8th SMART HOMES 2014 – Evening Session and Roundtable Dinner - King's College, Cambridge

Discussions at this session to cover connected smart homes and buildings innovation and market pull - 3 broad applications areas of energy management, security and assisted living. Corollary topics of: market maturity: consumers; unlocking the market for innovators; their funding challenges; the relationships with large players in smart homes markets.

Programme & Talk Links Online

6pm arrival

6:10pm Introduction by Dr Justin Hayward, Senior Consultant at Cambridge Investment Research

6:15pm Talk I: Security: Killer App or Dead Man Walking? Colin Howlett, Sentec

6:30pm Talk II: eHealth – Assisted Living at Home, Rob Halhead, DoCoBo

6:45pm Talk III: Home Connectivity Everywhere, Russell Haggar, CEO, Xsilon

7:00pm Talk IV: Lessons from the Connected Home, Pilgrim Beart, AlertMe

7:15pm Panel discussion of the 4 talk topics presented, continued at dinner…

7:30pm Pre-dinner drinks

8:00pm – 9:45pm Dinner Roundtable networking and continued informal discussion

Smart Homes Conference 2014 Talk & Discussion Summaries
King's College, Cambridge, UK – 3 November 2014
Notes by Jessica Toh, Cambridge University, edited by Justin Hayward, Cambridge Investment Research

Home Security: Safe living
Speaker: Colin Howlett, Sentec
Topic: Killer App or Dead Man Walking?
One-sentence summary: What is needed for smart homes to take off is not a single killer app but a platform upon which the apps can be built
Talking Points:
- Who are Sentec? A company around the creation and exploitation of market-disruptive technology for utilities, buildings, and consumers, technology involving sensors.
- Existing *home security* market:
    o ADT, Monitronics, Vivint, etc.
    o $13B industry in 2012
    o Much of it looks rather last generation. Is home security dead man walking?
- Existing *smart home* market:
    o Consumer electronics (by far largest), lighting, environmental, etc.
- Is home security a killer app?
    o What is an app in the first place? HW components→communications infrastructure→HW drivers→app services→API→application
    o What is a killer app? An app that will make you buy into the platform it sits on. E.g., browser on smartphone
    o What is a home? Increasingly not just physical space, but digital space. We have valuable belongings in the cloud.
- A platform for smart homes? Talked about starting with HW. Think of it as the base level of the platform. Need Application services and API on top, then the app the user will use.
- Who is building this platform? Most people don't have this platform in house now. Consumer electronics are building the platform like Google, Apple, Samsung, and AlertMe. "Smart" is growing outwards from their smartphones and TV. Currently more about status and being into gadgets rather than security because most people don't want to think about house being burgled.
- What will happen to security? Have to get sensors, like occupancy sensors and on windows. Might well come from energy market and not security market. People have money to spend on energy every month whereas they don't set aside a security budget each month. Once we get sensors, we get the platform. Not just about preventing burglars but maintaining well-being, like fire alarm and smoke alarm. Also about securing belongings in the digital realm.
- Security as the industry exists is not really killer app because it's not an app and not being driven by platform thinking. Nevertheless it still offers compelling value for segment of market. Don't see security vendors building open platforms needed for smart homes. Will become an app but not killer app. Likely not the existing security vendors that'll end up winning the business, which is more about platforms than security itself.
*OpenThings protocol coming soon from Sentec. 5 vendors signed up already.

Digital Healthcare: Assisted & fit living
Speaker: Rob Halhead, COO Docobo
Topic: E-Health
One-sentence Summary: As 5% of the UK population accounts for 33% of the healthcare budget, and the elderly population is growing, it is in everyone's best interest to detect health issues early and keep people living healthily at home for as long as possible; Docobo is tackling this through easy-to-use medical devices and data tracking in the home.
Talking Points:
-   Health as designed in NHS in 1948 not that different now; need to reengineer healthcare
-   Goal is to reduce cost
-   Goal achievable if keep people at home as long as possible as healthily as possible; stay away from care homes
-   ArtemusICS—single source of population health diagnosis and treatments
-   Population analysis: Moderate and moderate high risk people make up a tiny percent. 5% of population burn 1/3 of budget. Those who are at very high risk and have more than one condition (co-morbidities) largely require long-term condition-oriented care. There are now about 400,000 over 90 years old in the UK. Average cost of one of these patients is £10K. If you have stroke, £50-100K.
-   Continuum of care: most of us are well/worried well (hypochondriac). Case management personnel take an individual and see what they suffer from, how much they cost, co-morbidities, etc.
-   Docobo opened up the world of reaching this kind of data.
    o   Have own Care Portal. Many of elderly hate computers. They've created a games console-like device will take person's ECG when held. It's a medical device, not consumer object (passes higher regulation)
    o   Underneath it's a medical android tablet. High resolution video to transmit medication label to health professional.
    o   Reports that show physical readings and answers to symptomatic questions; responses are color-coded. Nurses 90% of the time look at the symptomatic questions (e.g., how do you feel? How are you sleeping?)
    o   iCare: Plant PIRs in strategic locations around house. Shows movement in different rooms. Partnered with TimeTech. Can build up pattern of movement. (E.g., elderly person may say they're fine but they got up to use the bathroom 9 times so didn't sleep well.)
-   Wealth of data ambulances have is incredible.
-   If we can detect things early, we can keep people out of care homes
-   Tech enables process change.

Connected Living
Speaker: Russell Haggar, Chief Executive at Xsilon
Topic: Connected Living needs…Connectivity
One-sentence Summary: Smart homes need a platform to avoid app silos, but this requires ubiquitous connection around the house; Hanadu combines existing network components into a single ubiquitous connectivity solution.
Talking Points:
- The killer app we're talking about is connected living. Without that as a platform we'd end up with a bunch of silos.
- IoT has been hijacked by doing things on your smartphone to control your home. Nothing wrong with that, but there's much more.
- Smart homes is about connected devices—there are different sources of devices (some simple, some complex)
- Connected living needs to be low cost, low power, have ubiquitous coverage, work out of the box, be small enough, and needs to work everywhere you want it to work
- Use cases are e-health, energy/smart homes, micro-generation monitoring, home automation, intelligent lighting, assisted living, smart appliances
- Wifi often doesn't cover whole house; there's no guarantee of link in every part. Can it go through several brick walls? End up with multiple tech in the home (e.g., Zigbee, Bluetooth, Zwave).
- Hanadu was developed to fill in the gap of no single radio technology covering the whole house. Uses existing network components.
- Powerline becomes the key missing link for connected living. Smart Homes need Smart Networks, not just a radio. What single platform can you roll out across the house? Hanadu fits within all existing standards, fit into a plug.
- Hive experience: Heating uses ZigBee radios. Have smart thermostat where dumb boiler becomes slave (Zigbee) and there's a web interface (ZigBee to broadband). At one point the display said "No RF". 2 days later British Gas sent email saying they couldn't read the signal. Sent additional ZigBee plug. £30-40 net cost to supplier. Problem due to single point solution of radios. Radio/powerline hybrid solution would be better.

Home Energy Management: Efficient living
Speaker: Pilgrim Beart, AlertMe and 1248 Founder
Topic: Smart homes strategy
One-sentence summary: Omnia is an extremely scalable and portable platform for connected homes; main learnings are: be honest, be open, humans don't scale, making it simple is hard, and IoT UX is different.
Talking Points:
- AlertMe creates platforms for connected homes
    o Hive (with British Gas)
    o Lowe's (in US, sells as Iris)
    o Energy Analytics—pure SW service proposition that helps engage consumers with their energy usage
- Most of what's been deployed into homes are single-point solutions; meant for specific use case and doesn't work with other products
- Omnia:
    o Extremely scalable platform
    o Architectural layers—abstracts everything so it's easy to add different home networks, including ones that haven't been invented yet.
        ▪ Portability: at design time engineers would decide where it would run and could end up being wrong. Omnia solves the problem by having a homogeneous runtime environment using Java. If you write it for the cloud and decide to move it to gateway, you can move it and it'd be fine. In terms of scaling, there are times where you want to do things on the edge (e.g., at handset so the processing power scales with number of users)
        ▪ Canonical Forms: e.g., doesn't matter who makes the thermostat; do same with networks.
- Sensor data fusion: in most connected home apps it's really important to know whether someone is home or not. There is no one sensor for occupancy that's good enough. Motion sensor can be fooled, electricity usage can be fooled, some detect whether one's smartphone is on the home network but not everyone has phones. Lots of sources, none singly reliable. Sensor data fusion comes in. Bootstrap and learn that different sensors might be more reliable in different homes. Tune to different homes.
- Some thoughts for discussion:
    o Be honest—made mistake with B2C because buyers thought they were buying a mature product in mature market. Should have been more honest about the state. Acknowledge we're all at beginning of journey and learning together.
    o Be open—people realise they can't do everything and need to work together. Tech seems to help those who help it most.
    o Humans don't scale—as you scale up, if you have a scaling bottleneck to do with CPU or RAM you can solve that, whereas it's not true for humans. Need highly automated process for customer support, adding new devices, etc.
    o Making it simple is hard. For every way it can work there are 100 ways it can not work. Need to deal with those. Making experience simple and reliable is difficult.
    o IoT UX is different: it is qualitatively different. Our interaction with phones and TV is modal, whereas it may not be for IoT devices.
- Book available on Early Release: Designing Connected Products: UX for the Consumer Internet of Things (O'Reilly) http://shop.oreilly.com/product/0636920031109.do?cmp=tw-iot-books-videos-product-promo_designing_connected_products

Panel Discussion

Question #1: IoT always fails to come up to expectation. Consumers don't care about the tech behind it. How will this evolve to become attractive to my grandmother? Is it too capital-intensive to see a service that works for people?

Responses:
- It's the service process you have to get right. Consumer market is where you can deploy millions of things and get mass. Aren't that many players who can deploy that many things. Quality comes from making lots of things. With AlertMe we wanted to avoid just doing things for rich people and geeks.
- How do we deliver value before platform is mature? IoT as slogan is about avoiding bad outcomes. Make sure we build open systems. Question is how can we deliver value in short-term? Unfortunately still at point where vendors do have to deliver everything from sensor to service. If we build in a way where we can incrementally change later we're on right track.
- For 15 years Wifi wasn't ubiquitous. There was Home RF. Bluetooth was being touted as home network. 3 networks competing. Now you buy iPhone and they assume you have Wifi. At some point there'll be a tipping point where something becomes ubiquitous enough where it'll become a given.

Question #2: For Telecare do you see need for open systems?

Response: We focus on professional healthcare—highly regulated, meet certain standards. In our consumer-centric world you can buy a pedometer and see how many steps you've taken. We tend to focus on long-term conditions because we're trying to keep people out of the expensive brick-and-mortar. Our business is working on the big numbers. The consumer and professional world of health don't really meet. To bridge that gap are thousands of apps out there that monitor your diabetes, but most GPs are not interested in what your blood pressure was 6 weeks ago. Might be interested in the average. They have too much work to do. Most of us google our condition before we walk into GP, often becoming more of an expert in it than the GP. Body is a complex integrated system. That's what the GP knows that you don't—if you poke one bit if can affect another. In the next decade GP will be more like a coach. The more people take an interest in their own health, the better. Most people with co-morbidities are hard to reach; they are not online. Majority of people we need to reach are not interested. Motivating the patient to take an interest in their own health is half the game for NHS. You're looking at full spectrum of humanity. There's plenty of tech out there but many aren't interested in their health. Pace of change in healthcare is slow because manufacturers are reluctant to make changes because they'd have to pass all the regulations again.

Question #3: Are the cultural and social barriers (e.g., data security, privacy) too costly?

Response: Web seems to show that people don't have a sense of privacy at all. It's often a topic brought up in conferences but in reality don't see consumers concerned about it. British Gas asked us to encrypt even at rest. That's where the brand thing kicks in because brands are aware of the pitfalls of what could happen.

Question #4: You're all assuming people want to communicate through providers. Elderly population didn't want anything linked to everyone else, particularly like recycling water or energy controls. Wanted one place where they can control how things work, so things like Hive are interesting. It's not necessarily everyone's desire to have it connected. Not everyone stores their photos on cloud. There may be a risk of over-complicating.

Responses:
- A lot of services people use are in the Cloud but they don't think about it. People do need to start in a position of control and maybe eventually they'd be interested in sharing water, etc. To be honest, a lot of people don't think about privacy on the web.
- Connected living may be about sharing within your home but may not share with anyone outside your home.
- This year we saw Google and Apple launch into this space. The scale of these things will help to drive the technologies. Thread does for IoT does what Wifi did for smart devices.

Question #5: Had an experience of putting in heating system connected to internet; had to tell person installing it what it was about. House didn't have Wifi. Internet connectivity went down, then house didn't have heating.

Response:
- When you start something new you have to educate the market; it's a push market. In healthcare it's becoming a pull market. In smart homes it's about value proposition—how much do I need this thing? In healthcare it's relatively inelastic.
- People tend to buy from expert recommenders. Maybe plumber recommends something, builder built it in, GP recommends something. Smart homes hasn't yet reached a coherent message for expert recommenders. Smart home vendors are trying to leap frog to the customer because early adopters are more familiar than expert recommenders. Many builders don't speak the language of smart homes.
- The trades are very difficult to bring forward. Biggest problem is with property team—they send a maintenance person who turns up with wrong set of screw drivers.

Question #6: What about security? 300K to 1M attacks per day to German telecom system. Security in IoT—you can control objects. May have secure intelligent products but some cheap insecure products. Water cooker sets house on fire and then IoT gets bad reputation.

Response: Security is a specialised area and not many in IT understand it properly. Inevitably mistakes will be made when you collide it with other products like street lighting. Problem in smart home, there are different radio technologies. Some are low-power so implementing some of these encryption technologies may be difficult. Have to accept there's a trade-off; some objects may be less secure. Security and usability sometimes trade off. Assumption that your local network is not part of internet will increasingly not be true. Something somewhere has to be responsible for managing that thing.