guide the labeling of the axes. Higher values of R² indicate that the product feature explains a greater proportion of variance in preference.

Table 3: Property Fitting of Product Features on the Handset Preference Space

<table>
<thead>
<tr>
<th>Product Features</th>
<th>R²</th>
<th>F</th>
<th>Dimension 1</th>
<th>Dimension 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Size</td>
<td>0.92</td>
<td>45.7</td>
<td>*** -0.96</td>
<td>*** 0.05</td>
</tr>
<tr>
<td>2. Memory locations</td>
<td>0.79</td>
<td>15.0</td>
<td>** 0.84</td>
<td>*** -0.30</td>
</tr>
<tr>
<td>3. Weight</td>
<td>0.78</td>
<td>14.5</td>
<td>** -0.86</td>
<td>** 0.20</td>
</tr>
<tr>
<td>4. Active flip</td>
<td>0.76</td>
<td>12.8</td>
<td>** 0.61</td>
<td>** 0.62</td>
</tr>
<tr>
<td>5. Charge time</td>
<td>0.64</td>
<td>7.1</td>
<td>** -0.78</td>
<td>** 0.17</td>
</tr>
<tr>
<td>6. Voice mail</td>
<td>0.64</td>
<td>7.0</td>
<td>* 0.60</td>
<td>* 0.52</td>
</tr>
<tr>
<td>7. Vibration alert</td>
<td>0.64</td>
<td>7.0</td>
<td>* 0.60</td>
<td>* 0.52</td>
</tr>
<tr>
<td>8. Standby time</td>
<td>0.57</td>
<td>5.3</td>
<td>* 0.48</td>
<td>-0.58</td>
</tr>
<tr>
<td>9. Display type</td>
<td>0.55</td>
<td>4.9</td>
<td>* -0.11</td>
<td>-0.73</td>
</tr>
<tr>
<td>10. Display characters</td>
<td>0.51</td>
<td>4.1</td>
<td>* -0.16</td>
<td>-0.69</td>
</tr>
<tr>
<td>11. Voice recorder</td>
<td>0.39</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Extended warranty</td>
<td>0.39</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. One touch dial locations</td>
<td>0.24</td>
<td>1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Caller ID</td>
<td>0.17</td>
<td>0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Extra battery</td>
<td>0.07</td>
<td>0.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Talk time</td>
<td>0.06</td>
<td>0.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p<.05
** p<.01
*** p<.001

Dimension 1 captures the “advanced functionality” sought by consumers. Size matters; consumers dislike large heavy phones (located to the left of the map) and prefer small large phones (located to the right) made possible in part by innovations in microchip and battery design. Other technology-driven innovations that appear to drive preference include memory locations, voice mail, and vibration alert. Consumers also prefer an active flip design and batteries that recharge in minimal time.

Dimension 2 captures the “usability” or ease-of-use provided by specific attributes or design platforms. Consumers prefer handsets that offer LCD over LED displays, and more characters displayed to fewer. An active flip design is preferred, as are phones with...
longer standby time, vibration alert, and voice mail.

Figure 3 shows the direction of the attribute property vectors in the model preference space. Large, heavy “brick-like” handsets are located to the left, whereas small, light models are located to the right. Notably, the top 3 preferred models have a flip design that increases their compactness. Exclusive model features, notably vibration alert and a digital answering machine, enhanced the appeal of the StarTAC and MicroTAC. Yet, the position of the entire Motorola product line was lessened somewhat by its adherence to an LED display platform.

Figure 3: Differentiation of Preference via Product Features

Attributes that fail to differentiate models in the preference space also provide insight into consumer perception. Though these attributes hold little potential as differentiators, they may still serve as prerequisites or points-of-parity that must-be fulfilled by all models in the category. Alternately, certain models may include features that are not necessary or desired by consumers (over-engineering). Whereas consumers care about model differences in standby time, they are seemingly uninterested in the fact that some models offer more talk time than others, or have extra battery capabilities. Likewise, voice mail was a valued differentiator but support for caller identification was not.

Step 3: Specify Relevant Innovation-Values Themes
Measuring the extent of innovation-values fit offers an overall judgment of compatibility. Yet to influence these judgments, a more micro and nuanced view of the specific values is needed to develop strategy to influence adoption decisions.

Laddering Interview Data. Initial analysis of the laddering data followed standard coding protocols using LadderMap software to facilitate the initial judgment task of coding verbatim comments and ensuing quantitative analyses. The four key steps are: (1) Specify elements (attributes, consequences, values) that constitute each ladder, (2) Develop a set of content codes (usually 30 – 60 codes), (3) Classify verbatim elements into the content codes, and (4)
Quantify links between concepts in ladders to build an implications matrix. To enhance the interpretability and usefulness of the results, the clustering procedure proposed by Klenosky, Gengler, and Mulvey was applied to the 692 binary vectors representing the ladders to identify the key groupings of related means-end concepts. An analysis of the pseudo-F and pseudo t statistics indicated a 7-cluster solution. The 7-cluster solution was consistent with the results of an independent qualitative thematic analysis of the original means-end chains. The seven clusters of means-end concepts represent innovation-values themes.

The results of the laddering interviews suggest that consumers’ cellular phone preferences are based on seven themes. Each theme represents a unique motivation or rationale for preference and choice within the category. The innovation-values themes are based on the network of connections between aspects of product knowledge (the innovation’s characteristics and functional consequences) and self-knowledge (how product use satisfies personally-relevant goals and values). Compatibility arises when the consumer perceives a connection or “fit” between these domains of knowledge. Individuals can have multiple sources of motivation and draw upon several innovation-values themes to formulate their preferences. The themes detailed in Table 4 are sorted by decreasing prevalence across participants: In Touch, Prudent Purchase, Reliability, Comfort, Driveability, Discretion, and Image. For brevity, we discuss the themes in discourse format instead of the hierarchical value map approach used in many laddering studies. Differences in presentation format have no material impact on the results.

Table 4: Innovation-Values Themes for Cellular Telephone Handsets

<table>
<thead>
<tr>
<th>Preference Theme (Prevalence %)</th>
<th>Attributes</th>
<th>Consequences</th>
<th>Emotional Payoffs &amp; Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In Touch (71.9%)</td>
<td>Answering machine, Memory locations, Vibrate alert, Long battery life, Talk &amp; standby time, Small size, Lightweight</td>
<td>Easy to carry, Have phone with me, Be in touch, in control, Maintain schedule, Don’t miss calls, Be responsive to clients, Deal with emergencies</td>
<td>Productivity, Professionalism, Accomplishment, Success, Peace of mind, Care for family</td>
</tr>
<tr>
<td>2. Prudent purchase (51.3%)</td>
<td>Sturdy design, Flip cover, Keypad design, Protected keys, Warranty</td>
<td>Durability, Damage prevention, Avoid accidental calls, Control spending, Save money</td>
<td>Be financially responsible, Thrift, Prudence</td>
</tr>
<tr>
<td>3. Reliability (45.0%)</td>
<td>Brand name, Memory locations, Keypad design, Warranty</td>
<td>Higher quality, Reliable, dependable, Trustworthy, Less hassle, Simplify your life, Less stress</td>
<td>Be prepared, Be responsive, Avoid feelings of anxiety, Security</td>
</tr>
</tbody>
</table>
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<th>Consequences</th>
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</tr>
</thead>
</table>
| 4. Comfort (43.8%)              | Lightweight
  Ergonomic feel
  Size
  Shape                           | Easy to carry
  Be unencumbered
  Less pain
  Can concentrate, focus          | Physical comfort
  Health
  Carefree, relaxed
  Enjoyable experience            |
| 5. Driveability (33.1%)         | Size & spacing of keys
  Lit display
  Visibility of keys
  Memory locations                | Easy to hold
  Readability of keys
  Easy to use
  Dial accurately
  Use while driving
  Multitask                       | Be efficient
  Personal health & safety        |
| 6. Discretion (29.4%)           | Small size
  Vibrate alert                   | Be discreet
  Be inconspicuous
  Do not annoy others
  Avoid embarrassment
  Not get mugged                  | Be polite, courteous
  Be respectful
  Social acceptance
  Personal safety                 |
| 7. Image (26.3%)                | Appearance
  Unique design
  Small size
  Feature-laden                   | Fashionable, modern
  Get noticed
  Instills confidence
  Conversation piece
  Impression management           | Personal & professional image
  Self-respect & esteem
  Success                         |

“In Touch” focuses on how features such as message taking, battery life, and portability keep the phone working and with the user at all times. Enhanced connectivity and fewer missed calls are critical to enhancing professional and personal productivity; taking care of business is tied to taking care of one’s family. Life runs on a schedule, yet changes in plans are inevitable. The power to make or take calls 24/7 empowers users to be more responsive and efficient, supporting their ambition for success.

“Prudent Purchase” concerns the desire to be practical and financially responsible, a goal that is realized by purchasing a durable, long-lasting phone. Innovations must heed the virtues of prudence and thrift. A broken phone is a useless phone; a design that resists damage or accidental dialing is critical. At a minimum, a phone ought to be able to withstand the abuse incurred by storing it in a purse, gym bag, pocket, or vehicle glove box.

“Reliability” appeals to consumers who want to be prepared for whatever challenges lie ahead. Brand name products backed by long warranties provide strong signals of product quality and trustworthiness over the long-term. Reliability is vital when one must be reachable to clients, supervisors, or family. Knowing that they will be able to connect at any time makes users feel secure and confident, a need that is especially salient during long car trips, such as driving across Alligator Alley, Florida. A sensible keypad design and memory locations help to simplify use and avoid the hassles, frustration, stress, and anxiety caused by lesser designs.

“Comfort” centers on the ergonomics of a phone’s design and the sensory experiential aspects of phone usage. Aspects of product design and form – especially phone weight, shape, and size – foster ease of use to allow the user to focus, relax, and enjoy the conversation. Conversely, consumers avoid poorly...
designed phones that are awkward or even painful to use. The annoyance of walking or exercising with a phone is familiar to men who clip their phone to a belt or stow it in a pocket, unlike women who put their phone in a purse.

Though currently a contentious legal issue, “Driveability” was an important issue to many multi-tasking consumers who wanted to use their cell phones while driving. Features including a lit display, optimally scaled and easily-read keys, and memory locations enhance dialing accuracy and reduce the risk of inherently hazardous activity. Drivers who lend their phones to passengers also appreciate an intuitive easy-to-use design as it alleviates the distraction and burden of explaining how to use it.

“Discretion” focuses on how some cell phone users want to remain inconspicuous and to avoid annoying others. Discretion is sought in public spaces including places of worship, schools, and restaurants as well in workplace meetings. Small phones with vibrate alert feature epitomize discretion. Discretion is driven by the desire to shun unwanted attention sparked by phone ownership, is compelled by a wish to avoid distracting others out of courtesy and respect, and stems from a feeling of precautionary safety and not wanting to be a target for thieves.

Finally, “Image” was an important criterion in terms of the phone’s appearance and features. Small-sized feature-laden phones with a unique design are fashionable, attracting attention and triggering conversations. Concerned with making the right impression, modern, expensive and prestigious phones instill confidence in those who “dress to impress, dress for success.” The quest for cool is shadowed by the escape from ridicule; nobody wants a large phone in the pocket that “looks like a boob.”

Step 4: Determine Innovation - Values Theme Importance

Means-end research typically provides insight into the qualitative dimensions of perceived value, yet only considers their importance as a function of prevalence of mention across consumers. To increase the interpretability, usefulness and actionability of study results, we augment the traditional analysis with scaled judgments of model performance along the innovation-value themes. These ratings are then correlated with consumers’ model preferences.

Innovation-Values Theme Ratings. Participants only rated the means-end dimensions they elaborated in the laddering interviews, and ratings of model performance were standardized across models. Already we have established the dominance of the StarTAC and MicroTAC versus their competitors using preference measures. The reasons for their dominance are evident upon examination of the standardized model performance ratings across the seven themes, as illustrated in Figure 4. Clearly, the two models outperform their rivals in the moderate- and low-preference tiers.

Step 4: Determine Innovation - Values Theme Importance
ProFit regression of the model performance ratings onto the handset preference space provides additional evidence of how consumers differentiate models in reference to the themes. The property vectors listed in Table 5 and fitted to the MDS space in Figure 5 show how the MicroTAC and especially the StarTAC received the highest ratings for six of the seven innovation-values themes. The lone exception was that the MicroTAC was rated as providing superior “Driveability” to the StarTAC. The fact that the “Driveability” property vector is perpendicular to the overall preference vector is important as it provides evidence of heterogeneity in consumer preference and raises the possibility that a minority (subsegment) of participants had distinct needs that were not fully satisfied by the next-generation product. We will revisit this issue later.

Table 5: Property Fitting of Innovation-Values Themes on the Handset Preference Space

<table>
<thead>
<tr>
<th>Preference Themes</th>
<th>$R^2$</th>
<th>F</th>
<th>Dimension 1</th>
<th>Dimension 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In Touch</td>
<td>.71</td>
<td>10</td>
<td>** .84</td>
<td>** -.04</td>
</tr>
<tr>
<td>2. Prudent</td>
<td>.71</td>
<td>9.6</td>
<td>** .67</td>
<td>** .51</td>
</tr>
<tr>
<td>3. Reliability</td>
<td>.83</td>
<td>19.5</td>
<td>*** .87</td>
<td>*** .26</td>
</tr>
<tr>
<td>4. Comfort</td>
<td>.84</td>
<td>21.2</td>
<td>*** .91</td>
<td>*** .10</td>
</tr>
<tr>
<td>5. Driveability</td>
<td>.56</td>
<td>5.2</td>
<td>* -.09</td>
<td>.74 *</td>
</tr>
<tr>
<td>6. Discretion</td>
<td>.77</td>
<td>13.8</td>
<td>** .84</td>
<td>*** .26</td>
</tr>
<tr>
<td>7. Image</td>
<td>.92</td>
<td>48.0</td>
<td>*** .96</td>
<td>*** .06</td>
</tr>
</tbody>
</table>

* p<.05  
** p<.01  
*** p<.001
**Binary Logistic Regression.** Logistic regression was used to examine the differences between consumers who ranked the StarTAC #1 with consumers who preferred another model. Specifically, we examined the association between preference status and the likelihood of using innovation-values themes as choice criteria.

Consumers see differences in the model performance for each of the innovation-values themes, but does the salience of these themes differ by preference status? The StarTAC was ranked #1 by 86 (53.8%) participants, and 74 (46.2%) ranked another model as their top choice. We observed that StarTAC fans were much more likely to identify the “In Touch” theme as choice criterion (66.0% versus 34.0%, log odds = 2.82, Wald = 8.05, p<.01) and the “Discretion” theme (60.9% versus 39.1%, log odds = 2.04, Wald = 3.92, p<.05), but were significantly less likely to use the “Driveability” theme (37.7% versus 62.3%, log odds = 0.38, Wald = 7.96, p<.01) as a reason for their preference.

**Step 5: Compare Innovation-Values Themes to Price Expectations**

Adoption depends not only on adoption-values fit, but also on fit with consumer price expectations. After examining a product, consumers formulate a rough notion of what they would expect to pay for the item (Monroe, 1990). The “Theory of Reasonable Price” suggests that consumers can specify their price expectations, and will be willing to buy if the price is deemed reasonable. However, the probability of purchase diminishes if this perceptual threshold is exceeded. Also, “Theory of Price Signaling Quality” maintains that many consumers believe that “you get what you pay for” and that higher prices signal higher quality to consumers. While high price and quality can create an incentive to buy, too low a price can cause buyers to avoid buying a product, fearing poor quality. This state of knowledge brings rise to the following research questions, aimed at identifying the motivational drivers of adoption.

To test the idea that “you get what you pay for”, we regressed the model price tier designations (listed in the table) onto the preference space and confirmed that consumer preference exhibits a high level of correspondence with market price tiers ($R^2 = .892$, $F = 33.9$, $p < .001$).

Shifting focus to consumers' internal standards of value, we tested the link between model preference status and consumer expectations of price level. As illustrated in the error bar graphs in Figure 6A, price expectations for the MicroTAC were very consistent regardless of participants’ model preference status. In contrast, price expectations for the next-generation StarTAC model shown in Figure 6B reveal that fans of the StarTAC (vs. fans of other models) perceived greater value and expected to pay significantly more for the phone at each of the four price anchors. On average, StarTAC fans had major reservations about product quality at $116.40 (vs. $66.67, $F = 13.21$, $p<.001$), viewed it as a deal at $190.81 (vs. $131.39, $F = 9.61$, $p<.01$), felt it as getting expensive but still worth consideration at $320.76 (vs. $220.69, $F = 12.10$, $p<.001$) and deemed it too expensive at $407.09 (vs. $304.86, $F = 7.40$, $p<.01$).

Overall, participants felt that the next-generation StarTAC would be priced higher than the incumbent MicroTAC. Fans of the StarTAC (vs. fans of other models) perceived a greater price premium ($\Delta P$ – StarTAC vs. $\Delta P$ – MicroTAC) across all four measures: “too cheap” (+$46.98 vs. +$12.50, $F = 13.29$, $p<.001$), “bargain price” (+$64.36 vs. +$20.69, $F = 16.25$, $p<.001$), “high-end consider” (+$93.20 vs. +$9.58, $F = 23.95$, $p<.001$) and “too high” (+$107.67 vs. +$21.25, $F = 20.48$, $p<.001$).

These results support the conclusion that Motorola should consider launching the new StarTAC model at a higher price than the incumbent model because consumers realize that it provides superior performance along crucial innovation-values themes. This brings us to the question of “which theme(s) drives price expectations?”

We investigated the relationship between theme salience and the StarTAC price perceptions. Evidently, the innovation-values fit of being “In Touch” is worth understanding innovation-values fit from the consumer perspective: a new mixed-model approach.
Table 2) onto the preference space and confirmed that consumer preference exhibits a high level of correspondence with market price tiers ($R^2 = .892, F = 33.9, p < .001$).

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We investigated the relationship between theme salience and the StarTAC price perceptions. Evidently, the innovation-values fit of being “In Touch” is worth
paying for. Consumers who used the “In Touch” theme as a choice criterion provided higher “begins to be expensive” price estimates on average (+$46.75, $ = 5.4, p<.05) than consumers who did not mention the theme. Activation of the “Driveability” theme proved to lower price expectations (-$52.60, $ = 7.67, p<.01), whereas the salience of “Discretion” has no significant impact on price expectations. These results demonstrate how mere differentiation is not a sound basis for developing a positioning strategy because consumers must also value the difference. Though the exceptional level of discretion provided by the StarTAC will be noticed by prospective customers, its capacity to keep users “In Touch” will matter most in closing the sale.

DISCUSSION

The goal of this research was to propose and demonstrate a novel approach to study innovations—value fit and compatibility. By adapting and extending the means-end motivational framework, we provided a conceptual template for analyzing technology’s relevance to consumers. This research also answered Hauser, Tellis & Griffin’s challenge to develop new consumer-centric perspectives on innovation adoption using field study data. The detailed analysis of 160 prospects’ reactions to a new-generation product using laddering interviews provided much deeper insight into innovation-values fit than is usual.

In this study, we pushed means-end methodology into quantitative directions that have rarely been explored. We asked: Why not capture consumers’ qualitative and quantitative reactions to an innovation at the same time? It is possible to gather complementary perspectives in a single stage, thus speeding analysis and providing timely input for the time-sensitive decisions that typify the innovation commercialization process. We demonstrated how first-step one-on-one interviews can deliver much more than purely qualitative insights by collecting additional measures such as brand/model preferences, performance ratings, and price perceptions. The effort to collect these scale measures is trivial compared to the “high amount of effort in data collection” and “extensive effort in coding (summarizing and categorizing) and interpreting the meaning of the results” required of the means-end approach. Conversely, this study provided fuller information and added uncommon qualitative insight to familiar descriptive and inferential statistics and positioning maps.

Our research has several important implications for both innovation scholars and practicing managers. From a theoretical standpoint, our means-end framework goes beyond the simple “poor-neutral-good” scale measures of innovation-values fit to produce a more fundamental understanding of consumers’ reactions to an innovation. Connections are crucial. Products only matter if consumers perceive personal relevance in their consumption. Innovations have to connect with consumers’ goals, values, and ultimately their lives. As such, this research builds on recent efforts that underscore how to gain a competitive advantage by establishing the personal relevance of a brand’s technology.

Managerial Implications

The means-end model of innovation-values fit also provides the kinds of actionable insights that managers need to make decisions about marketing new products. The innovation-values themes provide conceptual templates the company can use in positioning the innovative product. Commercial applications of means-end study results to domains like advertising are well-established in the literature.
Our extensions to the basic means-end approach include the collection and comparison of brand/model rating data and price perception measures—improvements that have been frequently suggested, but rarely implemented.

This methodology can benefit managers in two important ways. Firstly, shortening the product development process and improving probabilities of success has been an important topic for over two decades, and has been the subject of such voluminous research that six meta-analyses have been performed on the topic. By essentially collapsing the research process to one step instead of several, important product feature decisions can be improved and launches quickened. For example, design features and positioning decisions for a new line of consumer hand brushes can be made within a few weeks of the research being initiated. Launches can be made quickly with greater confidence that they are both delivering the features consumers value the most and that the promotional efforts are promising the benefits that are being valued most by consumers. Too often a crowded message of all the benefits a new product contains fails to clearly articulate the benefits that are most valued by consumers, because it is lost in the clutter.

Secondly, in many elite markets or business-to-business markets, the opportunity to reach customers is severely limited. One example might be studying the features most important to private purchasers of private jet services. The number of elite consumers who are able and willing to pay for this service is extremely limited. Furthermore, their attention for an interview is difficult and expensive to obtain. For this reason, market researchers will want to maximize the amount of information they can get from these individuals in one interview, because it may simply be infeasible to do a stage of qualitative and a follow-up survey without exhausting the available population willing to be surveyed. A similar situation exists for a financial institution desiring to interview CFOs of fortune 100 corporations on decisions related to fund investments. Only a subset of them is willing to participate in research at all, and maximizing the information we can get from each interview is of paramount importance.

There are additional strategic considerations to be considered. Innovative companies face the dilemma of cannibalization because the introduction of innovations often affects sales and profitability of older models. The next-generation StarTAC model leapfrogged the incumbent technology, instigating the need to reposition the MicroTAC as it was no longer the most feature-laden and desirable model on the market. However, it was rated as having the highest level of “Driveability” of all models tested. Unfortunately, though offering a differential advantage, it would be irresponsible and risky for Motorola to use “Driveability” as a positioning theme. However, if one closely examines the means-end elements that constitute this theme, it points to the fact that certain consumers wanted a handset that is really easy to use. Fast forward to the present and there is a bourgeoning niche market for handsets targeted primarily to seniors that offer large readable buttons and displays, and better sound quality; innovations that are compatible with their needs and fit with their values.

**Limitations and Directions for Future Research**

Price and perceived value are two sides of the same
coin. We discovered that people who see value in the next-generation product expect to pay more. Traditionally the means-end approach has been used to study consumer perceived value, but rarely has it reconciled the anticipated “get” of the exchange with the inevitable “give up”. Such tradeoffs are fundamental and ought to occupy a higher priority on researchers’ agendas. The present analysis takes some original steps in demonstrating a link between innovations-values themes and price expectations. The price sensitivity meter provides a theory-based approach to study consumer price perceptions more systematically, and yet has certain limitations (i.e. it tends to underestimate willingness-to-pay, and works best when consumers have lots of experience with the product). For this reason, future research should consider including more sophisticated measures of consumer price perceptions and tradeoffs for innovations.

Methodologically, this research could be extended and enhanced using quantitative and qualitative approaches. This analysis focused on the preference pattern of the market as a whole and did not fully explore heterogeneity in consumer preference. A high level of consensus among participants in their brand rankings across a-priori groupings lessened the harm instigated by this assumption. Yet, advances in latent class segmentation techniques and the increased availability of commercial software programs provide powerful tools to capture and investigate unobserved heterogeneity and are worth considering. Likewise, the systematic collection and analysis of insights from consumers’ technology narratives and metaphoric expressions of their thoughts and feelings would surface deep insights into the meanings and ideological concerns that structure how consumers perceive technology’s relevance.

In summary, this study has revisited the important relationship between consumer adoption behavior and innovation-values fit. Our analysis presented a method to identify the themes that constitute the general concept of innovation-values fit and established their impact on consumer perceptions of brand/model differentiation, desirability, and price expectations. We hope our means-end model stimulates future research on understanding innovation-values fit from the consumer perspective.

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