Successful Residential Product and Service Development: Integrated Market Research and Evaluation

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As electric utilities face having to provide more choices to consumers, their approach to these offerings must make use of good market research as part of their design. Utility offerings in earlier environments generally consisted of limited market research, followed by the offerings, followed by evaluations. In that environment, significant investments were frequently made before the evaluations had identified how to better achieve a successful product offering.

THELMA involves a combination of market and evaluation research integrated in a comprehensive design. THELMA is a study of horizontal axis (h-axis) clothes washers with high spin cycles, promising energy and water savings and involving a consortium of electric and water entities. The research design recognizes that water and energy impact estimates from lab tests are not enough to direct utility investments. It also recognizes that ''impact'' estimates are not an effective gauge of success.

This paper will discuss the THELMA project, emphasizing the research design and covering findings as they relate to demonstrating the benefits of the design. As a conclusion, the paper will discuss applying the general research approach to future utility offerings.

INTRODUCTION

As electric utilities evolve to having to provide more choices to consumers, either by unbundling or by providing new products and services, their approach towards these offerings must also evolve. Utility offerings/programs were generally not initiated with much market research behind them. Rather, the market research was typically captured in after-the-fact evaluations after significant product development and delivery expenditures had been undertaken. If issues or market barriers were found, it was frequently after initial perceptions had developed.

Interest in the potential savings from efficient washers precipitated the formation of The High Efficiency Laundry Metering & Marketing Analysis project. The THELMA research project was designed recognizing that a successful product offering would require key market information. THELMA is an Electric Power Research Institute (EPRI) collaborative project, sponsored by a consortium of 28 electric, gas, water, and waste-water utilities and organizations. It was established to research the market potential of efficient residential washing machines before significant investments were made by project sponsors to promote h-axis washers.

The broad goals of THELMA are to identify issues and strategies necessary to leverage a lasting market transformation to efficient washers. To address these issues, the THELMA research includes three primary objectives:

- To confirm engineering estimates of savings and assess customer laundering habits

- To identify potential barriers to the market penetration of efficient clothes washers

- To identify market intervention issues critical to utilities and suggest strategies for marketing efficient clothes washers

Washing Market

With these objectives in hand, a specifically targeted consumer offering could be accomplished. This approach is in contrast to after-the-fact market research, which was accomplished when demand-side management (DSM) programs were evaluated.

In today's market, washers can be broadly classified into two types: vertical axis (v-axis) and horizontal axis (h-axis). Compared to standard vertical axis (v-axis) washers, horizontal axis (h-axis) washers use considerably less water and detergent for a given load size, and higher spin speeds result in more water extraction. Energy savings are realized due

to less energy required for water heating and drying. According to Arthur D. Little, Inc., for a typical U.S. household, it has been estimated that annual savings of $80 could be realized through reduced water, detergent and energy consumption. The principal disadvantage of h-axis washers is that they require an electronically controlled direct-current motor and a more sophisticated suspension system. These requirements add to the costs of h-axis washers and potentially impact their reliability.

The current residential clothes washing market in the United States is dominated by v-axis washers (95 to 98 percent). Therefore, the potential exists for substantial energy, water, detergent, and waste-water savings through transforming the market toward h-axis washer technology.

RESEARCH DESIGN

The THELMA research design recognizes that water and energy impact estimates from lab tests are not enough to direct utility investments. It also recognizes that ''impact'' estimates are not an effective gauge of success by themselves. Therefore, the THELMA research involves a combination of market and evaluation research integrated in a comprehensive design. This design includes three distinct components: (1) a market assessment, (2) a distribution system analysis, and (3) an impact analysis. Figure 1 presents an overview of the major project components and illustrates linkages between each of these major research tasks. An outline of each component, the objectives of the components, and how they are connected are presented below.

Market Assessment

The market assessment addresses the consumer's views towards their laundering, their washing behavior, and their

Figure 1. *Overview of Technical Approach*

reaction to new technology. The key issues in the market assessment for efficient washers are understanding (1) the equipment features that consumers view as important; (2) the market barriers; (3) opportunities; and (4) the near-term potential for customer acceptance. These four issues are all crucial to estimating customers' reactions to the promotion of efficient washers in the market.

The key research activities for the market assessment include a series of focus group discussions with consumers, a market research survey, a laundry demonstration center, and in-home interviews with households that are participating in the impact portion of the study.

Focus groups with consumers. A series of four focus group discussions were held with consumers to explore issues related to their laundry behavior and the desirable characteristics of washers. The focus groups were designed to lead off the project and to provide information for the rest of the project's efforts. Specifically, the focus group research objectives were to (1) qualitatively assess the current market for h-axis washers, (2) identify and explore the educational needs of consumers, and (3) inform the surveys and on-site customer research described below. Topics for discussion during the focus group included current laundry practices and equipment, feedback on the design for a laundry diary, washing machine buying criteria, attitudes toward h-axis washers, propensity to buy h-axis washers, and the appeal of utility programs.

Market research survey. The survey was designed to generalize consumers' overall potential for accepting h-axis machines and to formulate the effects of utility investments on the technology. The market research survey collected quantitative data on many of the same topics included in the focus group discussion. The survey also collected household demographic and socioeconomic data, as well as data on current laundry practices. The market research objectives were to (1) assess potential market barriers and acceptance of efficient washers; (2) enhance the findings in the impact analysis (explained later); (3) assist in the extrapolation of the impact analysis results to the service areas of the participating organizations' territories; and (4) identify issues and strategies for marketing efficient washers.

To accomplish these objectives a market survey of the general U.S. population and 12 subpopulations was conducted using a combination of telephone and mail survey procedures. Random samples of households were initially drawn using random digit dialing (RDD). In the phone survey, residences were screened for the presence of a washer in the dwelling. Respondents who completed the telephone survey were asked to report on washing machine preferences by filling out the mail survey and also recording their laundry behavior for a one-week period in a laundry diary. In all,
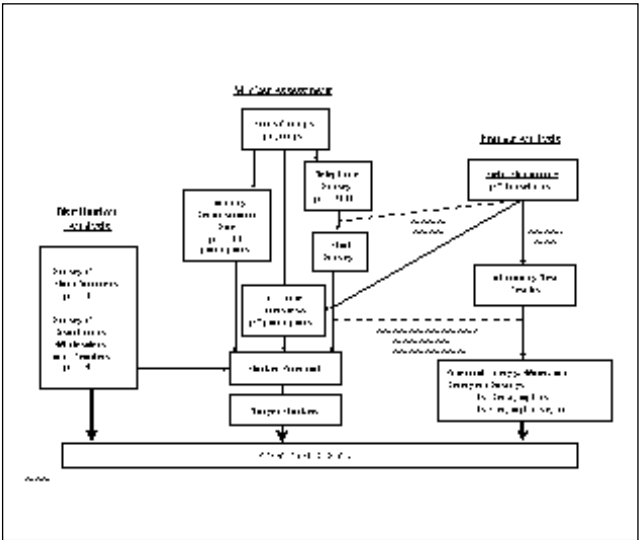
5,377 telephone surveys and 1,725 mail surveys were completed.

Laundry demonstration center. One of the difficulties in evaluating new products or technologies is that consumers lack knowledge of or experience with the product. This is a result which has been substantiated by our market research survey and from our early focus groups. To overcome this obstacle, the THELMA research included a demonstration center to allow consumers to see and actually do laundry using an h-axis machine, to compare an h-axis machine to a v-axis machine, and to consider purchasing an h-axis machine once they are more familiar with it. Additionally, researchers had the opportunity to observe first-hand consumer reactions. Due to the hands-on nature of this research, data collected on consumer perceptions about the advantages and disadvantages of the new washers and the issues affecting purchasing decisions about these measures are more reliable. The demonstration center is also used to help identify the information needs of customers and their preferences for utility programs. Data collection techniques in the demonstration center combine observation, in-depth interviewing, and self-administered questionnaires.

In-home interviews with field monitoring participants. Recognizing that investment decisions are facing increasing scrutiny, it was decided that the energy and water savings estimates from lab tests needed some substantiation. Households were recruited to participate in the field monitoring task of the impact analysis component. Tracking the experience of field monitoring participants is a key element of the market assessment. The major purposes of the in-home interviews at monitoring sites are to (1) collect primary, in-depth quantitative and qualitative data about consumer use of and satisfaction with h-axis washers over time; (2) compare use and satisfaction with h-axis machines versus the consumers' usual washing machine; and (3) gather evidence of how well participants are able to accurately complete the laundry diaries. An assessment of the reliability of diary responses will help generalize the impact results to the broader market research sample who had also filled out diaries.

In addition to conducting these interviews, researchers also provide participants with instructions for operating the h-axis washer. The researchers serve as a consistent point of contact for providing feedback about participant experiences with the washers, as well as other aspects of the data collection.

Distribution System Analysis

In addition to a consumer response to the technology, it was determined that in order to best succeed in the market an investigation of the washing machine distribution channels was essential. The distribution system research is of particular importance to the THELMA project because it helps clarify the characteristics of the market infrastructure for efficient washers. The distribution system analysis consisted of interviews with key manufacturers, distributors, and retailers of laundry equipment, including h-axis washing machines. The interviews collected mainly qualitative data exploring the range of opinions of professionals involved with the manufacturing and selling of v-axis and h-axis washing machines. The interviews were designed to achieve the following research objectives:

- Identify market barriers and opportunities from the perspective of members of the distribution channel

- Assess the acceptance and perception of h-axis washers among manufacturers, distributors, and retailers

- Assess current washing machine availability, stocking patterns, product selections, pricing, marketing and selling patterns

- Assess the repair infrastructure for h-axis washers

- Assess the potential for utility program influence on the market

- Develop strategies for incentives, marketing, and promotion of efficient washers by utilities

The distribution system research was designed to lead to a greater understanding of the distribution system for both v-axis and h-axis washers and help identify the techniques needed to increase the influence of utility programs on these systems. A thorough understanding of the current v-axis clothes washer distribution was viewed as a critical component of this research effort.

Impact Analysis

As mentioned in the in-home interviews section above, a key to demonstrating a return on investment is the measurement of actual performance of h-axis machines. The primary objective of the impact analysis is to estimate the potential impact on energy consumption, water use, and detergent use that could be achieved with a successful market transformation to the h-axis washing machine technology. The impact analysis relies upon information collected from three principal sources: (1) laboratory test results, (2) field monitoring of households, and (3) market data collected under the market assessment component.

Laboratory test results. Laboratory test results provide information on washer and dryer energy consumption, hot water energy consumption, total water consumption, mini-

mum detergent requirements, remaining moisture content, cleaning ability, fabric wear, cycle times, and assessment of various features. The objective of the laboratory test phase was to measure and compare the performance of a sample of h-axis machines with a baseline v-axis clothes washer, quantitatively and on a consistent basis.

Field monitoring of households. Although laboratory testing results are important in quantifying the differences in energy and water consumption between v-axis and h-axis technologies, they may not fully represent actual household conditions. The objective of the field monitoring is to assess how these data may vary in actual home use situations and develop correction factors that can be applied to the laboratory findings. Data on energy, water, and laundry chemical use is first monitored for 6 weeks with the v-axis washer currently in the home and then for 8 weeks with an h-axis machine that is installed in the home. In addition, the monitored households will keep a laundry diary during the monitoring period. Data from the diary will identify and quantify the behavioral changes in consumers' use of the h-axis washer compared to their use of the v-axis washer. As described earlier, these results will be useful in generalizing results to a broader population of users.

Linkages Between Research Components

All components of the THELMA research are connected to form an integrated, comprehensive research design as illustrated in Figure 1.1. Focus group results are used to modify the market research survey, in-home interviews, and laundry demonstration center procedures. Field-monitoring participants are segmented by demographic and household laundry characteristics. These same variables are measured in the market survey so that projections of the number of households fitting each segment profile, and their estimated laundry energy and water usage, can be calculated for the service areas represented by survey respondents.

To facilitate the process of interpreting and integrating the data, the distribution system surveys are designed in coordination with the customer-based surveys. Critical program design issues can be addressed by reviewing both the distribution system analysis and the customer-based market research. For example, projected penetration rates based upon customer research results alone could over- or understate the actual penetration rate that can be achieved through a coordinated utility effort. Knowledge of the distribution system's likely response can be compared to customer-based research results to provide more realistic estimates of market penetration.

RESULTS

The THELMA project is approximately two-thirds complete across all tasks. To date, many important results have

emerged from the focus groups, laboratory tests, distribution analysis and the market research survey. As designed, findings influenced the efforts of additional research and will ultimately benefit how the technology is marketed to consumers. The following is a summary of significant findings.

Focus Group Observations and Adjustments Made

The focus groups conducted for the THELMA project were designed to provide an initial picture of consumer views of h-axis washers, guide subsequent research components, and identify the potential education needs of consumers. These findings and the adjustments made to the further THELMA research are summarized below.

Consumers are unaware of or unfamiliar with the h-axis technology. In particular, the term ''h-axis'' held little meaning to participants. Participants most often associated the technology with the term ''front loaders'' but had difficulty relating top-loading mechanisms to this technology. Consumers did, however, relate to how the machines operated, i.e., tumbling clothes through a water and detergent solution. Based on this finding, a term more acceptable to customers was used to refer to this technology in future research components.

Consumers familiar with h-axis machines tend to have negative associations. Participants viewed these machines as being ''old fashioned'' or similar to the ones found in commercial laundromats. Concerns were raised about bending to load/unload front-loading machines, child safety, and leaking. This information highlighted the need for the impact analysis and laundry demonstration center tasks to focus on how people respond to using these machines and to measure how well their perceptions compare to reality.

Some participants volunteered potential benefits of h-axis machines. While energy and water savings hold some interest for consumers, the participants indicated that purchase price, reliability, capacity, ease of use, and cleaning ability would need to be comparable to their existing machines for them to seriously consider purchasing this equipment. Therefore, the conjoint analysis of the market research survey was carefully undertaken to weigh these various attributes. The in-home interviews and laundry demonstration center will also allow participants to compare these variables. Finally, marketing materials for these machines need to reflect these perceptions.

Focus group participants identified as a potential resource the education and financial incentives for machines. Consumers indicated that there was value in endorsements of products by utilities since they are perceived to be an impartial source. Because awareness of the technology is so low, it was unclear

if rebates without a strong educational component would be successful. This led to concerns about structuring the market research surveys and conducting the in-home interviews without biasing the participants. Careful planning went into designing research protocols that provided basic information on the technology yet conveyed a strong message that the information provided was not intended to promote any one manufacturer or washing machine design.

Lab Test Findings and Implications

The laboratory test phase of the project was designed to measure the performance characteristics, on a consistent basis, of a selection of currently available h-axis washers and a baseline v-axis washer. Findings from the lab tests and their implications on the THELMA research is summarized below.

H-axis machines use less water and energy than their v-axis counterparts. These findings are based on Department of Energy (DOE) test procedures. The results from the impact analysis will either verify or correct the assumptions used to define these tests. It is important that the utilities have accurate savings estimates in order to determine what level of program effort they can employ.

Cycle times are longer for h-axis washers. Both the in-home interviewing and laundry demonstration center tasks will measure consumer response to cycle times. It is not clear if consumers will find this to be a problem.

It was found that there is less moisture remaining in a load after the spin cycle has ended on the h-axis machines tested. Since a significant savings is attributed to dryers, the impact analysis has been designed to quantify dryer energy differences. This finding ties in with the previous need for accurate savings estimates.

H-axis machines generally provided greater cleanability. This finding was based on standard Association of Home Appliance Manufacturer (AHAM) tests. Both the laundry demonstration center and in-home interviewing tasks are designed to measure consumer perceptions of cleanability. If consumers do find this technology provides them with better cleanability, this could be a vital selling point for utilities.

Distribution Analysis Findings and Implications

In the distribution analysis, manufacturers, distributors and retailers were interviewed to get a perspective of the market barriers and opportunities that existed for h-axis washers from the professionals who did the actual manufacturing

and selling of washing machines. Major findings from this research and the implications for utilities are summarized below.

Retailers and manufacturers listed the potentially high price of these machines as a market barrier. This implies that this technology will be a continuing small-niche market unless there is some action taken to reduce costs. Specifically with respect to cost, retailers feel that price is a major obstacle to purchasing an h-axis machine and had some specific suggestions for how it should be handled.

Retailers are generally aware of the technology. Given that awareness, utilities will not have to start from scratch in educating retailers and promoting the technology. Retailers were also generally enthusiastic about the opportunities for selling these machines despite being concerned about first-cost, thus enhancing the potential for successful utility programs.

Attitudes about repairs and service were analyzed and should guide some program designs; specifically, they were not perceived to be an issue for most retailers.

Market Research Findings

The goal of the market research survey was to assess the market for h-axis washers in the U.S., as well as the service territories of the utility companies participating in the study. Major findings from this research are listed below.

The biggest barrier to purchasing an h-axis washer is initial cost. This compares with the findings from the distribution analysis. Careful attention to this issue will translate to successful marketing efforts.

Results indicated that the women in the market research sample are the primary users and purchasers of laundry products. In the majority of U.S. households, women are responsible for doing all of the laundry and are more involved than men in shopping for a washer and making the final purchase decision. Education, therefore, needs to target women and their concerns about machines and how they wash clothes.

Manufacturer's reputations and consumers' desire to buy American products are strong influences on consumer acceptance. Manufacturer's reputation and the machine's warranty are additionally important features in choosing a new washer. Probability of purchasing an h-axis machine goes down dramatically if the only h-axis choice is a European-made model. Thus, if major U.S. manufacturers provide this technology, a major barrier will be overcome.

Based on the survey findings, there is market growth potential for h-axis machines. There is interest in h-axis washing machines even in the context of relatively low awareness of the h-axis technology for residential use. Based on the survey data, the current market share for h-axis machines shows good potential for market growth.

The survey has identified market segments that are likely to adopt this technology earlier than the rest of the population. The identification of these ''early adopters'' will be used in conjunction with other results to guide program design recommendations.

CONCLUSION

In an environment where consumers can freely choose providers, the ability to understand their needs and wants could make the difference for success. Past product offerings generally saw little market research before initiation, relying on post-evaluations for making corrections if needed. Frequently, significant investments were made before evaluations identified market barriers. Success through appeal to consumer tastes and preferences in a competitive environment will require more.

The THELMA research project was designed recognizing that a successful product offering would require key market information. THELMA was initiated to research the market potential of efficient residential washing machines **before** significant investments were made by project sponsors. THELMA involves a combination of market and evaluation research integrated in a comprehensive design. The research plan covered distribution channels, consumer attitudes, consumer washing behaviors, lab tests, and an impact assessment. Findings thus far have suggested strategies for market introduction, identified market segments where probability of penetration are highest, identified branding strategies and identified strategies for working with distribution channels. Findings will also be important for determining which parameters should be tested over time and will ultimately be useful in setting baselines from which to evaluate success. Continuous market research is essential to successful businesses.

In general, as utilities react to a different market environment, information on customers, their tastes, and preferences will become part of the utility's typical efforts. Most large consumer product companies have large internal market research groups. Utilities are similarly beginning to organize to address their company's needs. While it may not be necessary to undertake the extent of market research THELMA is developing for each future offering, THELMA can provide a market research base that can be built on. With an ongoing market research effort, projects like THELMA can answer information needs from an already existing database, hence the value of ongoing market research.

Once the THELMA research is completed, all the data learned from the focus group discussions, the market research survey, the laundry demonstration center, the in-home interviews, the distribution system analysis, and the impact analysis will be synthesized and integrated along with the pertinent data from the laboratory tests. The information learned from these data will help form an assessment of the market transformation baseline, including current distribution channels, availability of h-axis models, stocking patterns, pricing, marketing, and purchase patterns. It will also address program design issues related to the potential for utilities to influence the market, such as the influence of incentives on manufacturers, distributors, retailers, and consumers; strategies for the use of incentives; market segments to target; and other promotion strategies that will be effective in increasing the adoption of the h-axis washer technology. These are basic information requirements for most consumer offerings.

REFERENCES

Dieckmann, John T. and W. Murphy. 1995. *The High Efficiency Laundry Metering & Market Assessment—Laboratory Testing Phase.* Cambridge, Mass.: Arthur D. Little Inc.

Dethman, Linda. 1995. *Task 2.1: Results of Focus Groups with Consumers.* Seattle, Wash.: Dethman & Associates.

Van Liere, Kent and B. Teml. 1996. *Task 3: THELMA Distribution Analysis.* Madison, Wisc.: Hagler Bailly Consulting, Inc.

Van Liere, Kent and W. Mok. 1996. *Task 2.2: Market Research Report.* Madison, Wisc.: Hagler Bailly Consulting, Inc.