VALUE BASED HOME AUTOMATION FOR TODAY'S MARKET

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The emergence of a market for home automation has been projected to be "just around the corner" for nearly a decade. However, the HA market is not presently large or undergoing high growth. It has been a market with large potential but the secret to unlocking that potential has yet to be discovered. In the continuing search for the key to this market, it is suggested that today's home automation systems focus not on technological possibilities but on valued benefits that appeal to consumers and to another interested party -- electric utilities. It is felt that such a focus may help spur activity in this area.

We will discuss the reasons why home automation has failed to date. This is useful in order to understand what must be done to overcome these failures of the past. We will also discuss enabling developments in a number of areas which help to address these failings. In particular, utility automation is considered to significantly impact this market.

The $12,000 Thermostat

A recent visit to a showcase home in New England graphically illustrated an all-too-common problem with HA systems. This model house cost over $300,000 and featured a post and beam architectural design, the latest in materials and a home automation system. Questions related to the HA system caused a rapid response from the salesperson who stated, "Oh, you don't want that. We call that our $12,000 thermostat." While the vendor will remain nameless, this system was too complex and perceived as unreliable by the salesperson. All functions had been disconnected -- all the sensors, all the controllers, except the thermostat. This occurred in a house intended to show off technology, including HA. The point is that home automation is not failing just because of cost. We must also get beyond the $12,000 thermostat.

HA Market

The home automation market does have huge potential but the questions are: when and how much? When acceptance does occur, will it be a rapid or slow penetration of the market? Estimates for the home automation market are between $5-10 billion in this decade. These estimates have proven optimistic in the past and are likely to remain so. The estimated sales for the 1991 home automation market are approximately $1 billion. However, this is largely electronic thermostats and "you-do-it" security -- not what most would call true home automation. But when home automation is accepted, not only sales of home automation systems will result, but it will spur on growth in stereo, television, and other in-home electronics. HA will be an important market, someday.

Reasons for Market Failure to Date

Home automation is not a 'hot' topic. It is not the topic of luncheon discussions, as are notebook PC's, for example. Very few potential customers understand HA, which translates to few interested customers. But what people are talking about today is crime, the environment, and energy conservation. Those are hot topics and this perhaps would suggest a focus in terms of what a home automation system should provide.

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Confusion/Disinterest cost answer is still mostly cost. The cost threshold has not been reached for the most important market segment — upper-middle income people. High-income homeowners have achieved this cost threshold and other reasons explain their disinterest. Contributors are not only the manufacturing cost of the product, but the development, installation, service, and support costs.

Another factor is poor user interfaces. There have been several systems offered that just were not user-friendly. If a VCR is too complex for the average consumer, a HA system must automate the programming of its features. Lack of standards is another market inhibitor. If standards do not exist, it is difficult for numerous companies to design products, create competition, and drive the prices down. In addition, consumer confusion must be considered. People don’t understand what home automation is and therefore they do not realize the potential benefits. All these factors combine to slow the acceptance of HA.

Enabling Developments - Utilities and Technology

There are several ongoing developments that now enable home automation to overcome these obstacles. The most important of these developments is utility automation (UA). This is an international trend — all utilities: gas, electric, water and waste disposal are working to automate their operations and are spending billions of dollars in the process. The goal is to create a more efficient business, using technology as a competitive tool to satisfy their customers and control their costs. Activities include automatic meter reading (AMR), computer-aided dispatching (CAD), computer control of substations, demand-side management, customer information systems, plant monitoring and control. An underlying technology being applied across all of these systems is two-way wired and wireless communication.

In particular, for the electric utilities, automation extends to the factory, to office buildings, and to the home. Electric utilities have a desire to defer loads or decrease loads, in order to avoid adding generation capacity or causing brownouts — a temporary loss of power due to system overload. Electric utilities’ vision of home automation strongly resembles what any home automation vendor would potentially consider in terms of appliance control and energy management.

Utility automation has overlapping goals with home automation and actually are spending money within the homes. There are roughly 1 million homes in the U.S. that have some form of load control. In most cases, it is strictly a timer for the hot water heater. But the utilities realize it is now possible to achieve more control at a reasonable cost and better serve their customers. The utilities’ interest in decreasing/deferring loads in the home decreases a homeowner’s cost for HA. If a
utility participates in or supports a home automation system, this contributes to addressing the cost issue.

Another significant enabling development is environmental consciousness. All the buzzwords -- acid rain, smog, ozone depletion, and global warming -- are causing government regulations which impact industry in general, and utilities in particular. In addition, for years, the public utility commissions have been driving the utilities to control their emissions and avoid adding new generating plants. Also, the environmental awareness of the general public -- the recycling to anti-pollution mindset -- is becoming much stronger.

The third major development is in the area of wireless and powerline communications technology. New integrated circuits are being introduced which allow lower cost, higher speed radio frequency, and powerline communication. Some of these developments have been driven by the utilities' metering and control needs. The need within several industries for low cost, short range communication results in products and components which can benefit the home automation market. Greater flexibility in terms of communications media within the house eases installation and decreases cost.

The fourth major development is the high level of semiconductor integration that allows design of single chips which include computing capability, a communication protocol and memory. This enables communication and control at a reasonable cost. The development tools required to design products using these chips are also becoming available. These technology improvements are being largely driven by the computer market but again HA can benefit through the use of these chips to cost-effectively distribute intelligence within the home.

A "Coupled" HA/UA System

We can devise a HA system design leveraging off of these developments, which focuses on coupling the value to the home owner and to the utility. If the home is viewed as a system with inputs, outputs and internal functions, the residential "inputs" are essentially the utilities (electric, gas, phone) and entertainment (cable, broadcast TV, radio). In terms of "outputs," we have wasted energy (heat, cold) and sewage. Note that the electric utilities are the only input with a need to control within the house. Thus, control capability has value to electric utilities, versus the other utilities and entertainment, which strictly provide a service.
Customer Needs and Market Segmentation

In terms of customer needs, the surveys are consistent. People are looking for a secure home to address concern with increases in crime. They want a properly controlled environment to feel comfortable and they want to feel good about the environment in general by supporting conservation. There is little interest in "convenience"/features such as controlling a microwave while commuting home in order to have dinner ready as they walk in the door.

In terms of market segmentation, consider that the best candidates for home automation are also the best candidates for utility automation. Upper-middle and high income consumers tend to be relatively large energy users with central air conditioning and larger homes. Focusing on this connection is important to a successful "coupled home/utility" system approach.

Now examining the U.S. market, which is the single largest market for home automation, there are between four and five million homes purchased each year. Between 1 and 1.5 million of these are new home buyers (except in the present recession). It is suggested that the potential customer list can include the existing home buyer in addition to the new home buyers. Retrofit is conceivable using wired, wireless or powerline communication and can be designed cost effectively. New and existing home buyers actively consider security, comfort and conservation needs, making them the best targets for marketing efforts.

The Commerce Department projects that there will be a 50% increase in the number of couples with greater than $50,000 income between 1990 and 2000. This group of working couples will be buying first homes and trading up to larger homes. This market segment represents a key opportunity for HA in this decade. In addition, identification of market subsegments such as the ardent energy conserver or a "techie" who has his own home computer, further increases the probability of a sale.

Addressing the Issues

Any new system must address the failures of the past. The following table summarizes the response of the coupled HA/UA system to the issues affecting past systems.

Cost concerns can be addressed through coupling to utility needs, and a focus on security and energy conservation. Standards are sufficiently defined to allow design of a product or system. CEBUS is fairly well defined and Echelon’s LON is available. HBS and ESPRIT are also making good progress. A simple interface is necessary to address the poor interfaces of the past. A few buttons (and maybe a display) must be the limit. Requiring homeowners to configure and program the system is unacceptable. This may be offered for the advanced customer but not for the general market. Customer disinterest can be overcome by limiting features to those that have present value -- security and conservation. We cannot continue to confuse the market with too many features and functions!

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<td>Lack of Standards</td>
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<td>Few buttons, basic display</td>
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<td>Consumer Confusion</td>
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Valued System for Homeowners and Utilities

The recommended system diagram is not complex, with wired and wireless connections to every electronic and electrical object in the home. It is a simple system which is easily
explained and installed. The security aspects of the product should address emergency response because many of the working couples are going to have elderly relatives living with them and would like the comfort and security of emergency response. Fire and intrusion detection features complete the security aspects of the system. The security features are coupled with useful conservation features of water heater, air conditioning, and heating control. This will create the ability to coordinate with utility rate schedules. The system must provide an interface or gateway to the utilities to allow control and data exchange. The two-way communication through this gateway can also be used to support security features.

HA product offerors must avoid being blinded by technology and provide value and benefits. The result will be a more saleable product for today’s market. Someday the home market will demand a truly intelligent and truly automated house, but not yet. There are no guarantees in this difficult market, but companies must keep trying approaches in order to unlock the door to the home automation market.

**Valued System for Consumers and Utilities**