Is Home Control Heating Up?

CABA/Zanthus White Paper

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Introduction

In the coming year, industry watchers are expecting a host of players to expand their mass market plays in the home control arena, from advanced lights and locks to programmable thermostats and energy consumption monitors. Buoyed by heightened interest in energy conservation, growing use of wireless networks and smart phones, and improvements in wireless device interoperability, the thinking is that home control (or "automation") may finally be poised for launch.

The likes of Google, Microsoft, major telecom companies, established home security and hardware providers and a slew of startups are all in the game now. And federal smart grid stimulus money is poised to drive demand in networked appliances. As a result, the 2010 Consumer Electronics Show (CES) in Las Vegas is featuring a wide assortment of "smart home" solutions aimed at mainstream consumers, right alongside the more familiar and flashier mobile devices and home entertainment offerings.

Their success will hinge on the answer to this question: Can home control be more compelling now than it's been over the past decade, when the typical consumer response to the idea has been, "Why do I need that?"

According to more than a dozen consumer studies on the topic, the answer is a hopeful yet sobering, "It depends." **The research demonstrates that while the general idea of home control is not very appealing to mainstream consumers initially, it can become strongly compelling once the benefits are made clear.**

Making benefits clear to consumers may sound simple enough, but it's not. The challenge of communicating the benefits of home control to a population with no simple way to experience them is at the heart of the dilemma that solution providers have been wrestling with for years. It's the classic Catch-22, or in more modern parlance, it's like the "TiVo effect." Most people won't adopt an innovative, transformative product or service until they understand how it can improve their lives, and they can't understand the benefits until they adopt it.

And that's just for starters. There are plenty of other obstacles to overcome. So, how can home control purveyors get past them in these challenging economic times?

This paper attempts to answer that question by drawing on nearly a decade of consumer research on the topic of home control. The studies were conducted by Zanthus, an independent market-research-based consulting firm specializing in the high tech sector, for the Continental Automated Business Association's Connected Home Research Council (CABA CHRC). Research sponsors—including the largest consumer appliance, electronics and service providers, plus major utilities and retailers—pooled their resources through CABA's CHRC (and its predecessor organization, Internet Home Alliance) to conduct the research. (See Research Methodology box.)

Research Methodology

The objective of the research program was to gauge reaction to numerous home control concepts. A variety of techniques were employed, from focus groups and surveys that tested product and service mock-ups, through extensive in-home pilots involving the installation of prototype smart home devices with hundreds of homeowners. Target respondents were North American consumers (mainly in the U.S.), who were interviewed from 2001 through 2008. See individual study descriptions at the end of this paper.

In addition to reviewing these past studies, current CABA CHRC members and industry watchers contributed their thoughts on the current state of the market in telephone interviews conducted with Zanthus during December, 2009.

The Big Picture

Let's start by reviewing general attitudes about the "connected home" concept over the past several years.

In a large tracking study of U.S. online consumers conducted during 2005 and 2008, we asked consumers to rate the appeal of the "connected home." It was described as a home where normally independent systems—including lighting, heating, security and more—are linked for ease of control and monitoring while at home or away. The results: In 2008, about one-in-four consumers considered the connected home idea “definitely or somewhat appealing,” essentially the same number as in 2005.

While interest in the connected home idea seemed stagnant on the surface, we noticed that mass market consumers—those who typically have a “wait and see” approach to adopting new products and services—were a bit more neutral and open to the idea than three years earlier. Early adopters on the other hand, ever quick to grasp the synergies that result from a whole-home system, remained as strongly interested in 2008 as they were three years earlier. (See Figure 1.)

Figure 1. Appeal of the “Connected Home” Concept

Appeal of the Connected Home Concept	U.S. 2008			U.S. 2005		
	Total	Early Adopters	Mass Market	Total	Early Adopters	Mass Market
Definitely/somewhat appealing	23%	51%	2%	22%	51%	1%
Neutral	61%	48%	71%	57%	48%	63%
Definitely not/somewhat not appealing	16%	0%	28%	21%	1%	36%

Source: 2005 and 2008 State of the Connected Home Market Studies. Total sample size (n) =1,800 per wave. Percentages may not add to 100% due to rounding.

What’s behind this subtle yet mildly encouraging shift? Our take, in a word: mobility. With laptops and Web-enabled cell phones now at critical mass, consumers are catching onto the potential that comes from connecting to the Internet anytime, anywhere. And now, with smart phones offering an “app” for just about anything, the possibilities of connecting to their *home* via the Internet or a smart phone may be starting to dawn on them.

As we’ll see in the next section, mobile access is a key driver of satisfaction and delight with home control. In a culture where mobility is strongly linked to the closely-held values of individual freedom and control, that’s not surprising.

What Resonates With Consumers

First, the good news.

Consumers get energized when they understand how home control can improve their lives (and the lives of their family members). From our research, the three main benefits that drive interest and satisfaction are:

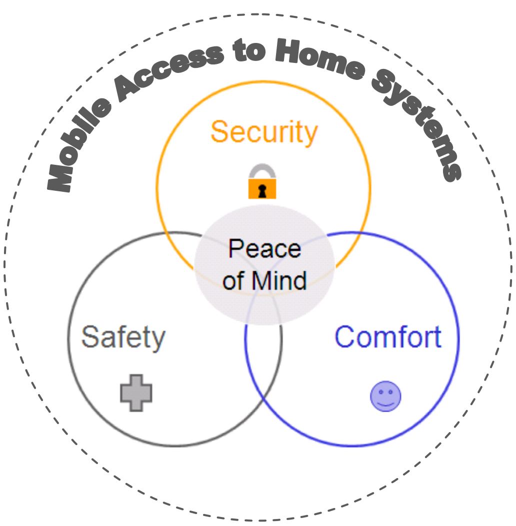
1. **Peace of mind.** This flows from having control of enhanced home security, safety, and comfort at your fingertips—whether you happen to be at home, or not. While not everyone wants every feature or function—at least right away—everyone does want less stress and more peace of mind. When done right, home control can really deliver on this most important point.
2. **Saving money.** Home energy management is the key area where consumers expect to realize cost savings, and interest appears to be growing.
3. **Ease of use.** Forget the VCR; now consumers can't figure out how to use the programmable thermostat. A well-executed home control system with an intuitive user interface can resolve multiple pain points for consumers. However, ease of use is more of a "must-have" for consumers than a benefit that motivates them to consider home control in the first place.

Next, we'll examine each of these ideas in turn.

Home Control Delivers Peace of Mind

Figure 2 illustrates how the three main elements of home control, coupled with mobile access, work together to deliver on this rather remarkable promise.

Figure 2. Key Benefits of Home Control



In effect, when discrete home systems—temperature control, locks, lighting, appliances, phones, Internet messaging, and more—are allowed to work together, synergies occur that bring about an enhanced sense of security, safety and comfort. Add the ability to check in and make changes when you're away from home, and stress and worry go down, while a sense of control and comfort goes up.

A few typical examples:

- The ability to create scenes or “scenarios” that fit your lifestyle using combinations of lighting, shades and temperature settings can save energy and money, while also making life simpler and more relaxing.
- An automatically lit path makes it safer to walk into the house at night, and makes the experience more pleasant and enjoyable.
- Getting alerts on your phone when the kids come home means not having to wonder where they are (or if they came in after curfew last night).
- Having a warm house when you get back from your holiday break earlier than expected is much nicer than coming home to 55 degrees and no hot water.

According to our research, these benefits can be best delivered in a system with one or more of the features listed in Figure 3. Primary features—which for the most part involve systems that affect life on a daily basis—are the most popular. Secondary features are desired by some, but are not as compelling initially.

Figure 3. Desired Features in a Home Control System

Primary Features

- **Home temperature** control, with ability to pre-program various usage scenarios, and override settings from home or remotely.
- **Security system** features and notification with video access and intruder protection.
- Advanced control of **indoor and outdoor lighting.**
- Networked **door locks** with door status notification and entry log—including the garage.
- Enhanced **energy conservation** and monitoring.
- Increased **safety monitoring** and notification for fire, smoke, leaks, power outages and air quality.

Secondary Features

- Enhanced system **status and maintenance awareness**, including: smoke detector battery life, furnace filter effectiveness, appliance status, car maintenance requirements, and home computer and networking maintenance needs (including file backup).
- Enhanced control of **outdoor sprinklers**.
- **Water conservation** and monitoring.
- **Monitoring family member activities, health and fitness** (particularly for children, aging parents—and even pets).
- **Emergency medical response**, especially for adult children who want to monitor their aging parents.

It's interesting to note that some of the secondary features go beyond "home" control to include staying in touch with (and caring for) family members—concerns expressed more often by women than men.

Mobile access is the "special sauce" that enables these features to really deliver that all-important peace of mind. Once consumers get a chance to use it in their everyday lives, they learn to prize the convenience of having their home at their fingertips 24/7.

Knowing they could take care of just about any household situation from a phone or a computer, no matter where they were, without having to plan ahead, went a long way toward reducing stress and promoting peace of mind.

Knowing they could take care of just about any household situation from a phone or a computer, no matter where they were, without having to plan ahead, went a long way toward reducing stress and promoting peace of mind for consumers in our pilot studies. In our 2002 home control system pilot with 50 households, two-in-three users reported the system, which allowed remote access, had "great impact" on their peace of mind about their home. Participants especially liked checking the Web to ensure the door was indeed locked and the house was secure.

In our 2001 energy management pilot study with 300 households, more than two-in-three rated mobile access to the thermostat as the top "required" feature, far ahead of being notified if energy use exceeds a pre-set threshold (which only about one-third of participants considered a must-have). In the 2002 home control pilot, homeowners went online to view their home via webcam feeds more often than they used any other function. Many also controlled lights while away from home, and unlocked doors remotely for family members, service providers, and others. More than half of the time when participants accessed the system to change settings, they did so remotely, usually from work.

Figure 4. Consumers Talk About the Benefits of Mobile Access

"What I like is the ability to open the front door using a phone. That worked well when my kids were coming home and we didn't have the front door unlocked."

"If I left before others did, I liked being able to check to see if they put the alarm on, because they weren't very good about that. So then I set the alarm even though I had already left."

"We'd go away almost every weekend. A few times I forgot to program the security system until we were halfway to another part of the state. Being able to do that remotely was great."

"One of my fears is if I go away on a 7-10 day vacation and something goes wrong when I'm away. With this system, I wouldn't have to worry."

Engagement with mobile access wasn't limited just to times when pilot participants were away from home. They liked not having to be in a specific location *within* the home to take care of a task—for example, answering the doorbell from upstairs, and checking to make sure the garage door was closed from their bedroom (although in 2001, they couldn't actually close the garage door remotely, much to their disappointment). In essence, consumers told us they want access to their systems at multiple points throughout the home, just as they might have access to the phone system via multiple phones in the home. One key location desired by most, however, is the kitchen—the command center of the home.

A clear trend is evident across the study period: Busy parents of young children—both moms and dads—are among the most responsive to the "peace of mind" promise of home control, through always having their finger on the pulse of what's going on at home. These are people who are striving to balance work and family life, anticipate frequent use of such a system, and are very likely to say it's for "people like me."

Busy younger families aren't the only ones who respond well to the "peace of mind" benefits of home control. Once their families have grown, older consumers—who can be more mindful of the possibilities of things going wrong—gain peace of mind from knowing the pipes aren't leaking, the garage door is shut, and the stove is indeed turned off. And digital entertainment enthusiasts, regardless of age, have a special knack for envisioning the benefits of home control, now that they've got so many other toys to play with.

Saving Money Drives Interest in Energy Management

No discussion of the benefits of home control today is complete without talking about consumer interest in saving money. Home energy management is the key area where consumers expect to realize cost savings, and energy conservation was a top-rated feature of a home control system in our 2008 tracking survey.

Until recently, consumers have had no viable way to identify energy-wasting devices in the home. That looks like it's about to change, with a number of emerging home energy monitoring solutions timed to take advantage of smart meter rollouts across the country. These Home Energy Management Systems (or HEMS) are designed to provide both the consumer and the power company the information they need to reduce waste and schedule demand to avoid peak periods, thereby reducing the need to build new power generation plants.

In our energy management pilot in 2001, consumers tried out a demand response system. Several hundred homeowners agreed to let the power company control their home thermostat, making the home slightly warmer (during warm weather) on occasion. In exchange, they received an Internet gateway device, a programmable thermostat, a smart meter that shared electric usage data with the power company via the Internet, and access to a Web site that they used to remotely adjust settings. Users were able to remotely monitor and control their home's temperature from all Web-enabled devices, including personal digital assistants, cell phones and computers.

After using the equipment for a few months, expectations for savings were not fully met, primarily because users had already been using programmable thermostats to lower their energy consumption before the trial. The value of energy management, it turns out, is easiest to realize for those not already engaged in the process, or for those making changes to their household habits (such as going on vacation, adding TVs, plugging in Christmas decorations, etc.). Still, participants realized average energy bill savings of 10% per month. And on average, they said they'd be willing to pay about $100 for the equipment and $5 per month for the ability to access their system remotely. Post-trial, they were also more likely than at the outset to say they valued learning about how much energy they use, and how to conserve it.

Figure 5. Consumers Talk About the Benefits of Energy Management

> *"It would be nice to know which appliances have the greatest impact on our energy costs. Right now, I don't know which appliances or systems are using the most energy and how to best manage them."*
>
> *"We left our outside Christmas lights on for a month and then were surprised by a $300 electric bill. This might have prevented that."*

Not surprisingly, consumers continue to expect energy management systems to deliver on their promise of saving money. In our 2008 survey, four-in-five expected payback on their investment in a home energy management system to occur within five years, with just over half expecting it to occur within *two* years.

To meet these ambitious goals, consumers expect their power companies to help underwrite the costs of needed equipment. And, they expect to improve their home's energy efficiency through their own actions.

Though not covered in our consumer studies, industry players tell us that consumers want control over changes to their home's energy consumption habits—they don't want to just hand total control over to the utility company via a demand response system. They want to compare their overall energy consumption to neighbors and to similar homes to determine what their consumption "should" be, and learn what steps are needed to make improvements. Then, to determine if their goals are being met, they expect to actively monitor their usage, at least at first. They want to set a specific energy usage threshold and be alerted when it has been exceeded, and receive month-to-month and year-over-year energy usage comparisons.

While energy management is the major area attracting attention these days when it comes to saving money, some consumers also expect insurance breaks for security systems, and early adopters express interest in minimizing water consumption, too.

Ease of Use Strongly Affects Overall Satisfaction

Ideally, home control allows a consumer to "have a conversation" with her house, without the need to learn and remember how to communicate with each individual device and system.

- What temperature is the house set at during the day?
- Does the furnace need maintenance?
- Will the lights come on when we're on vacation?

But typically, consumers aren't motivated enough by ease of use alone to go out and seek a home control solution. Instead, they decide to investigate new products and services for another reason—perhaps enhanced security or energy savings—and then evaluate whether a particular offering is acceptable in terms of setup and usability. It's later, once they have experienced the new device via an intuitive touch screen or web-based interface, that they have the opportunity to get excited about how easy and enjoyable it is to use.

And according to our research, usability is strongly associated with overall satisfaction with home control. That starts with setup. The explosion in high-speed wireless networking has simplified installation for many consumers, allowing them to begin to consider add-ons to home networks that they never have before. Yet setup challenges remain, which we'll address later in this paper.

Once systems are up and running, usability depends most on three key factors: familiarity with the control type, simplicity of the controls, and usefulness of the help function (See Figure 6).

Figure 6. Top Drivers of Home Control System Usability

1. Familiarity with the control type.
2. Simplicity of the controls.
3. Usefulness of the help function.

Familiarity often means that consumers expect home controls to mimic their experiences with favored digital entertainment technology—especially personal media players, TV remote controls and increasingly, smart phones. And, when multiple controller types can be used to access a given system (for example, a computer, smart phone, touch screen and TV remote), having similar interfaces is key.

Familiarity can also be achieved through personalization. System integrators have long known that satisfaction with home control systems increases when customized touch screen controls are tailored to each family's lifestyle and individual family member preferences.

Here is where one-touch control for personalized scenarios comes in. Shutting off all the lights on the way out the door, or turning them on when walking in with an armload of groceries, goes beyond just controlling the lights. The act of one-touch control simplifies the entire task of leaving for work or bringing in the groceries. Some consumers even envision voice control to make the process that much more user-friendly.

Of course, not everything about a new system can be immediately intuitive. Seasoned system integrators know that consumers who get up-front training actually use their systems' many capabilities, and ultimately, that leads to higher satisfaction. Later, help functions provide additional insight. Both training and help features are well-received if they present information in different formats, to account for various preferences and learning styles.

When it comes to usability, gender and age differences matter. For starters, women as a group can be more demanding than men. They can be less willing to spend time learning a new system up-front, and consider aesthetics to be more a part of the experience of interacting with the system.

As for age—ease of control becomes more associated with comfort to consumers as they grow older. As a result, features like intuitive interfaces and remote controls for lighting and shades can make a significant impact on quality of life with older consumers. Boomers (age 50-64) especially are used to technology and therefore open to such solutions as they age and seek to maintain their quality of life and independence—more so than their older counterparts.

Inevitably, home control systems need service. And privacy concerns aside, consumers are impressed when fixes can be done quickly by a technician accessing their system remotely.

And finally, the "set it and forget it" nature of home control also contributes strongly to a sense of usability and satisfaction. Once systems are set up and working properly and consumers are used to them, there's less need to monitor or make adjustments. This frees up users for more enjoyable pursuits while they experience the comforts provided by the automatic nature of their personalized settings.

Figure 7. Consumers Talk About Ease of Use

"Knowing that everything is right at my fingertips is great."

"I like that I never have to touch the thermostat."

"The less I have to do, the better!"

What Keeps Consumers Away From Home Control

Now, for the challenges.

1. Lack of **awareness and understanding** about home control—the biggest stumbling block.
2. Concerns about **technical complexity**, including ease of use, data privacy and security.
3. Concerns about **cost**.

As before, we'll take these one at a time.

Confusion Over Channel and Benefits Drive Lack of Awareness, Understanding

With home control still an emerging category for the mass market, consumers have scant opportunity to hear about it in the first place, and once they do, they're not sure where to go to learn more. Home control company web sites tend to be aimed at advanced do-it-yourselfers with an interest in home electronics, or at professional builders and integrators—leaving most everyone else either ignorant, or wondering what the big deal is.

Figure 8. Consumers Talk About Lack of Interest in Home Control

"What problem does it solve?"

"Why would anyone need something that fancy?"

"It's all just for convenience and to help make people lazier than they already are."

"It would have to change our lifestyle. I don't see it happening."

"Who needs the aggravation?"

"I am too busy at present to add another project to learn and use."

Now, some consumers are starting to discover home control solutions online, through announcements by major industry players, coverage in home improvement magazines and TV shows, and even smart phone application stores. But what they don't often realize is that their home devices, systems and even power meters have to be connected to the Internet in order for the applications and energy monitors to work.

Once they start to investigate the options, there's still no commonly recognized channel or product category for consumers to turn to, particularly for solutions aimed at existing homes. Even early adopters are confused. Is a professional integrator the best option? Where do you buy what you need to install it yourself? A home improvement center? Consumer electronics retailer? Discount merchandiser? Once inside, do you go to the electronics aisle, the home hardware aisle, the electrical aisle, or all three? What are you overlooking? Is the sales staff knowledgeable enough to help you sort it all out and put a system together? So far, the answer is: Not really.

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Even buyers of newly built homes are not usually offered the opportunity to consider home control add-ons by their builders. And of course, most don't know enough to ask. If home buyers *do* learn about the possibilities, it may be an unexplained mention on a checklist (what's "structured wiring," anyway?) when they are overwhelmed with dozens of other seemingly more important decisions to make.

Once consumers learn about specific products or services, they still have trouble envisioning how the benefits would play out in their own lives. As discussed earlier, this is a key stumbling block that's difficult to overcome without actual hands-on experience. We'll have more on this later in our recommendations.

Overall, most consumers currently have no way to remotely access their home systems aside from voice mail and email, and don't feel a burning need to do so—there's no "killer app" that would motivate them to replace existing devices and systems. And the information they find on home control is typically technically focused.

Which leads us to our next topic: Perceptions that home control systems are complex and hard to use.

Concerns About Complexity Can Be "Deal-Killers"

Consumers foresee complexity throughout the entire experience of implementing a home control system, from initial consideration through purchase, setup and use (assuming they get that far).

Consideration & Complexity

Clearly, consumers see home control systems as complex. Compounding the problem is the perception that once multiple systems are combined, the potential for technical problems multiplies. For example, in our 2008 tracking study, we saw that a multi-featured integrated home management system was perceived as more complex than a one-system solution—a home energy management gateway (see Figure 9).

Figure 9. Perceptions of Complexity

% Rating Concept "Very Complex"	U.S. (n=319)	Canada (n=143)
Integrated Home Management System (Multiple Features)	28%	23%
Home Energy Management Gateway (One Feature)	20%	13%

Source: 2008 State of the Connected Home Market Study.

Even though consumers felt the integrated home management system was superior to alternatives than the energy gateway, likely demand for the integrated system was lower—dragged down by perceptions of complexity. Mass market consumers in particular expressly preferred a standalone energy management product to integrating that function into a whole-home system.

Across our studies, consumers have told us they fear technical glitches could bring down many vital home systems at once—lights, locks, the works. Even if only one system is affected by a technical hiccup, they fear intolerable consequences, like being locked out of their house or not being able to control the temperature.

In addition to concerns about downtime, consumers worry that safety and security monitors will simply make wrong decisions about when to notify them, or when to call for help—in essence, sounding the alarm for burnt toast while ignoring intruders.

Many also express concerns about the underlying technology becoming obsolete. As wireless standards evolve, will they be left with a bunch of sensors that can no longer "talk" to each other?

Some consumers are suspicious that data about their home habits will be used for marketing purposes, or worse. Participants in our energy pilot were concerned that utilities would use data about their energy consumption habits to increase rates, or attempt to sell them products and services based on their usage. They also worry about criminals accessing information about their home habits, or the home itself. They ask questions like: “What if someone hacks into my webcam? What if a hacker can tell my house is in vacation mode? What if the system gets a virus?” Mobile access via a cell phone can introduce a whole new level of worry about maintaining privacy and security, as they wonder what would happen if a family member lost his phone.

Purchase & Complexity

Once consumers decide to pursue an interest in home control, and they navigate the available purchase channels as discussed earlier, they may find information is too technical to sort through on their own. This can be particularly true once they discover the need for network infrastructure to support their devices of interest. They may wonder, “Why can’t I just buy a lock or a light? Why do I have to have this box?” Retail sales staff and product web sites may only compound the problem by talking over consumers’ heads in technical terminology.

Related here is the subject of aesthetics and style. Once they get a look at available systems, consumers (especially women) may retreat because sensors, controllers or other devices seem obtrusive, intimidating, and, well—ugly. They don’t want their home to look like a laboratory, with obvious measuring instruments and cameras tracking activities and movements of household occupants. They want systems to blend into the background and complement their home décor.

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Setup & Complexity

Consumers’ concerns about setup appear to be strongly felt. Based on their experiences setting up Wi-Fi networks and consumer electronics devices, they worry about:

- The need to pull wires and cut holes in walls—now less of a concern due to emerging wireless solutions.

- Getting devices to “plug and play” without a lot of troubleshooting.
- Dealing with electricity.
- Wireless signal interference with other home devices, particularly phones or Wi-Fi networks, as well as weak or lost signals.

For systems with multiple devices (access control, lighting control, etc.) from multiple manufacturers, potentially using different standards and protocols, these concerns are compounded. And, consumers who already have networkable devices in their homes may have difficultly learning how to tie new devices together with the old equipment.

In essence, consumers want a “plug-and-play” experience where devices connect reliably and simply. Short of that, they want fast, effective help with troubleshooting. But do-it-yourself installers report frustration with having to contact multiple parties (including ISPs, device manufacturers and firewall software providers) to resolve installation problems. Even if they only have to deal with one company, they may have to make multiple contacts before a situation is resolved. Ultimately, they may give up and call in a knowledgeable friend or even a professional installer, but many times, if they can’t resolve a problem with a reasonable amount of effort, they will simply take the system back to the store and give up. After all, to many DIYers, this kind of project is supposed to be fun.

A glitchy professional installation can have negative repercussions, too. In our energy management pilot, satisfaction with the installation process strongly influenced participants’ impressions of the system overall. Installations that involved multiple visits or more time than expected started the whole experience off on the wrong foot. Consumers in other studies we’ve conducted tell horror stories about inexperienced installers who cause problems and make matters worse.

Consumers recognize that even once a system is installed, it will periodically need maintenance or other updates. Often, systems need some fine-tuning once family members have had a chance to use them.

All things considered, many consumers aren’t convinced that the seemingly inevitable setup and maintenance hassles will be worth the trouble.

Usage & Complexity

Once systems are properly installed, the main usability issue consumers face is climbing the steep learning curve to reap the promised benefits. They often use a trial-and-error approach to learning their new systems rather than making an up-front effort to get educated, which can prolong the process of learning and cause irritation.

Other sources of frustration with using home control systems include:

- **Stopping old behaviors.** Not only do consumers have to learn new behaviors, they have to stop ingrained ones. They may still wander around the house turning off lights and appliances instead of just hitting the "away" button before heading out to the store.
- **Family members** (mainly children) changing settings and preferences, unbeknownst to other household members.
- **Pop-up notifications** to phone, TVs, computers and other control screens that cross the line into sources of annoyance. Consumers want a way to easily change their notification preferences on a frequent basis, depending on what they're doing, and to easily dismiss messages one at a time. In our Laundry Time pilot, the most popular consumer response to pop-up messages was "Ignore."
- **Down time and slowdowns**, due to dropped or weak wireless signals, or other causes.

Figure 10. Consumers Talk About Technical Complexity

Consideration

"The standards are still changing. Investing in equipment that may not be expandable is a waste of time, energy and effort."

"I like 'hands-on' control; I guess I'm old-fashioned and don't believe in 'central' command. If the central command goes out, everything quits."

"The privacy factor. I just don't believe you can GUARANTEE it."

"It does too much. Too many 'whistles and bells.'"

Purchase

"The sales rep switched his geek brain on and started telling me I needed equipment I'd never heard of. He never really got what I was asking—just talked over my head."

Setup

"Our house is 80 years old. It would be a nightmare to set up."

"How time-consuming would it be to install? Would the time investment pay off with ease and efficient use?"

"I don't know how I'd go about setting it up yet. Where I'd plug this or that, if one PC acting as the server died, would I not be able to control other things?"

"Seems like an awful lot of work to figure out."

Usage

"Anything with too much technology is always confusing at first until one knows how to use it."

"Ease of use would be hard to believe."

Consumers Require Affordability and Value

As things stand, most mass market consumers generally think of home control products and services as being "luxuries," and therefore, priced out of their range. For newer self-install solutions, consumers may assume that prices are high because the technology is still new and evolving.

For those earlier adopters who *do* investigate current options—for example, to control blinds and/or lights in a home theater room—the need to invest in a gateway device (in addition to the necessary device sensors and controllers) can be a big hurdle.

Beyond the up-front investment, consumers wonder about the total cost of ownership, including installation, related equipment, multiple controllers, service fees, upgrades and maintenance costs. Only a minority would consider paying monthly service charges for services like security and safety monitoring.

Figure 11. Consumers Talk About Cost Concerns

"I expect that each sensor would be inexpensive, but a large number would be needed."

"I assume that I'd have to buy a small computer to run it."

"An electrician is at least $100 an hour."

"My husband has been laid off and is doing contract work. This is just not something we NEED."

And for solutions promising enhanced energy efficiency, consumers may not be motivated enough by the potential payoff, no matter how fast the initial investment can be recovered. As one consumer put it: "My energy bills make up a small percentage of my monthly bills, so the savings would probably be minimal."

All in all, since consumers don't feel a burning need for home control, they are generally content to sit on the sidelines, waiting for prices and paybacks to be more enticing.

Conclusions and Recommendations

There is a lot of work to do in order for home control to get a secure foothold in the North American market. Broadly speaking, solution providers need to:

1. **Make the benefits clearer to consumers.**
2. **Make it easier for consumers to acquire solutions.**
3. **Make it easier for consumers to install and use solutions.**

Next, we'll elaborate with specific recommendations for each of these areas.

Make the Benefits Clearer to Consumers

Improve how and where consumers can discover home control solutions. And once you've got their attention, don't talk technology—demonstrate a lifestyle.

Make opportunities for discovery. Both online and off, properly introduce consumers to the promise of home control using rich media, including videos—and best of all—hands-on demos. At retail, create one-stop centers where consumers can learn and explore. For the most compelling experience, add home control features to real rooms where consumers can experience the benefits first-hand: hotels, design showrooms, model homes, and home theater demo rooms at consumer electronics retailers. Make sure to let consumers try their hand at using a smart phone or other portable device to work the controls, whether they are in a home control demo room, or simply shopping for a new phone (or browsing an "app" store).

Next, remember to weave stories about home control into information offered by more traditional home improvement-oriented outlets and media. Shoppers looking for a programmable thermostat, a home security system or outdoor lighting should at least be made aware of the opportunity to have anywhere, anytime access to these systems.

Nothing is more effective at influencing consumers than word-of-mouth from experienced users. Some suggestions for harnessing this effect:

- Encourage early adopters to spread the word via online product reviews, user forums, social networking sites and blogs.
- In-home free product trials coupled with a video/web camera for online video journaling could kick-start the effort.

- Twitter would provide a natural way for smart phone home control converts to share their enthusiasm and provide links to compelling video demonstrations.
- Where feasible, recruit product evangelists to do in-person demos at their homes, perhaps in collaboration with builders and remodeling contractors, who often will pay for “open house” events when their projects are completed.

Consumers are open to home control when they are buying or remodeling a home, especially if they can wrap the cost into their mortgage or financing. Create new tools and processes to help them make design option decisions with confidence. Suggestions:

- Be more proactive—assessing wants and needs and then making customized recommendations—rather than simply providing information or checklists to home buyers and remodelers.
- Offer interactive computer simulations that allow prospective owners the opportunity to envision their design choices.
- Offer home control options when buyers are thinking about media rooms and kitchens, right along with LCD flat screen TVs and “smart” appliances.

Once you’ve got consumers’ attention, make the most of it by focusing on lifestyle—not technology. While it’s fine to talk in technical terms about home control with some early adopters, it’s not enough for everyone else. Most consumers—including a lot of women—could care less about the underlying technology, and may even be hostile to the idea of installing a lot of fancy electronic tracking gear in their home environment.

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Home control terminology is laced with potential landmines when it comes to reaching less technically-minded consumers. For example, while the much-used term “automation” might be music to the ears of an early adopter, it can conjure up images of robots and factory assembly lines to everyone else. And talking in generalities about “whole” home control can be overwhelming. Instead, focus on specific benefits, particularly improvements to lifestyle and to quality of life. Provide concrete examples of how consumers can realize the benefits in their lives. See Figure 12, Do’s and Don’ts of Home Control Messaging.

Figure 12. Do's and Don'ts of Home Control Messaging

Technology Focus ***Don't say*** ***(or say less)***	***Lifestyle Focus*** ***Do say*** ***(or say more)***
Program lighting & music scenarios.	Easily create the perfect party mood.
Remote access.	No more wondering what's going on at home. Make sure the doors are locked and the kids made it home on time.
Event notification.	Don't wait to fix a problem with your appliances or heating system until it's too late.
One-touch control.	Ready for bed? Turn off the lights and lock your doors from your bedside with the push of a button.
Energy monitoring.	Put an end to wasted energy, without sacrificing comfort.
Automate your home.	This system worries about your home, so you don't have to.

Tailor appeals by life stage. Of course, one size does *not* fit all when it comes to the lifestyle benefits of home control. Life stage can determine what the some of the key "hot buttons" are, from entertainment and efficiency to security and comfort. Keep generational needs in mind when crafting solutions and positioning:

- **Younger consumers (under 35 years old)** are particularly receptive to the idea of energy efficiency. They also are the most interested in using a smart phone to access a home system.
- **Adults (25-49 years old) in families with younger children** value family safety and security, mobility and digital entertainment. They include many first- and second-home buyers, who are typically overwhelmed by the number of decisions they have to make. And, they may struggle with maintaining a balance between the demands of home and career. Moms, especially, can value the conveniences of home control in their busy lives.
- **Older adults (50-64 years old).** Empty nesters may be seeking to simplify life, save on monthly bills, and streamline home maintenance. They also may have

increased responsibilities for aging parents, and have second homes or vacation rentals they want to keep an eye on.

- **Retirees** may choose to relocate, and seek ways to enhance their comfort and safety while at home. Interest in health monitoring and maintaining their independence increases at this stage.

Leverage other consumer characteristics. Product ownership, hobbies and geography also can drive interests in home control.

- **Home entertainment enthusiasts** are among the first to understand home control's benefits. In our 2008 tracking study, there was a strong relationship between engagement with digital entertainment and interest in home control. Catch these consumers when they're upgrading to an HDTV and/or switching to radio frequency (RF) remote controls from infrared (IR). Educate them about connecting customizable remotes to lighting and shade controls for "scene setting."
- **Smart phone users** tend to be on-the-go, and already use their phones to a great extent to manage their lives. This group will most quickly grasp the benefits of mobile control, and be familiar with downloading applications.
- **Residents of areas with high energy prices and/or demand**—including western and southern states in the U.S. and western Canadian provinces—are most attuned to the benefits of energy monitoring.

Finally, recognize that home control decisions are shared decisions. All members of the household need to feel their concerns are valued, and to participate in the decision-making process. Don't make the decisions all "gadget" decisions—include choices for color and style, too.

Make It Easier for Consumers to Acquire Solutions

Build in flexibility so consumers can get as much or as little functionality as they like, and appeal to their desire for a deal.

Offer independent solutions, but provide packages. While early adopters prefer integrated systems, they are in the minority. Connecting multiple home systems to a central interface is just too much for most mainstream consumers to think about. Make it easy for them to get going with low-priced starter kits or add-on functionality bundled with other products (like lighting and door hardware) and services (like TV programming, cell phone service, and home security monitoring).

Then, tempt them with packages that illustrate how combining features can offer a richer experience. Packages and bundles can be especially helpful to buyers of new homes, who want to cut down on the number of decisions they have to make. Two combinations should be especially compelling:

- **Security and comfort package.** Include control, scene-setting, monitoring and alerts for access (doors and doorbells), heating/cooling and lighting. Let them add on shades, appliances, smoke detection and air quality monitoring. A great add-on to home theater.
- **Energy management and home maintenance package**. Include energy usage monitoring (ideally, incorporating *all* utilities—electric, gas, etc.), smart appliance connections and maintenance notifications. Ultimately, add water usage monitoring, too.

Lower the costs of entry. Keep costs for single-function solutions in the low hundreds of dollars—at most—not the thousands. Consumers need simple, low-risk options to get them started down the home control path.

While starting with a standalone product is one way to keep costs down, other approaches to making that first step affordable can and should be leveraged as well:

- Give hardware and/or services away for free or at discount when possible, with the option of cancelling security monitoring, energy management, or other related services down the road if desired.
- Make it easy for consumers to realize savings through rebate programs or other incentives.
- Assume they'll want to use existing devices (PCs, smart phones and other mobile devices) as controllers, reducing the need to buy separate dedicated controllers.
- Tempt them with starter devices bundled with energy-saving products such as low-energy light bulbs.
- For energy management offerings, clearly communicate savings in terms of dollars and cents. Partner with local utilities to provide rebates and free home energy audits.
- With safety and security solutions, partner with insurance carriers to provide discounts on premiums.

Make It Easier for Consumers to Install and Use Solutions

Make the user experience as enjoyable as possible—right from the start.

To the extent possible, offer a "plug-and-play" installation experience, where devices dynamically find and configure themselves on a network. You don't have to be a "do-it-yourselfer" to set up your TV. Why should you have to be one to install a programmable thermostat? While this paper has not addressed the issue of technical standards directly, offering a simple out-of-the-box setup and usage experience will go a long way in achieving consumer acceptance.

Offer outstanding installation and support services. Those who want to do installation themselves will need the backing of a quality support program, where issues can be diagnosed and addressed with as little effort as possible. Provide extensive, well-organized information online, and provide options to get quick responses from experts—including from the user community. Phone support should facilitate remote diagnosis and repairs where appropriate.

Of course, not everyone wants to tackle setup themselves, Offer professional installation services at the point of sale, and certify installers to inspire confidence.

Beyond installation, users need to feel they are backed by strong warranties, service and support. Expect consumers to encounter issues as they reconfigure and add devices to their systems, and make the experience of resolving problems as painless as possible.

Make control seamless. Mobile control is the fastest way to "delight" consumers based on our research. So, make it easy for them to control and monitor their homes from anywhere (both inside the home and out), using any connected device or smart phone. Keep in mind that cell phones and other personal mobile connected devices will be used both when away, and when at home.

Regardless of the device, consumers need to feel familiar with the user interface. Borrow from the most popular touch-screen and graphical web-based user interfaces to ensure users feel comfortable exploring and using their systems to the fullest.

Part of a seamless user experience is not having to worry about privacy and security. Consumers expect a robust firewall to protect the system. Provide assurance that usage data specifics will remain private and not be used to raise rates or market to them without their permission.

Leverage existing behaviors as much as possible. The most obvious play here is adding home control features such as lighting and temperature control onto security systems, which already require users to set the alarm on their way out the door, and disarm it when they return. Along the same lines, allow users to incorporate alerts and messaging into current services—primarily email and voice mail—so they can avoid having to monitor a separate service. And even though mobile control is a must-have, remember that practically everyone will want to access their system from the kitchen—the home's command center. A stationary access point of some kind will likely be welcomed there.

All household members (at least all adults) must be comfortable using their home control system. Keep in mind that different people have different learning styles, and want varying degrees of technical information. Provide instructional materials in multiple formats, including video. Provide brief “how-to’s” along with more elaborate technical descriptions for those who want the details.

While one of the core benefits of home control is its “set it and forget it” nature, user engagement can and should occur, since engagement is related to satisfaction. Consumers want intuitive ways to override or modify system settings as needed—for example, to postpone responding to a maintenance alert. Energy management systems should offer ways for users to be actively engaged so they can feel in control of their energy consumption and then feel rewarded with dollar savings.

In general, find fun and interesting ways to keep users involved with the system and facilitate ongoing discovery. Push information and new functionality through periodic “did you know” messages (ideally, customized to use patterns), software upgrades, and regular e-newsletters. Encourage consumer “pull” of information through online user forums and social networking sites dedicated to the product or service.

To Succeed, Keep It Simple, Affordable and Enjoyable

As stated at the beginning of this paper, we believe that mobile access via smart phones and other portable devices has the power to pique consumer interest in home control as never before—and to keep them wanting more. But, true mass market success will require that providers deliver on many, if not all of the *other* recommendations in this paper, too. This is especially important for solutions that can be used with existing homes, where the biggest market opportunity lies.

Will that happen in the near future?

Maybe. If the experience can be made simple, affordable, and enjoyable enough to capture the consumer imagination, home control may soon start to come into its own in North America.

We look forward to watching how it all unfolds.

Studies Conducted for CABA CHRC by Zanthus

- **State of the Connected Home Market Study** (2008). Quantitative web survey with 1,800 consumers in the U.S. and Canada. Goal: Assess North American consumer interest in, and adoption of, consumer technology products and services within the spheres of entertainment, family and career. Includes some comparisons to a similar study conducted in 2005.
- **Digital Kitchen Study** (2007). Quantitative web survey with 600 homeowners who participated in choosing both kitchen appliances and consumer electronics for the home. Goal: Determine what consumer technology products and services would best suit the needs of North American homeowners in the kitchen.
- **Senior Living Study** (2007). Quantitative telephone survey with consumers age 50 and older who bought a newly constructed home in the previous four years. Goal: Understand behaviors and preferences regarding home technology.
- **Home Network Study** (2006). Qualitative study in two phases: 1. Telephone interviews with system integrators and installers, and 2. Focus groups with consumers who recently set up a home network themselves, or used an integrator to expand a home network. Goal: Understand home networking opportunities and barriers.
- **Laundry Time Pilot** (2006). In-home trial of connected laundry appliances over several months in six homes. Goal: Test features of a prototype system.
- **Safety, Security and Comfort Study** (2005). Central electronic group concept test using hybrid qualitative/quantitative approach, with 48 early adopter consumers age 25-54. Goal: Guide development of home information and control products.
- **Digital Entertainment Migration Study** (2004). Quantitative web survey with 600 digital entertainment enthusiasts. Goal: Identify non-entertainment functionality of highest interest.
- **American Digital Dream Study** (2004). Two-phased study: 1. Exploratory focus groups, followed by: 2. Quantitative web survey with 400 consumers. Goal: Identify preferences for purchase of home technology among buyers of newly constructed homes.
- **Home Control Hub Study** (2004). Quantitative web survey with 600 homeowners. Goal: Test interest in home hub concept and related applications.
- **Home Networking Retail Pilot** (2004). Qualitative in-store observations and interviews with shoppers. Goal: Evaluate the in-store consumer experience when shopping for home networking products.
- **Mealtime Pilot** (2004). In-home trial of prototype connected kitchen appliances with 20 homeowners. Goal: Understand how Internet-connected appliances can address consumer needs.
- **Home Control Pilot** (2002). In-home trial of prototype home control system with 50 homeowners. Goal: Test usage of, and satisfaction with, the system.
- **Energy Management Pilot** (2001) In-home trial of demand response system with 300 homeowners. Goal: Test usage of, and satisfaction with, the system.

About CABA: The Continental Automated Buildings Association (CABA) is a leading industry association that promotes advanced technologies in homes and buildings in North America. More information is available at:

www.caba.org

CABA's Connected Home Research Council is a cross-industry network of leading companies engaged in collaborative research to advance the connected home space. The Council's research projects enable participating companies to gain important insights into the connected home space and leverage those insights into viable new business opportunities.

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About Zanthus: Zanthus is a full-service market research-based consulting firm serving high-tech companies. Headquartered in Portland, Oregon, Zanthus is particularly well-known for a uniquely compelling combination of industry and research expertise, plus commitment to reliable research methods and analytical techniques.

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Thank You

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