

Identifying and Using Emergent Consumers in Developing Radical Innovations

A full proposal submitted to the MSI Collaborative Research Competition: *JMR* Special Issue
Practitioner–Academic Collaborative Research

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March 1, 2004

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Identifying and Using Emergent Consumers in Developing Radical Innovations

Several years ago, David Porter, Kansas City inventor and entrepreneur, had an idea that an intelligent storage device outside of people's homes would stimulate the home delivery of goods¹. Porter bounced the idea off some business customers, enlisted engineers to help with the technical specifications, patented the SmartBox solution, built a prototype in conjunction with a company and ran a small home trial, following which, the company concluded that the market for the SmartBox was too small and abandoned the project. The SmartBox is a really new product (or a radical innovation) relative to how consumers currently accept delivery of goods at home. David Porter approached the authors in the hopes that we could help him learn which consumers might be the "right" ones he should be talking to and how he might use them to further develop his concept and improve its chances for success in the marketplace. In the course of these discussions, we realized that such a concept development problem is not unique and is in fact faced by many consumer goods firms looking to develop really new innovations.

Scholars in marketing and strategy have long explored the broad subject of radical product innovations, a topic that is top-tier in the *Marketing Science Institute's* 2002-2004 research priorities. One reason the topic remains key is that while new product development is a major activity of firms, most of the 25,000 products introduced in the United States each year fail (Goldenberg, Lehmann, and Mazursky 2001), perhaps due to their incremental nature. The product development process remains challenging for many firms because average consumers² have difficulty estimating the usefulness of a radical innovation relative to incremental innovations (Hoeffler 2003). Such preference uncertainty may lead firms to abandon projects that might ultimately be successful innovations. It turns out that firms tend to focus their energies on their average consumer and when these consumers exhibit uncertainty with respect to an innovation, firms tend to not pursue such new projects (Christensen 1997). For example, consultants engaged by AT&T concluded that the cell phone market would not be profitable because average users still preferred landlines and recommended AT&T pull out of the cell phone market (Economist 1999). AT&T followed the consultants' advice for years, during which time cell phones significantly disrupted landline phone use. Today, experts forecast that cell phones may one day supplant entirely the use of landlines (Federal Communications Commission 2003; Kolko, et. al. 2003). The above problem may be particularly acute in the consumer packaged goods industry. Govindarajan and Kopalle's (2003) analysis of data from senior vice presidents and general managers at 138 strategic business units concerning six industry sectors showed that consumer packaged goods was the least radical in nature.

¹The material in this paragraph was derived from personal communication between David Porter and the authors and articles reported in *Business Week* (Borras 2000) and the *Wall Street Journal* (Tam 2002).

² In the remainder of this paper, we use the terms average, typical, and mainstream consumers interchangeably.

This suggests that the use of average consumers in new product development may be more suited for incremental innovations.

Thus, researchers have long noted that the average, mainstream consumer is not that useful in developing really new products (Griffin 1996; Hoeffler 2003). On the other hand, while much research has emphasized improving current new product concept techniques, for example, using mental analogies (Dahl and Moreau 2002; Hoeffler 2003), visual depiction and animation (Dahan and Srinivasan 2000), Web based testing (Dahan and Hauser 2002), and conjoint analysis (Green, Krieger, and Vavra 1997), little research has focused on *which* consumers to use in the new product development process, particularly in the consumer goods industry. Note that the lead user approach, using expert customers with an early awareness of their needs in the idea generation stage of new product development, has been applied in a business-to-business setting (von Hippel 1986); however, the use of particular, as opposed to mainstream, consumer groups for developing and testing radical new products in consumer settings has not received nearly as much attention. Considering further the high failure rate of new products introduced in the United States each year, a methodology that can aid in the product development process for really new consumer products is appropriate.

Thus, the goal of this project is to develop a methodology to identify these “right” consumers. We call these right individuals “*emergent consumers*” and propose that identifying and using such consumers in the concept development stage of developing radical innovations in the consumer goods and services industries can 1) aid in the successful development of radical new product concepts, 2) improve the chances of success in the marketplace for such innovations, and 3) help predict their ultimate acceptance by the mainstream customers. Identification of emergent consumers complements current concept testing methods mentioned earlier. Because some radical innovations have the power to actually disrupt current products in mainstream consumer use, the development of such an “early warning system” can be vital for radical innovations targeted at typical consumers. Our thesis, developed below, is that emergent consumers are those who exhibit the ability to process information in a dominantly experiential way and that the interactions among such individuals will, in a new product development context, produce a radical innovation that mainstream consumers will find more appealing and be more likely to adopt relative to one that is developed by mainstream or innovative consumers.

Consistent with this goal, this research addresses two questions. First, how can we identify emergent consumers? This answers *who* firms should talk to first when testing new consumer products that represent really new ideas. Second, how can emergent consumers be used at the concept testing stage to improve the subsequent new product development process with a firm’s mainstream consumers? This answers *how* firms can extract and incorporate key feedback from emergent consumers.

From a research perspective, these questions are important because prior literature suggests that existing firms find it hard to develop radical innovations, particularly those that may actually disrupt the products being used by typical customers (Ahuja and Lampert 2001; Chandy and Tellis 2000). While prior research notes that firms should adopt a positive orientation toward emergent customer segments in order to develop innovations (Christensen 1997; Govindarajan and Kopalle 2003), it does not shed light on how firms can identify such customers.

Theoretical, Methodological and Managerial Contributions

This research makes two substantive contributions. First, drawing on psychological theories of information processing and self-organizing theory in biological systems, we introduce the idea of emergent consumers and identify their important role in the new product development process for radical innovations in consumer markets. Second, we develop a new methodology for the identification of emergent consumers and show how firms interested in developing radical innovations can use such consumers in the concept development phase of new product development in order to improve their targeting of the broader mainstream consumer and improve their opportunities for new product success in the marketplace.

Managerially, our research will address why firms should not seek input first from its average, mainstream consumers in developing radically new products. We will show that new product concepts developed and modified in conjunction with emergent consumers may actually have a higher likelihood of ultimate success with the mainstream customer base. We also discuss why emergent consumers are not lead users, how they differ from Roger's (1962; 2003) classic innovation adopter categories, and distinguish the emergent consumer construct from the construct of dispositional innovativeness (Steenkamp and Gielens 2003). David Porter's SmartBox concept presents the opportunity for a unique and exciting application of our proposed methodology. More generally, we expect this methodology to influence business practice where such innovations are concerned. Below, we describe the theory, methodology and plan for empirical analysis and modeling and the role of the academics and practitioner in the research.

THEORY

Current Approaches for Developing and Testing New Product Concepts

One approach to developing new products is to use templates that help specify the final pattern of an innovation and steer the pattern formation process (Goldenberg, Mazursky, and Solomon 1999). The goal is to uncover hidden logical patterns in past product innovations to determine the next innovation in that pattern. The template approach is a product based perspective. A consumer approach follows from

Rogers' (2003) innovation diffusion theory which suggests that innovators and early adopters play a key role in the diffusion process by directly or indirectly influencing the adoption of an innovation among the mainstream users. Accordingly, at a more disaggregate level, Goldenberg and Efroni (2001) develop a stochastic diffusion model for the propagation of needs among consumers.

A related consumer oriented approach to evaluate the potential success of an innovation is to rely on consumer innovativeness, defined as a predisposition of consumers to *buy* new and different products (Midgley and Dowling 1978), within a population. Midgley and Dowling (1978) and Steenkamp, ter Hofstede, and Wedel (1999) argue that researchers should distinguish between the operational definition of innovation adopter categories (Rogers 2003), which is ex-post product introduction, and the underlying disposition of consumer willingness to buy new and different products. It turns out that consumer innovativeness was found to be correlated positively with personality traits such as extraversion, risk taking, and tolerance for ambiguity (Steenkamp et al. 1999). This discussion suggests the use of consumers who are high on innovativeness in developing and evaluating new product concepts.

In business-to-business settings the use of lead users in developing innovations has received wide attention (von Hippel and Katz 2002; von Hippel, Thomke, and Sonnack 1999; Thomke and von Hippel 2002). The lead user approach is an engineering-orientated approach suitable for industrial settings where the lead users are experts among the customer group of interest and able to articulate both needs and ideas for solutions (Lilien, et.al. 2002). Lead users have a conscious awareness of their needs, are motivated to innovate to satisfy those needs, and experience those needs earlier than most in the market (Lilien, et.al. 2002; Morrison, Roberts, and von Hippel 2000). The lack of studies of lead users in consumer settings suggests that (i) it is hard to identify lead users in a consumer market and (ii) lead user status may not be a trait-based characteristic.

Consumer Thinking Styles

A considerable body of research in the area of dual-processing theory has differentiated two types of information processing styles: experiential (intuitive, associative, affective, holistic, and heuristic) thinking style and rational (analytic, logical, causal, intentional, systematic) thinking style (e.g. Epstein 1994; Pacini & Epstein 1999; Sloman 1996; Smith and DeCoster 2000). Additional research has substantiated the existence of individual differences in these two thinking styles through measurement instruments that assess an individual's relative tendency to engage in rational versus experiential thinking (Epstein, Pancini, Denes-Raj, and Heier 1996; Pancini and Epstein 1999; Norris and Epstein 2003a, 2003b).

Rational thinking style involves goal-directed, active, logical processing, and permits consumers to make optimal judgments about the utility of adopting a particular product innovation. Many product

adoption decisions are based upon rational information processing. Experiential thinking style, on the other hand, involves holistic, emotional, associative processing. Immediate experience is critical for experiential thinking, while logic and evidence are critical for rational thinking. While experiential processing produces more rapid results than rational processing in the short term, the experiential consumers' responses remains stable over time. For example, a rational consumer can be easily convinced that a new brand of toothpaste provides the same benefit for lower price; on the other hand, it will be much harder to convince an experiential consumer with extensive experience with a particular brand that a lower priced new entrant should be considered.

Recent research (Norris and Epstein 2003b) has shown that experiential thinking style correlates with a number of measures of creativity, while rational thinking style does not. This suggests that experiential consumers are more creative, have more imagination, and are more holistic processors relative to average consumers.

Self-Organizing Systems and Emergent Behavior

Self-organization among certain individuals, for example experiential consumers, is a process by which patterns at an aggregate level emerge based on numerous interactions among the individuals, and the rules specifying interactions among the individuals are executed using only local information, i.e., information from the interactions (Camazine, Deneubourg, Franks, Sneyd, Theraulaz, and Bonabeau 2001). Camazine et al. (2001) summarizing research in this area, indicate that members of such a group experience the process and outcome of interactions with others like them which in turn guides their actions.

Self-organizing theory suggests that the members rely on such local information because it is usually difficult for an individual to obtain complete global information in a reasonable amount of time. Emergence refers to a process by which a system of such interacting individuals acquires qualitatively new properties that cannot be understood as the simple addition of their individual contributions. The sum is more than the parts.

Emergent Consumers

Camazine et al. (2001) establish the scientific nature of the emergent property among individuals, where under a particular set of conditions a global pattern emerges over time. In the context of a new product development process, we posit that the resultant "global pattern" is a radical innovation that mainstream (or average) consumers will be likely to adopt. The "particular set of conditions" under which the radical innovation develops is brought about through the various interactions among emergent consumers.

We propose that emergent consumers develop an intuitive, almost “instinctive” understanding of a radical innovation through a sequence of small scale, affective, and associative interactions. They are able to do this because they possess a high degree of experiential processing ability. Emergent consumers need not be the most innovative, nor possess the most expertise. However, they are the consumers best able to develop a “global pattern” of the radical innovation via experiential, holistic processing and interaction with other such consumers. The interactions among emergent consumers are based on simple rules of thumb requiring only limited access to global information. An example of global information would be the extent to which a radical innovation may eventually diffuse through the mainstream consumers.

These interactions among emergent consumers can also be affective in nature, consisting not only of objective information regarding an innovation, but impressions of how it could be used, feelings about the innovation, or associative connections the innovation invokes in consumers’ minds. In other words, the innovation itself is built based on the interplay with the emergent consumers³. Therefore, the condition required for this pattern to emerge is the interaction among consumers who are not typical, mainstream consumers but rather possess the ability to process information experientially. We call such consumers *emergent* because the pattern of the radical innovation developed by such consumers emerges or evolves in such a way that the innovation has a higher likelihood of success with the mainstream consumers.

Thus, the emergent consumers are those who possess an experiential thinking style. Given the experiential nature of the emergent consumer, the basic thesis of the paper is that the interplay among the emergent consumers in a new product development context will produce a radical innovation that will in general be more attractive to mainstream customers relative to one that is produced either (i) by average, mainstream consumers or (ii) by consumers who are high on innovativeness. The emergent consumers’ self-guided, experiential nature is ideal for developing radical innovations (as opposed to incremental innovations), which might, over time, even replace the products that mainstream customers currently use. In other words, pursuing innovations in conjunction with emergent consumers could help firms solve the puzzle of how to develop innovations that mainstream consumers might initially reject but will eventually find attractive (Christensen 1997).

Our notion of emergent consumers suggest that such consumers, due to their creativity, imagination, holistic and experiential thinking, can help drive the innovation in a direction that mainstream customers will value in the future. A corollary to this premise is that radical innovations *may cause new behaviors to emerge*, such that the mainstream consumer then sees the new emergent behavior

and the corresponding benefits, and adopts the behavior. So, firms need a way to identify emergent consumers, elicit their ideas, and develop the innovation accordingly.

Emergent Consumers are not Lead Users. In our theory, emergent consumers are experiential, do not have to be experts in the product category, but help develop the innovation via using simple, local rules. The corresponding interaction results in an innovation that mainstream consumers would like in the future; it might even be harder to predict up front what the final “pattern” might look like.

In contrast, lead user status is product category specific and is not a trait-based characteristic; also, lead users are clearly goal-directed, as they are highly motivated to find solutions to their unmet needs (Lilien, et. al. 2002). Further, Lilien, et. al. (2001) found that lead users did not differ significantly from non-lead users on the Myers Brigg’s scales of “sensing/intuition,” “thinking/feeling,” or “judging/perceiving.” Thus, lead users do not appear to possess a unique thinking style that underlies their “lead user-ness.” Note also that while the lead user approach is an engineering orientated approach suitable for industrial settings (von Hippel and Katz 2002; von Hippel et al. 1999), the emergent consumer approach is experiential in nature and highly suitable for consumer settings. Finally, lead users are experts among the user group, while emergent consumers are not necessarily experts but experiential processors of information.

METHODOLOGY

Our proposed methodological approach involves a comprehensive calibration and validation phase involving scale development, construct measurement, and structural equation modeling to support our understanding of the emergent consumer and related constructs along with several laboratory studies to assess: a) reactions of emergent, lead user and innovative consumers to a set of radical and incremental innovation concepts; and b) whether emergent consumers are more effective in developing radical innovations that are more desired by mainstream consumers.

Before describing our methodological plan, we report on the results of a pilot test that demonstrates preliminary support for our theoretical framework.

Pilot Test

We conducted a pilot study using 93 consumers to measure a set of constructs related to innovativeness (exploratory acquisition of products, exploratory information seeking, dispositional innovativeness, impulse buying, and market mavenism) and information processing style (experientiality,

³ Note that emergent consumers may also interact indirectly. For example, the use of a cell phone by an emergent consumer may help a firm modify the cell phone itself, say with respect to its weight, size, power etc., thus affecting the behavior of other individuals.

rationality, and visual/verbal processing). Coefficient alphas and measurement scales for the various measures are provided in Table 1.

Table 1: Coefficient Alphas for Scales Used in Pilot Study

Scale:	Alpha:	Source:
<i>Innovativeness Scales:</i>		
Exploratory Acquisition of Products (EAP)	.877	Baumgartner, Hans and Jan-Benedict E.M. Steenkamp (1996), "Exploratory Consumer Buying Behavior: Conceptualization and Measurement," <i>International Journal of Research in Marketing</i> , 13, 121-137.
Exploratory Information Seeking (EIS)	.825	
Dispositional Innovativeness (DI)	.852	Steenkamp, Jan-Benedict E.M. and Katrijn Gielens, "Consumer and Market Drivers of the Trial Probability of New Consumer Packaged Goods," <i>Journal of Consumer Research</i> , 2003.
Impulse Buying (IB)	.926	Rook, Dennis W. and Robert J. Fisher (1995), "Normative Influences on Impulsive Buying Behavior," <i>Journal of Consumer Research</i> , 22 (December), 305-313.
Market Mavenism (MM)	.573	Steenkamp, Jan-Benedict E.M. and Katrijn Gielens, "Consumer and Market Drivers of the Trial Probability of New Consumer Packaged Goods," <i>Journal of Consumer Research</i> , 2003. Market mavenism was measured by four items, adapted from Feick and Price (1987). Original scale has 7 items
<i>Processing Scales:</i>		
Experiential Ability (EXPA)	.795	Norris, Paul and Seymour Epstein (2003a), "The Investigation of Some Fundamental Issues Concerning Rational-Analytical and Intuitive-Experiential Thinking Styles with a Short Form of the Rational-Experiential Inventory," working paper.
Experiential Favorability (EXPF)	.761	
Rational Ability (RATA)	.814	
Rational Favorability (RATF)	.804	
Verbal Processing (VERBAL)	.794	Childers, Terry L., Michael J. Houston, and Susan E. Heckler (1985), "Measurement of Individual Differences in Visual Versus Verbal Information Processing," <i>Journal of Consumer Research</i> , 12 (September), 125-135.
Visual Processing (VISUAL)	.722	

An exploratory principal component analysis (Table 2) showed that innovativeness, rational processing style, and experiential processing style are independent constructs. While previous research (Pancini and Epstein 1999) has demonstrated that rational and experiential processing represent orthogonal dimensions, this is the first empirical evidence that additionally shows that experiential and rational processing styles are both independent of innovativeness. *Thus, experiential processing style, which we theorize is a strong correlate with the construct of a consumer's emergent nature, is a separate*

dimension from innovativeness as defined by the scales in Table 1. We also note that verbal and visual processing both correlate with innovativeness, and, consistent with prior theory, verbal processing correlates with a rational processing style and visual processing with an experiential processing style.

Table 2: PCA for Innovativeness and Processing Style Scales

	Component:		
	1 Innova- tiveness	2 Rational- ity	3 Experien- tiality
DI Dispositional Innovativeness (DI)	.808	.126	.133
EAP Exploratory Acquisition of Products (EAP)	.800	.136	
EIS Exploratory Information Seeking (EIS)	.748		.177
MM Market Mavenism (MM)	.634	.254	
IB Impulse Buying (IB)	.591	-.310	.169
RATF Rational Favorability (RATF)	.111	.892	
RATA Rational Ability (RATA)		.844	.133
VERBAL Verbal Processing (VERBAL)	.428	.591	
VISUAL Visual Processing (VISUAL)	.315	-.382	.381
EXPF Experiential Favorability (EXPF)			.901
EXPA Experiential Ability (EXPA)	.150	.136	.887

In the pilot test, we also provided respondents with a concept description and series of five questions (listed in Table 3) about the SmartBox asking them to rate their interest in the SmartBox on a 7-point scale for each item. As noted above, the SmartBox (concept details provided in the Appendix) is a new invention ([U.S. Pat. #5,774,053](#)) intended to make home pickup and delivery secure and convenient even if no one is home.

We regressed the responses to each of these five questions on factor scores for the three principal components of Innovativeness, Rationality, and Experientiality identified in Table 2. Results are shown in Table 3. For all five questions, experientiality has a significant effect on the extent to which consumers state they want the new product. Innovativeness, on the other hand, was only significant for one of the five questions (use conditional upon adoption), and rationality was not significant for any of the five. The pilot study thus shows that the consumers most likely to adopt the new product concept are indeed experiential processors. In the context of developing radical innovations that have the potential to disrupt products that mainstream customers use, an emergent set of experiential consumers would initially like the concept more than average, mainstream users.

Table 3 - Standardized regression coefficients and p-values predicting interest in SmartBox from three factors

SmartBox Question ⁴ :	Factor 1 (Innovativeness)		Factor 2 (Rationality)		Factor 3 (Experientiality)	
	Beta	p-value	Beta	p-value	Beta	p-value
<i>Product adoption:</i>						
Assuming you would be provided with a free "smart" delivery box, and further assuming it could be located to the front, side, or back of your home or apartment (wherever you'd like), how likely is it that you would want one?	.125	.212	.181	.072	.264*	.010
Would you be willing to pay the cost of installation if it wasn't any more than, say, \$100?	.118	.237	-.133	.185	.291*	.004
What if the cost of installation wasn't any more than \$50?	.129	.207	-.127	.216	.210*	.042
What if the cost of installation wasn't any more than \$25?	.172	.095	-.023	.820	.217*	.036
<i>Use, conditional on product adoption:</i>						
Assuming you had such a box, please estimate whether you would be more likely to order home-delivered goods (laundry, groceries, goods bought on the Internet, anything).	.263*	.008	.077	.430	.306*	.002

Proposed Study One

In this calibration and validation study, we plan to measure the structural relationships among the theoretical constructs, fit a series of confirmatory factor analysis models, and further refine the measurement of the emergent nature, lead user, and innovativeness constructs. Reactions to the radical and incremental innovation concepts will then be predicted from emergent nature, lead user status, and innovativeness.

A broad range of measures related to innovation and processing style will be collected, including all of the measures listed in Table 1 as well as optimum stimulation level (Steenkamp and Baumgartner 1995), susceptibility to normative influence (Steenkamp and Gielens 2003), introspection (Fenigstein, Scheier & Buss, 1975), lead user status (Morrison, Roberts, and von Hippel, 2000) creativity (e.g.

⁴Seven-point scales were used.

Christensen, Guilford, Merrifield, & Wilson, 1960; Christensen, Merrifield, & Guilford, 1958; Lawshe & Harris, 1957), product category involvement, and expertise (e.g. Kopalle and Lehmann 2001).

Three subscales of experientiality – intuition, affectivity, and imagination – will be measured using an extended version of the experientiality scale used in Study One (Norris and Epstein, 2003a). In addition, we will provide descriptions of a radical innovation (the SmartBox will be used in this context) and an incremental innovation⁵. The presentation order of the radical and incremental innovation will be counterbalanced across respondents. Respondents will be asked to evaluate their level of interest in these innovations, and to rate these innovations on the construct of new product novelty (Moorman 1995).

The sampling frame of respondents for this study will be randomly chosen from the eLab Online Panel⁶. We will email requests for participation to 2,000 panelists to achieve a sample size of 1,000 (historical results from the eLab panel have achieved cooperation rates of about 50%). As an incentive, the names of respondents who complete the study will be entered in a drawing for cash prizes totaling \$500.

Lead user status was not measured in our pilot study. While lead user status has typically been applied in business-to-business contexts, we will construct a lead user scale specific to the SmartBox consumer context that incorporates the following characteristics: 1) actively engages in a broad range of activities related to the delivery of consumer goods to their home and workplace (category specific expertise), 2) expects that adoption of the innovation will address their needs and provide clear benefits, and 3) experiences these needs ahead of the general population (Lilien, et.al. 2002; von Hippell 1986; von Hippel, et. al. 1999; Urban and von Hippel 1988).

The sample will be randomly split into calibration and validation subsamples of 500 respondents each. Standard psychometric procedures, including item-total correlations and coefficient alphas will be obtained for each of the measured scales, and correlations among scales and exploratory factor analysis will be used as a first step in assessing the structural relationships among the various constructs in the calibration sample (Novak, Hoffman and Yung 2000). As in the pilot study, we anticipate that scores on scales for experiential processing style, introspection, creativity, and imagination will load together on a factor that defines a consumer's "emergent nature," and that orthogonal factors for rationality and innovativeness will again emerge. We expect that lead user status will load on both innovativeness and

⁵ Pretesting will be used to identify an appropriate incremental innovation related to the home delivery category, for example a special service where UPS notifies you by cell phone prior to a delivery, and the consumer can tell them to deliver at home or specify an alternate location.

⁶ As of February 2004, the eLab Online Panel consists of 27,000 Internet users who are willing to participate in Web based experiments and surveys. New panelists are referred to the eLab Online Panel from a variety of sources – links on the eLab web site (<http://elab.vanderbilt.edu>), affiliates who direct traffic to the eLab panel sign up page, and a referral program. A \$250/monthly prize drawing for all registered panelists, and additional prize drawings for those who participate in online surveys, are used as incentives.

rationality – potentially defining an additional orthogonal factor – and that additional orthogonal factors may emerge that are characterized by constructs such as susceptibility to normative influence.

Following this initial exploratory analysis, structural equation models will be used to formally test the fit of confirmatory factor analysis models, and, by eliminating poorly performing items and/or scales, to further refine the measurement of latent factor specifying constructs for emergent nature, lead user, and innovativeness (Andersen and Gerbing 1988). Fit of the final structural model, using reduced item sets across the relevant scales, will be assessed in the validation sample. The outcome of this process will be individual level scores on the construct of emergent nature (there may possibly be subscales for this construct), as well as scores on additional constructs including innovativeness, lead user status, and rationality.

Reactions to the radical and incremental innovation concepts will then be predicted from scores for emergent nature, lead user status, and innovativeness. We hypothesize that emergent status will both predict interest in and intention to adopt the radical innovation concept. To our knowledge, there has not been an in depth examination of the characteristics of lead users and the identification of lead users, particularly in the consumer market (Morrison et al. 2000). Therefore, while we cannot offer hypotheses with respect to lead users, we will test for their effects in this study. Based on the pilot study, we believe innovativeness will be predictive of the incremental innovation concept, but not the radical innovation concept. Multivariate linear regression, MANOVA/canonical discriminant analysis, and structural models will be used to determine these relationships.

Proposed Study Two

Study 2A. Building upon the results of Study One, Study 2A will have different consumer groups further develop the SmartBox concept. Based upon individual scores for emergent nature, innovativeness, and lead user status, we can identify four groups of consumers using the data from Study One:

	<u>Emergent Nature</u>	<u>Innovativeness</u>	<u>Lead User Status</u>
Group 1	High	Average	Average
Group 2	Average	High	Average
Group 3	Average	Average	High
Group 4 (control)	Average	Average	Average

Within each of the four groups, we will select ten consumers and ask them to further develop the SmartBox radical new product concept so that a typical consumer would like the new product when introduced in the market. Each set of consumers would be requested to meet in an electronic chat

room/discussion board for four sessions of about 45-60 minutes over a four week period. The online sessions would be moderated by one of the study investigators, and participants would be encouraged to post ideas on the discussion board during the course of the study. Each participant would be paid \$40 if they completed all four sessions.

Actual activities in the online sessions will include basic creativity tasks for idea generation (e.g. brainstorming, lateral thinking, mind mapping, and random stimulation as described in Goldenberg and Mazursky 2002), as well as more structured activities such as Web-based user design exercises and the “information pump” (Prelec 2001; Dahan and Hauser 2002) exercise for generating innovative and distinctive descriptions of the product concept and how it can be used.

Study 2B. In this study, we will use a within-subjects design to test whether emergent consumers are more effective relative to the other groups in developing radical innovations that mainstream consumers find appealing. Based upon the materials generated in these online chat sessions from the four groups, the research team, in conjunction with David Porter, representing the practitioner perspective, will prepare four modified new product concepts for the radical innovation. The modified new product concepts obtained from each of the four groups will then be given to a sample of 250 mainstream consumers (i.e., within one standard deviation of the mean on emergent nature, lead user status, and innovativeness) drawn from the original 1,000 respondent Study One combined calibration and validation sample. Respondents will then rate the likelihood of adoption of each of the four new product concepts. Mr. Porter will also rate the modified concepts. A key research question is the extent to which each of the modified concepts represents the “global pattern” that mainstream consumers would be most likely to adopt.

We will develop a multivariate model to test whether the new product concept developed by emergent consumers (Group 1) for the radical innovation is evaluated more favorably relative to concepts developed by the other groups. A significant result would show (i) a successful identification of emergent consumers, (ii) role of emergent consumers in developing radical innovations, and (iii) effectiveness of using the output from emergent consumers as an input to typical/average consumers. Covariates will include initial ratings of the product concepts from Study One. The left-out category would be the concept developed by average consumers. The above multivariate formulation would also be used to test for significant differences in the ratings of concepts developed by the four groups.

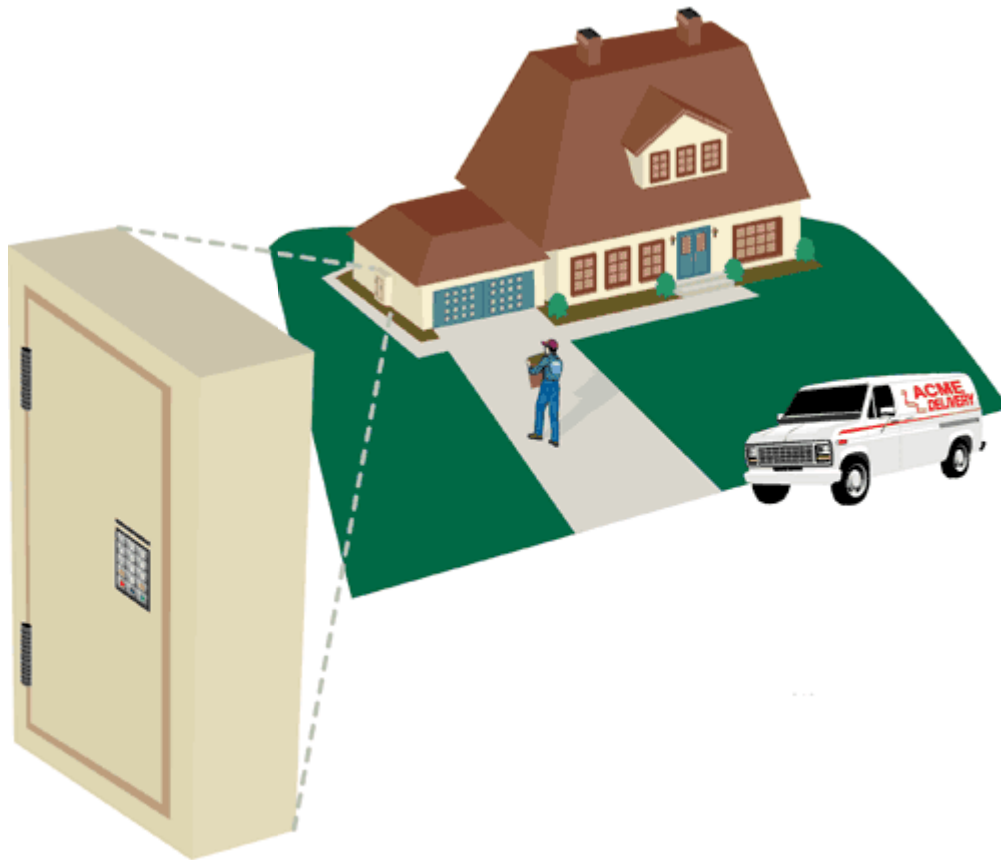
Roles of Academics and Practitioner in the Research

In this practitioner-academic collaborative research, Professors Hoffman, Kopalle and Novak will be responsible for theory and model development, along with empirical testing of the theory. David Porter has provided the motivating applied problem and will work closely with the professors on the

empirical analysis by contributing concept development ideas and professionally prepared alternative SmartBox concepts for the studies. Mr. Porter will also offer a practitioner “reality check” at various key stages throughout the research, ensuring that the academic work maintains relevance to the real-world problem of the mainstream consumer adoption of radical innovations. Mr. Porter will play a key role in Study 2B in the concept modification stage as well as evaluating the relative attractiveness of the five modified concepts from an entrepreneurial and business perspective. We believe this research project will have substantial practitioner contribution and addresses a problem of fundamental interest to marketing managers. The level of practitioner involvement constitutes in-depth collaboration in the implementation phase of our methodology and significant advisory involvement in other phases of our project. Mr. Porter would also be happy to write a commentary on the results of the research.

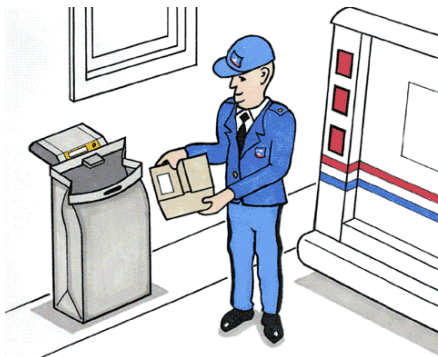
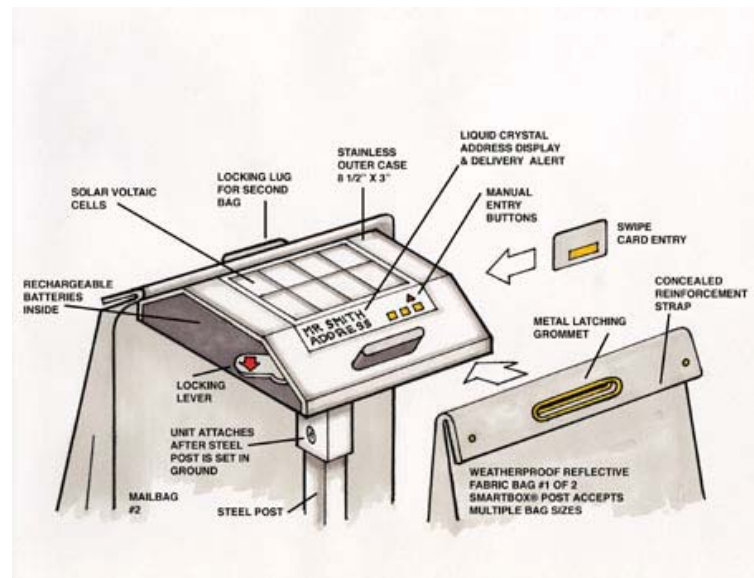
APPENDIX: Initial SmartBox Product Concept

We'd like you to evaluate a new product concept called the "SmartBox." The SmartBox is depicted in the drawing below. Regardless of whether it's laundry, dry cleaning, groceries or most anything else, the SmartBox should make home pickup and delivery secure and convenient even if no one is home. Presuming you had a choice of many styles, sizes and installation locations, please imagine that a device similar to this is on, by, or close to your home – or, if you live in an apartment, that a cluster of them is by your building. Suppose that FedEx, UPS and the Postal Service as well as grocers, drycleaners and anyone else you want to authorize could use it to make secure pickups and deliveries. Built-in intelligence enables authorized deliveries only and sends notification to both consumer and merchant whenever a delivery is made.



Ever hear the phrase "the postman always rings twice"? Years ago, postmen either rang or knocked; but in 1916 efficiency experts discovered that the average postman was wasting nearly two hours a day waiting for people to answer their door, so the Postal Service required that all homes have a mailbox. Today email and electronic billing are causing first-class mail volume to decline; and research suggests

that if people can't be home to receive goods that won't fit into their mailbox, then most won't order many home-delivered goods in the first place. Similar to 1916, if the USPS now deployed bigger/smarter mailbox-like devices that all vendors could access – not only would such “stores” make home shopping soar, but significantly boost delivery revenue, too. The SmartBox, invented and patented by inventor and entrepreneur David Porter is one such mailbox like device. Many designs are possible, including clusters of boxes outside of apartment buildings (see Figure 1). Common goals include security, durability, aesthetic appeal, ease of installation, speed and ease of operation, and low cost. In addition, all devices must be smart – enabling authorized access only, and providing an audit trail of everyone who delivers.



Each Smart Box unit is powered by photovoltaics and battery, has internal memory, and a short range radio chip used exclusively for communication between the Smart Box unit's memory and the person wishing to gain access to the Smart Box unit. Each Smart Box unit is also equipped with an internal cell phone used exclusively for communication between the Smart Box unit's memory and the Smart Box Web site; and cell phones in multiple Smart Box units share the same “party line” number. Delivery personnel receive unique vendor codes by registering with the Smart Box Web site. The Smart

Box Web site simultaneously calls multiple Smart Box units with vendor code updates, and individual Smart Box units update their memories only if the incoming data-stream contains their own unique unit number. Upon delivery or pickup, a delivery person inputs his vendor code into a Smart Box unit's memory via keypad, swipe card, smart card, embedded label chip, or automated shippers module; and the unit opens if the memory verifies an authorized code. The unit then calls the Smart Box Web site; an email notification is sent to the customer; and the Web site records all transaction history.

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