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Hrdlicka, Anna

The future of housing and technology in Japan

-the Connected Homes Group Study Tour.

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This report describes experiences drawn from a study tour in Japan June 2003 focussing "The future of housing and technology". One important conclusion is that the future of housing is not only technology, but that technology is a large part of our future housing, and activities related to life and living. Technology should, however, be developed with care and with emphasis on use and the user.

It is also important to invest in this field, both from a scientific / research perspective and from a product developing perspective. There is a need on accepting this as a field of research and conducting both research and development. Initiatives that should be concentrated in investigating how (and if) technology should best be introduced in the home environment, in order to meet human needs. There is also a need to invest both capital an knowledge to make this happen.

From the multidisciplinary perspective of the group a number of observations has been made; the most important being the opportunity for cooperation between Swedish knowledge and Japanese electronics industry in developing digital services, and home related electronics with an emphasis on user needs.

FUTURE FINDINGS

- **The market for "connected homes" is something that will happen (again). Japanese electronics makers, amongst others, show and increasing interest in investigating the market opportunities related to "connected homes".**
- **Usability and ease of use are essential for success in this field. It is important to focus on functionality / services rather than technical capacity.**
- **The market for housing related services and products consist of many different segments with various characteristics; families, elderly, young people etc.**
- **Simple uncomplicated business models are essential to sell services in mobile (and fixed) networks.**
- **The Japanese government is heavily supporting certain markets in order to establish new business opportunities. One such being large test-beds and large scale prototypes for future living.**
- **Introducing new technology is seen as an evolutional process, not a revolution; one step at the time.**
- **There are opportunities for Swedish research and development to co-operate with Japan industry in the field of housing and technology.**
- **Sharing the same future concerning an increasing share of elderly citizens, environmental concerns, information stress and women's entry and role in the labour market, Japan and Sweden could co-operate developing solutions. With or without technology.**
- **Technology is FUN! This said to emphasise the cultural differences in terms of technology usage.**

The future of housing and technology

Much can be said about the future, much can be said about technology and our homes. Asking ourselves the question of the probable future of housing and technology makes the picture more complex, and we will probably come out with as many answers as individuals to which we asked the question. The only thing we will know for sure when asking questions about the future is that the correct answer will come – later.

The future of housing and technology is not an issue of housing, or an issue of technology but a complex picture of human needs, wants and vast technical possibilities. It is also an issue of solving specific “problems” or “needs”, needs formulated by groups or individuals.

From the Swedish perspective, with “IT-boom” in the late 1990’s in vivid memory we wanted to investigate how the issues of home, technology and future were interpreted in Japan. Given, amongst other things, the strong position of the Japanese electronics industry it became interesting to study how the Japanese handle the challenges of implementing technical solutions in our homes and society.

Again, from the Swedish perspective much effort has been made to understand the user and user needs, however, with a weaker position in terms of electronics industry, and a much smaller national market for products and services. Therefore, a comparison had to be made.

A first contact between Institute for Futures Studies (Institutet för framtidsstudier) and ITPS (technical attaché Shigeyuki Naito) in Tokyo was established in November 2002. Following that a multidisciplinary group of Swedish participants were formed during the spring of 2003. The ambition with this tour was to take into account the different aspects of the theme “housing and technology”. Therefore, the group consisted of people from both “hard” and “soft” disciplines; architects, usability experts, people working with the handicapped, elderly and disabled, network engineers, consultants, housing and energy experts, all in some way interested in the question of “housing and technology”.

Here, I will also take the opportunity to especially thank Shigeyuki Naito at the Swedish Embassy for his devotion in making this trip a success. Together with the group he has explored the future market of housing and technology, observing both opportunities and obstacles.

Concluding observations

A conclusion - not only of this tour - but, from Swedish development within the “technology for the home sector”, is that technology for the home has to be developed separate from technology for the office. The home is not an office environment; it is a “world of its own” where understanding of the user and use has to be taken into account. There are no shortcuts in understanding user needs in different environments and that goes for the home as well. Having said that, it is of course possible to find inspiration from IT-solutions in the industrial / office sector and of course technology should be reused in different environments.

But, technology has to adopt to its “habitat” – in this case, the home. One way to deal with that is by making technology invisible. Ubiquitous and non-invasive is two words that were frequently used.

Products and services for a home environment have to be developed with a user focus, and be packed and bundled to attract customers in their respective every day life. This goes for services as entertainment as well as security and safety. And, most important there has to be a business case that pays off.

Given the size of the Japanese versus the Swedish national markets, and the demographic similarities between the two countries, there are incentives to see where there are possibilities to develop joint efforts in the “home sector”. There are also cultural differences that might work both as hindrance and open up possibilities. The Japanese playfulness versus the European “industrial thinking” is one.

One such opportunity for Sweden is to benefit from Swedish knowledge and research in developing user oriented products and services, products that can be marketed at a global scale. This also by making use of Swedish experiences and skills in fields other than technology – i.e. fields where technology can be applied as a component in every day life.

Taking account for factors on a societal level, such as an ageing population, changes in values and behaviour, and values are something that can be a Swedish contribution in this development. A co-operation with Japanese electronics makers and research would be an interesting opportunity and we believe that this is also something that Japanese companies encourage. One example is by inviting Swedish lectures on the topic of future housing to stimulate knowledge sharing.

Another observation is the need for standards. Now most companies involved in developing “our future homes” work on their own solutions and hope to set a de facto standard. This might not be the way to go as expressed by both the Institute for Future Technology and by Toshiba. The way forward is co-operation, both within Japan and on a global scale – to set standards[1]. The fix on all levels seems to be – co-operation.

And, please, do remember – TECHNOLOGY IS FUN! That outlook might be a road to success, in Sweden as well as in Japan – breaking up the business like approach to technology that Sweden represent.

A. Even signs in the subway use cute animals to stress the point that people should be careful not to get caught between the doors. (Photo Anna Hrdlicka)

[1] Anders Hektor, NITA is mentioning this in his report (in Swedish) with a reference to the efforts of Microsoft in the home sector. The report can be found at www.nita.uu.se

Highlighting the week

The study visit week in Japan was planned jointly by the ITPS (Swedish Embassy) in Tokyo, and Institutet för framtidsstudier (the Swedish Institute for Futures Studies). The aim of all visits was to encourage the exchange of ideas and views. The focus for the participants was knowledge sharing, i.e. both sharing within the group and with the Japanese hosts. Therefore, the programme contained both a seminar at the Swedish embassy where the Swedish group had an opportunity to present their experiences and research, and study visits to Japanese companies and research facilities.

The issue of "housing and technology" is in itself too broad to be covered in one week. The study tour, however, provided some examples covering the theme "housing", and what will be needed in terms of a broader understanding. In other words covering issues from IT networks to social networks.

Technology and the future

Institute for future technology[2] (**IFTECH**) in Tokyo has been conducting foresight surveys on technology and its role in society since 1979. Every 5th year, a national foresight is conducted, listing the most important areas of research and when certain technology will emerge "on the market". The 7th foresight was reported 2002 and the planning for the 8th is on its way. This series of foresight is one of the longest in the world using the same method, and attracts interest from many countries.

The method used is a Delphi method with a panel consisting of 3.000 senior researchers and executives. The absolute majority of these panels are male – 2.900 male and 91 female! The reason; there is not enough women in senior research and / or executive positions. This however, does not constitute a problem according to IFTECH representatives, who say that the result would probably not have differed with a more gender-balanced (50-50) panel – this "because the questions concern technology".

The goal for the work within IFTECH is to find a focal point and to be able to direct and prioritize research initiatives to the most interesting areas and their realisation time, see picture below. This work is related to Japan's "Science and Technology Basic Plan" in which efforts in research is directed on a five year basis. High emphasis is put on "e-Japan" (see below) in order to provide an infrastructure for future development.

The results of the foresight should point at applications, in a broad perspective. Not specific products rather areas in which applications of certain types might be used. More like, application areas for certain technology, as in illustration G below – applications for home and everyday life, for transportation etc.

Mr Kikuta points at the importance to include the opinion of the users of technology and, therefore, the importance to also include non-technical field in the foresight. The report is available in English – a 600-page document, and a summary of 85. But there is also more "easy access" to the findings – see picture below[3].

[2] June 10th. Dr Takahi Kikuta, head of science and technology policy research division and Ms Kazuko Katase, researcher. More about IFTECH: http://www.iftech.or.jp/english/index_e.htm

[3] Se also http://jvsc.jst.go.jp/shiryo/yosoku/section1/page11.htm (page11.htm – page17.htm) for more illustrations.

B. Illustrations of "future findings". (Source IFTECH)

In the report IFTECH lists important topics along with a year in which this should occur. Mr Kikuta is pleased with the fact that they have, so far, been accurate to 65% in their foresights. One ranked as no. 5 on the IFTECH list is "Widespread use of highly reliable network systems capable of protecting the privacy and secrecy of individuals…". This should be realised in 2010, and ranked nr 20 is "Widespread use of portable multimedia wireless terminal operating about 100 Mbps which can be used throughout the world" – realised around 2013.

Building the homes of the future

What is a future home? What determines its features? During our stay we had the opportunity to visit four different approaches to tackle the challenges of our future homes from the "housing perspective". However, factors as demography, housing market and personal values continuously come into account, and alter this focus. In short, technology is not always in focus when dealing with issues of our future homes.

Of course these approaches differ, both considering scale, scope, and considering for whom it was built. But, the same factors have to be taken into; an ageing population, the fact that the former three generation families now seem to be dissolving, and the fact that people move from rural to urban areas for work. On top of this some see technology as a possible fix, while others do not consider the possibility.

Another factor affecting the future homes and houses in Japan are the increasing number of women entering the labour market. The traditional role of the Japanese woman being a home maker is slowly changing affecting both the tradition of three generation housing and requirements on services as day care for children, nursing homes for the old etc.

The group had the opportunity to visit **Nippori Community House**[4], which contains Japans first collective house. This Community house has been inspired from European examples – the Netherlands, Sweden (Färdknäppen[5]) and Denmark – and is an experiment attracting both elderly that can afford to invest in their housing and an

[4] June 11th. Professor Ikuko Koyabe, Japans Women's University

[5] *Färdknäppen* is a collective house at Södermalm in Stockholm. For more information contact Kerstin Kärnekull (for contact address se participant list below).

experimental part – the collective house! The first floor of the house contains kindergarten and restaurant that will be open both for people living in the community house and people in the neighbourhood. The second and third floor is the new collective house – Kankanmori – with 28 apartments plus 13% common space. This part has been designed together with the tenants, and the maintenance is being taken care of by the tenants – a solution very uncommon in Japan.

C. Section of Nippori Community House and women's bath on top floor – a room with a stunning view! (Source Nippori Community house, Photo Niklas Brunsberg).

Floors 4 to 6 contain a home for elderly / old and in need of care. And the rest, 7 to 11 contains apartments for elderly that want to feel secure living on their own – the apartments all have alarm connected to the doctors / nurses in the house.

The idea of the collective part of the house is that the tenants should be able to live a more fruitful life and reduce problems by sharing, experiences time and effort and caring for their common environment. Even though this house has LAN in all the apartments it cannot be said to be an "IT-house", its qualities are the planning for all stages of life, from kindergarten to care for really old people. Other housing qualities are the common bath on the top floor. This is a house that adds to quality of life and shows that the future of home does not necessarily need high tech. But still, new technology adds extra value, the tenants of the collective house have their own web site "Kankanmori no kaze" – *the winds of Kankan mori*. [6]

This collective housing solution was contrasted by **Sanyo model house**[7] in Tachikawa, Tokyo. A single-family house constructed by Sanyo Electronics. Even if it seems odd to us this model house has been built by one of the largest electronics makers in Japan. Why? Well, this is an excellent opportunity for Sanyo to develop the whole concept of the future home – filled with technology, appliances and gadgets from Sanyo. The vision is to connect all appliances in the house to a home network. Under the motto "Make IT business" they are trying to position Sanyo on the market of future homes. The concept builds on the fact that a business case built on "maintenance" of appliances and functions is more worth than one built on just selling the appliances.

The house come with a 20 year service plan free of charge and an option for service years 20-60 at a price of ¥ 20 000 (approx. 150 Euro) a year. It is equipped with a service plan, much like if you buy a car, but supposedly that will be needed since the house is packed with electronics. Electronics in absolutely every device possible, starting with the finger print scanner that opens your front door. Via the bath tub alarm (that will sounds if you don't move for more than 75 seconds, to the cuddly little dog containing a health central ready to connect to your doctor via the Internet, to finally the

[6] For more information on Kankanmori and collective housing in Japan, please visit http://www.chc.or.jp/english/

[7] June 10th. Mr Akihiro Hosoi, Manager, Planning and Mr Eung Joon Ahn, Analyst and Coordinator.

heart of the house – the portable home terminal. This house shows all the technical possibilities, technology everywhere. But, for Sanyo products only – adapted to their own standard for home communication.

D. Health care robot "Hoppi" and a cleaning robot from Sanyo. (Photo Per Thorselius & Niklas Brunsberg)

This, of course, is one of the challenges of the connected home. Building systems from a standard accepted and adopted by all, enabling consumers to make their own choice of brand and letting different products from different brands work together in their home system. In the greater Tokyo area about 20 of these houses has been sold so far. The price of the house is increased by the price of the technology included in the concept – according to the information provided – technology adds about ¥ 4.000.000. A "ordinary" Japanese house sell at ¥ 25.000.000 (excluding the price of land).

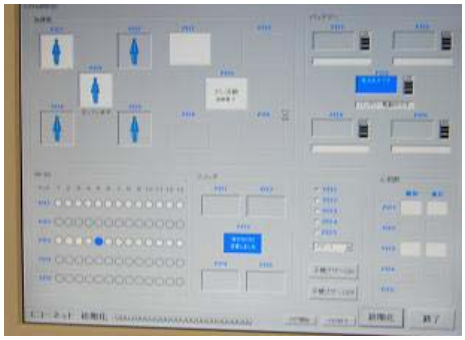
But that is not all. Since Japan is an earthquake area Sanyo has also been experimenting with other than traditional building material, such as using steal beams instead of wood for the construction – this, to make the house earthquake and fireproof and to prevent the material from being affected by weather conditions. They are also using composite materials (wood and plastic) for floorboards and walls. This is interesting as when other parts of the world (US and Sweden) have found a new, and increasing, interest in building wooden houses. It is also contrasted by the great interest in Swedish wooden houses.

E. Sanyo model house (Photo Kerstin Kärnekull)

A related project is the **"Sensor house" in Osaka**[8] conducted by AIST (National Institute for Advanced Industrial Science and Technology). This is a experimental project and nothing has yet been turned into products. In this house 167 different

[8] June 13th. Mr Yoshihiro Matsumura and Dr Katsunori Matsuoka, Deputy Director

sensors of 15 different kinds is set up to automatically detect and understand normal / un-normal behaviour of the inhabitants of the house by detecting movement, posture, acceleration, heart rate, use of appliances etc. The behaviour is analysed using an algorithm for "normal behaviour"[9]. Why? To, create a safer and more comfortable living, especially for old people living alone, this since the number of accidents at home are steadily increasing (they are almost as many as the traffic accidents since 2001[10]).



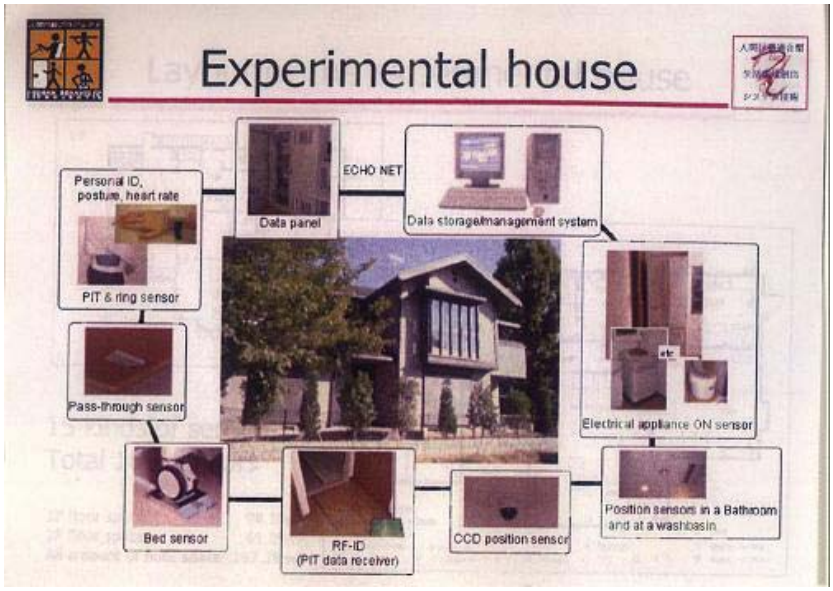
F. Demonstration in the sensor house and the interface monitoring the inhabitants. (Photo Anna Hrdlicka)

This house has not gone through testing with "real" inhabitants but plans are to do some kind of long term testing during 2003. The aim is to develop technology to support everyday life. AIST cooperates with Japanese companies in putting products on the market. As in many cases, the research conducted in the Sensor House has financial support from the Japanese government. From the Swedish group great interest was expressed for this experiment. It will be interesting to see a more "commercial" outcome of these trials[11]. The price tag? A house like this would cost ¥ 30.000.000, whereof half refers to technology.

[9] This algorithm has also come of use in the air traffic industry where airplane seats are equipped with sensors that can detect if a passenger displays "un-normal" behaviour. This can indicate, un comfort, illness or security risks.

[10] According to statistics from the Department of Health, unfortunately, we have no closer information on that statistics. However, statistics from Finland show that the number of people injured in and around their homes is double the number of people injured in traffic accidents.

[11] It might be interesting to compare this project to the **"@home apartment**" at Danderyd's Hospital in Stockholm with this experiment.



G. Examples of sensors used in the Sensor house. (Source: Sensor House)

Mori Building in **Roppongi Hills Residence**[12], containing 793 luxurious apartments, was the fourth housing project visited. This is an 11-acre development in central Tokyo that has taken 17 years from start to finish. It was opened in April 2003 and contains both commercial area, offices[13], a hotel, a 9-screen cinema, a modern arts museum, restaurants, apartments, and parks.

These apartments are what Mori call “serviced apartments”, a concept that resembles staying at hotel. The tenants rent their apartments (approx. ¥ 1 500 000 per month ~ 120 000 SEK) and have access to various services, from valet parking, reception desk and restaurants in the house. They also have access to a social club open to “Roppongians”. Of course these exclusive apartments are equipped with Internet access, a digital local community that provide information on the close neighbourhood and a home control panel[14]. But, the selling point for these apartments seems to be focused more on the exclusive setting and the services offered than the possibilities given by technology. The electronic services and concept within the Roppongi Hills area, the commercial part, are supported bye-Japan.

[12] June 16th. Mr Yukio Ozawa, Manager at MII Project Department, Mr Tsutomu Uema, Manager at Residential Leasing group and Ms Masako Kito, Academy Hills. More on Roppongi Hills: Http://www.roppongihills.com/en/information

[13] Within the commercial part of Roppongi Hills we had the opportunity to see office related projects that were part of e-Japan. These focused locaton based infroamtion services using hot spots, RF-id applications for libraries (another useful application for RF-tags) and a print service using ID-cards. These applications were for office use only and are not (jet) appicable in homes.

[14] What springs to mind, as a similar approach is the project IT Bo in Vällingby Stockholm where similar ideas were developed during the mid 1990´s. However, the rents in Vällingby are not within the same price range as in Roppongi Hills.

H. The entrance hall of Roppongi Hills Residence and Roppongi Hills (the office building) by night. (Photo Anna Hrdlicka)

One observation from Roppongi Hills concerns environmental goals for inner city developments. Since the city is so dense there are few parks and little green areas. This in turn adds to the climatic problems, especially during the summer. A dense, concrete, city with no trees have less ability to absorb the sunlight which causes temperatures to rise. Therefore, all new development has to add something "green", usually small rooftop gardens, trees and bushes, to – at least try – to fulfil the environmental goals. [15]

Housing - reflections

Four very different approaches, four concepts of living in the future... But what is the role of technology in these concepts? Is it really to make life "easier and more comfortable to live"? Maybe, but in very different ways, Roppongi Hills has an air of exclusivity that will need to include the latest (internet and automation) because their tenants expect those services to be included. But, more important is the concept of high level service conducted by **real** people, the luxury factor.

In Kankanmori on the other hand, technology is not at all an issue even if broadband is installed in the house. There the experiment is more on the concepts of tenure to solve real problems – social interaction rather than interactive media.

The other two projects rely on technology as a fix and have a strong "techie" focus[16]. In a way those projects could be seen as huge experiments with possibilities, demonstrating; "This can be done! Do you want it?".

The idea of offering concepts with a high-tech profile is to add extra value for the consumer, in this case focussing on convenience, health, safety and security. By doing this theses companies will be expanding their business, and refining their offer. However, as seen from the above examples convenience, safety and security might be offered in different forms – with or without technology focus.

One impression is that housing in it self is, or might become, "conceptualised". You buy the lifestyle you want or that refers to you and your values; Traditional, high tech,

[15] For more information on Roppongi Hills please visit: http://www.roppongihills.com/en/information/

[16] See also the part about JEITA below. They have also built a showcase house filled with technology, but we did not have the opportunity to visit that showcase.

collective, etc. Much the same way as mobile phones, restaurants etc are sold as "concepts". Packaged housing.

The appliances and standards

Living in the future Japanese society seems to be much about technical gadgets and appliances – at least if you ask the Japanese electronics makers. Remote controlling your, home and your life, but also relieving your life from stress, and boring duties – in other words let technology create an easier and more fun life. This motto has followed the "technification" of the home since early 1930 – if not earlier. Technology, however, also adds to the complexity of our homes. The number of remote controls in our homes is steadily increasing and one question is "what will be the future home control panel"?

The motto for the future seems to be; *anywhere, anyhow, any time.* Technology should be there for you to solve problems and "make life easier and more fun to live"[17]. This motto has been driving the appliance makers for tens of years and with today's technical and societal complexity it is not easily accomplished. Words as "ubiquitous", "pervasive", "connected" and "intelligent" all signal future possibilities and something worth waiting for. Or, is it just more gadgets, appliances and terminals that don't connect over the same network and just create more stress and frustration?

I. This is maybe not what we want our future walls to look like. Example from kitchen wall of the Sensor house in Osaka. (Photo Anna Hrdlicka)

To get a picture of how the "biggies" think and act the group visited **Panasonic Centre**[18]. The show case opened in September 2002 with a mission to *realize the ubiquitous network society*" and to *live in harmony with global environment*.

This was a visit that made an impression not only by the number of high-ranking managers who welcomed us, and took part in the discussions asking questions on use and usage. But also by the way the future was exhibited. The theme of the exhibition is; "from micro-electronics to nano-electronics, the age of information exchange" or "from industrialisation to the age of information exchange" and refer to different stages of technology development and diffusion. The exhibit contain four different zones displaying concepts and real products:

[17] This motto has been used before and will probably be used again.

[18] June 11th. Mr Kenya Harada, Director, Mr Daisaku Komiya, Engineer, Mr Hideyuki Taki, Assistant Manager Market Development Team, Mr Sean Umezawa, Manager Corporate International Affairs Group, Mr Henry Matsumoto, Leader Planning and Management Office, Ms Nobuko Kanemori, Coordinator, Corporate International Affairs Group.
More on Panasonic; www.panasonic-center.com

The Future Zone (communication style 2010)

Tomorrow Zone (system solution, 2004-5)

Today Zone (content technology)

On time (content delivery)

We also had the opportunity to se the Future Life-style Lab where concepts of the near future home were displayed. It was interesting to se how "the future" was perceived in a home context with a focus on design rather than functionality – a room with a large screen where ONE person should surf and entertain himself. Alone! This room seemed to be a "male domain" and the rest of the family should interact around the kitchen table – the "living table" (correctly named "family peace") where information could be gathered and exchanged amongst family and friends with the help of smart agents. The concept built mostly on fixed screens, information exchange (the agents), and automation of household duties. The concept of making life easier and more pleasurable, again…

There seems to be, if not a gap then at least, a blank in the chain from designs to usage. Naturally, since the answers of tomorrow lay ahead of us. But, there is little focus on other groups than one defined "family". One thing is clear though the future is about communication and about exchanging information – at the same time as your house manages the boring duties of every day life.

J. Vacuum cleaning in the future? Please observe the suggested dress code. Panasonic Center. (Photo by Niklas Brunsberg and Per Thorselius)

The display at Panasonic, spanning the history, via the present to the, was impressive in terms of ideas, concepts and products and made an impact in the large number of different areas spanned by this company. But from the following round table discussion two questions remain: Do we know what will be demanded in the future and by which groups? And, how can we find out what problems to solve?[19]

Another visit where design and usability was in focus, was **Hitachi Design Centre**[20] where we had the opportunity to see, and test, concepts for new displays and terminals, both more conventional ways of solving problems emanating from man-machine interaction and more explorative ways of designing terminals where no keyboards or

[19] See also reports by Brunsberg-Thorselius, Hektor and Hunhammar.

[20] June 12th. Ms Yuuki Hara, Usability Design Group and Mr Keishi Muto, Designer. . *More on Hitachi;* http://www.hitachi.co.jp/Div/dc

touch screens where used. We also had the opportunity to see Hitachi's version of "a living table" using Radio Frequency (RF) tags to hold information.

Hitachi is one of the biggest electronics makers with over 300.000 employees worldwide and a product range spanning from mobile phones to elevator and trains. Hitachi has design offices at five locations, two in Japan and three abroad (San Diego, Milan and Singapore). Usability testing, however, is only available in the Japanese offices. The staff in the Tokyo office consisted of four people, which struck us as comparatively few.

The lab in Tokyo is fully equipped with cameras, mirror wall, sound system etc. Throughout the product development process, engineers and R&D staff are invited to watch (from the back room) users try out prototypes. The Design Center staff also work with a portable usability. There are four usability engineers employed and these work as consultants for R&D departments evaluating solutions and providing suggestions for improvement. Methods in use are:

- Opinion & Attitude (questionnaire, individual interview, group interview)
- Context of use (observation, contextual inquiry, ethnographic interview)
- User's cognitive process (task evaluation, cognitive modelling)

User interface is clearly the focus of most projects in the usability design group. But as we understood it not all products were tested in these labs. The labs represent a new way of thinking around these issues – a learning process that will probably take some time. The representatives from Hitachi told us that the back room so large because they wanted to invite the engineers to the testing room. This very pedagogic approach had proved successful and a lot of engineers have left the design office with a new view on usability.




K. Three different concepts for displays without keyboards. The Crystal Ball, the living table, the RF-tag on a plastic dolphin and the "bubble device" ((Photo Anna Hrdlicka – top two – and Niklas Brunsberg)

The staff also presented Hitachi's thoughts on New Human Interaction Design as focusing on:

- Ubiquitous (anywhere-WLAN, anytime-broadband, anybody-reasonable price, anything-connected)
- Flood of information – means longer user time
- Wider variety of user profile – easy use
- Wider variety of user purpose – not only efficiency, but also fun and relaxation

Generally the desired path for product design is to reach a high degree of both intuitiveness and fun to use for the user.[21] However, not all products went through usability testing, and usability testing was more a tool for early stages of the design process and in late stages of product testing on different customer groups. The staff at the Tokyo office had experienced specific problems in testing products on Japanese customers. They are too polite to say anything bad about the product, the panels in Italy and USA where much more straight forward in expressing their opinion!

During the study tour and visits to different showcases one thing was ever present – the small cleaning robots. The strong focus on robots in Japan took us to Kyoto and an interesting visiting at **ATR[22], Advanced Telecommunications Research Institute International** in Keihanna Science Center outside Kyoto. This is a research lab focussing its efforts at understanding the robot as a communication partner, a tool for social relationships, or for "life support" – a butler or a companion. Focus is on interaction and we were presented to two different robots, the cuddly little one-eyed robot *Mu-Social* that was talking to itself and the taller, smarter more communicative, *Robovie*.

L. This little guy in metal, Robovie, creates contact with Andrea Tegstam from the Swedish group. To the right Mu-Social (Photo Anna Hrdlicka)

Meeting this robot in the lab was interesting and "different". Robovie has the language of a five-year old and keep asking you questions. The Japanese speaking parts of our group said that it felt like talking to "somebody" not like talking to a machine. This was also something that was evident from the video clips shown to us. This was a robot that managed to touch people and make contact. This of course is necessary if robots should be able to take a place in our homes – a vision common in Japan.

The step from a small (rather stupid) cleaning robots[23], via robot pets (such as Aibo) some foresee a future where robots can help us with everything from clearing up areas from chemical vast to collecting the paper. Robots seem to be somewhat further away

[21] More on Hitachi, see Andrea Tegstam's report *Hitachi Design Center*

[22] June 13th. Dr Norihiro Ahita, Director. More on ATR; http://www.atr.co.jp

[23] We have seen similar development in Sweden, but not on the same scale. The lawn mower from Husqvarna powered by solar cells and the vacuum cleaner from Electrolux.

from our homes than just connected appliances. A question is if this robot friendly culture is something typical Japanese or if it can turn into a global trend[24].

To provide a stable environment that allows different appliances from different brands and makers to connect standard protocols are needed. A situation built on "plug-and-play" is what is desired, but much remains to be done. At **Toshiba**[25] we had a presentation on their work on network standards. The first statement by Toshiba was that the lack of standards is a hindrance for the home related market, it is not until we have standards that the technology can be used to full extent and the ubiquitous society can become a reality.

As observed by many others, broadband and PC will increase the use of technology in daily life in our homes, but the appliance makers have to agree on a standard for network communication, in order to develop all possibilities given by technology. Toshiba is one of the companies working on this at a national level in Japan, where some result is expected in 2005. Before that every alliance maker decides what technology to use to connect the appliances in our homes. The "standards" commonly used today are ECHONET[26] and PAN.

Toshiba's solution for a networked home is called "Trans Cube" and is a HNS – Home Network Station. This cube allows appliances to communicate and communicates with the world outside your home. Toshiba's motto is: anywhere, anytime and from any device". Toshiba, as others see the services connected to the home as a future income[27] – housekeeping, security, support, entertainment, shopping, all done through terminals and, ubiquitous solutions. This is the same kind of thinking as other companies, the difference being that Toshiba also presenting their focus group; elderly and women – the project is called *Feminity*, a project aiming at delivering services for women / house makers.

The presentation at Toshiba underlines what was said at IFTECH, that common standard decides how fast and how far the development can go. The visit was also focusing the problems and obstacles that need to be overcome.[28]

Who is creating our future? - Reflections

A feeling still remaining after these visits was that much is given by technical limitation and that there still remains much to be done in understanding the user – the people living at home – and the usage of products at home. Visions of home network and

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[24] More on robots?! See www.robodex.org where you also can read about the 50th anniversary of Astroboy, a Japanese robot boy (Manga) idol of many a Japanese engineer!

[25] June 12th. Mr Kosei Okamoto, Technology Executive and Dr Maasao Isshiki, Chief Specialist.

[26] "The ECHONET Consortium was inaugurated in 1997 to shape an affluent society in the 21st century that was compatible with both the human being and the environment.
The ECHONET Consortium has since developed key software and hardware to support a home network that is committed to energy conservation, boosting security, enhancing home health care, etc. The network we develop uses power lines, radio frequency and infrared to provide a low-cost implementation of data transmission without requiring additional wiring.
The consortium plans a validation test to evaluate the validity of the systems and software developed and to drive publicity in and outside Japan. It also expects to stage efforts to enhance security, strengthen interworking with the Internet, and develop new application middleware."
Souce; Echonet homepage. For further information please see:
http://www.echonet.gr.jp/english/index.htm

[27] Similar concepts were discussed in Sweden in the late 1990's. Instead of selling a refrigerator the concept of keeping your food cool should be emphasised.

[28] Please see Anders Johansson *Toshibas huvudkontor, Tokyo (in Swedish) and* Niklas Brunsberg & Per Thorselius *Resebeskrivning Connected Home, En delegation I framtidens boende.* (In Swedish)

networked homes offering added service in different forms is still a reflection of a strong technology focus – the result of technology experts leading the way into new markets with little focus on other than “possibilities”.



M. Concepts from Panasonic; the integrated fridge / micro wave etc; induction heating; dinig table with integrated terminals. (Photo Per Thorselius & Niklas Brunsberg).

Another observation is that a lot (most) of the concepts presented, as “the homes of the future” are showcases, aiming at inspiring. It turns out that many of these show cases are produced by advertising or design firms – all in order to attract interest from customers, but with little bearing on societal change and future challenges.

Although the presentations of future technology were impressive, many of the concepts has been presented before, i.e. the “living tables” that were presented by Panasonic and Hitachi has been presented in similar settings by Swedish Telia, Philips Electronics, MIT and others. Although in these versions the functionality of RF-tags had been added.

It seems ideas travel around the globe and leaves us with one question: who is presenting the visions for our future home? The researchers? The advertising firms? The designers? The Science Fiction authors? Where is the user in this process? The discussion focus much on user interfaces and there seem to be some agreement on the need for many different devices – even if the multi-remote-control-communicator device is still a secret dream for some.

N. Astro Boy – inspiration to many Japanese engineers, and Carl Larsson inspiration to many Swedes. (source Robodex)

There is a need to create visions and pictures – otherwise the message of technology as an aid can not come across, but there is also an important task of understanding and interpreting user needs, focussing on solving “real problems” or creating new opportunities. This might be the first step towards products and services that are accepted and widely used.

But designing the future of housing and technology do not only raises demands on technology but also on the design of housing. One thought about this is that new ways of dealing with the needs in housing, the use of technology and the conceptualisation of housing itself might demand new ways of designing homes. Maybe a future need will be a room completely free from all technology. A refuge.

Communications Market

Ms Kazuko Katase at IFTECH gave a presentation on the communications market concerning broadband in Japan. Today Japan has between 30 and 40 million "broadband-users". Most of these are connected via ADSL since this is a simpler and, cheaper way to obtain broadband connectivity[29]. Even though ADSL does not offer the same bandwidth, customers are satisfied with the solution (1MB).

Concerning pricing the ADSL and fibre / Ethernet are almost equal because of modems and monthly fee, but the main advantage for ADSL is that there is no need to install that solution for a whole house. Another problem is that the willingness to pay for this fixed access is limited. Many people, especially the younger generation use their mobile phone for surfing and email. Anywhere, any time…

Ms Katase thinks that the fixed access solutions via fibre will be adopted in privately rented apartments first and then as any other infrastructure that "SHOULD" be included. The point being, that the opportunity or the landlord to offer added service to his tenants. On such being safety and security – for elderly.

This picture is confirmed by **Jupiter Telecommunications**[30] (**J-Com**) in Tokyo. J-Com are working the market for fixed broadband access and focussing mainly on cluster (urban) areas to gain benefits of scale. Initially cable-TV and IP-telephony[31] was offered, but today "*high speed connectivity"* and "*always-on"* are still killer applications.

J-Com believes that packaging will be the key to success and their focus is on families. The whole family should benefit from using the net. However, it seems like "Quality of Life", as a concept, not necessarily are connected with your home. Instead people seem to spend more time away from home – using their mobiles. Depending on life style, stage of life and other factors.

Another problem with the Internet is the assumption that anything that is "out there" is free. That makes it much more difficult to get paid for the extra functionality or services. Again, packaging or bundling might be a key to success, focussing on segments as the elderly. In 20 years from now we will look back and realise that we, today, ask ourselves similar questions that we did 20 years ago when cable-TV was new:

Will anybody be willing to pay extra for cable-TV?

How does all this fit together? The future seems to be more questions than answers and much rely on the prerequisites of each country – Sweden: "Hem-PC", Japan: DoCoMo. To understand the situation in Japan, Sabine Ehlers from ITPS gave the he group an extensive summary of the Japanese mobile[32].

The "trillion dollar question", according to Sabine Ehlers, is how to solve the limitations of the terminals, how to overcome the limitations set by the use of keyboards. That would open the market, and create opportunities in reaching people that today refrain from using "complicated" technology. User friendliness is one key. But that is not enough. Change takes time and in Japan the state is protecting new markets because it takes time to "educate" both developers and consumers in understanding the benefits of new technology – this is a learning, or educational process.

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[29] According to Ms Katase only "few" are connected via fiber or ethernet soultions, but according to other figures up till 9 million people should have access via fiber and CAT 5 or higher.

[30] June 16th. Mr David Harrison, Vice President and Engineering Advisor, Mr Akihiro Furukawa, Assistant Vice President, Mr Brad Gunn, Marketing and Sales Advisor, and Mr Kunimasa Takahashi, Product Manager. More on J-Com; http://www.jcom.co.jp

[31] J-com believes that primary line telephony via FTTH will be realised in 2005.

[32] June 9th Sabine Ehlers, Technical Attaché IT & Telecom, Swedish Embassy. More on IT in Japan; http://www.itjapan.se

The co-operation between operators, appliance makers and content-providers are tight. This creates a simple business model that gives all involved parties an opportunity to earn money on their investment. Compared to this Swedish / European business models are very complicated and do not allow easy solutions between the involved parties. Therefore, simple business models keep the cost low for the consumer, and also keep the cost of development on a lower level.

Success factors are; understanding the market; realising what consumers long for and need or educating them to need something. In Japan the market is consumer oriented and technology is marketed as "fun". It is fun to be able to send video clips to your friends, this maybe because in Japan you pay for your own mobile bill. In Europe technology is marketed as something "business" and very exclusive – it is important to be able to connect to work anywhere. This may be explained by the fact that your mobile bill is paid by your employer.

Another success factor is also to understand the slowness of the market. Introducing technology is a process of evolution, not a revolution[33]! The development is built on functionality. The development is about communication. People's need to communicate with family and friends – peer to peer communication is according to Ehlers a winning concept. But, to reach as many as possible this demands simpler user interfaces.

A fact pointed out by Ehlers and others is that elderly is a "forgotten group", but they will be a substantial group – a market segment. Another to-be killer application might be storage! We will see a development where the number of video clips, text messages, pictures and music start to flow there will be increasing. There will be a need to store this material that does not easily fit into boxes and cupboards. The demand for fixed connection will also increase when people need to manage their stored video clips and photos received via the mobile.

As for developing appliances for the home the slogan from NTT DoCoMo touches the same values; "Making life work. Making life richer!" Technology has the ability to change people's lives. That is a selling point in Japan![34]

National efforts

In Japan the government, and the companies seem to have realised the need to support development in order to increase growth in the Japanese IT and Electronics industry. Therefore, national efforts are taken to insure that development. This is done both by governmental effort such as E-Japan, the work of IFTECH and by associations lobbying for their specific interests towards both the government and the consumers. Please, see below for a brief description of three different initiatives.

E-Japan

During the tour we often came across the strategy "e-Japan" and were told that this strategy is to promote the building of digital infrastructure and services in Japan. In a way a Japanese version (larger scale) of the Swedish strategy "24h-government" (24-timmarsmyndigheten or maybe Näringsdepartementets IT-delegation) but more focused on creating an IT-society focusing on the many different areas where IT can be used.

The Japanese government has launched e-Japan in order to promote research and development in how to make Japan a leading nation in terms of making use of IT in everyday life. This plan has come to its second phase and the second step of the e-Japan strategy is now being implemented.

[33] Compare this to the marketing of 3G in Sweden.

[34] NTT DoCoMo has a video on their home page, a vision for 2010 – worth watching. Please see www.ntt.docomo.com/home.html and click your way to "Vision 2010".

The objective of this strategy is to make Japan the worlds most advanced IT nation by 2005 by making effective use of the broadband infrastructure technology and internet infrastructure already put in place. The Japanese government want Japan to be an IT-oriented society – a society where the advantages of IT is available for all.

For the second version "e-Japan" seven key areas has been identified; *medical treatment, food, living, finance for small and medium sized enterprise, knowledge, employment and government services*. At least four of these areas touch upon the home. [35]

By promoting these areas and by promoting these specific areas the goal is to quicken the "e-development" and the making use of IT in society as a whole. There is also a strong focus on preventing digital divide and on services or content.

This programme supports different initiatives to implement IT in homes, one being making use of IT in Roppongi Hills Residence. However, results form the projects have to be presented openly so that others can use the experiences made.

JEITA

This association; Japans Electronics and IT industry Association[36] is working actively to promote the use of IT and electronics in all sectors of society. It also works actively to promote diffusion of new technology in new fields – i.e. the home. JEITA actively makes proposals on industry policies to the Japanese government in order to ensure that technology is taken into account. JEITA's mission is "to foster a digital network society for the 21st century in which IT advancement brings fulfilment and a higher quality of life to everyone".

JEITA made a presentation to the group at the Swedish Embassy on their work on housing, a work that mainly focuses on the possibilities created by technology. The impression is that they have a strong focus on technology itself but also on environmental issues such as environmental friendly ways of heating.

One such environmental friendly effort was the interest in photovoltaic (solar panels) that would be a small-scale power source that could be spread on "micro level". Other functions in the JEITA-model house was rain sensors that activated the laundry to be taken in automatically, a dog feeding machine that allowed you to leave your dog for a week and the ordinary "connected homes appliances". This project is also driven by technical possibilities, but JIETA has the ambition to understand the user. The next step them are to build an IT-town for 20.000 inhabitants[37].

Alice Forum

Realising the need for convergence and joint efforts in creating a sustainable IT infrastructure in the homes / buildings, and promoting industry standards a forum has been created to gather different interest groups around the home and housing. The Forum for Agreeable Living with Intelligence, Communication and Electronics – ALICE Forum[38] – was created with representatives from the building industry, the electronics

[35] Asia Pacific Perspectives September 2003, Volume1, Number 5, pg. 34

[36] June 9th. Mr Yoshinori Sugihara, General Manager, Special Project Promotion Office. More on JEITA http://www.jeita.com/top.html

[37] Compare Svenska Bostäder in Vällingby Stockholm that has been working in this direction for 10 years.

[38] Mr Yasukazu Terada, Research Director, National, Mr Yasuhiro Takaoka, General Manager, Panasonic, Mr Kazuyuki Yamamoto, Corporate R&D Planning Office, National, Mr Kyoko Fukushima, Research Institute of Human Engineering for Quality of Life, Mr Tokuda, Smart Life Research Group, Mr Hiroshi Umeyama, ALICE Forum, Mr Goto, ALICE Forum, Mr Koji Miyoshi, ALICE Forum, Mr Sakaki, ALICE Forum, and Mr Jun Kato, Mitsui Real Estate Co. Ltd.

industry, and fields of connectivity, quality of life, etc. Representatives from different ministries are co-operating with ALICE Forum; the Ministry of Telecommunications, the Ministry for Trade and Industry and the Ministry of Construction.[39]

This forum has actively promoted the building of IT-infrastructure to peoples homes issuing certificates on broadband installations and writing books on how to obtain broadband in a rented or owned apartment. But, ALICE Forum are also dealing with the problems of technology companies wanting to sell as much equipment and high-end solutions as possible whereas the builders want to get away as cheap as possible – is there a middle road?

Now the forum is focusing on issues of the ageing society, life style and home automation. The focus is on usage. How IT should be used in the home and in the homes of the information society – in the words of the forum "Utilisation at home". Alice forum plans to do research on how different life styles will change according to the use of IT at home. The forum also conducts surveys on broadband-users trying to catch the needs of the future consumers.

ALICE Forum points at the fact that the user is not in focus for the current development, something they feel must come across to the government in order to direct efforts for future development. They also point at the importance of standards for connecting home appliances and the eternal question of *ho-mu-ta-mi-na-ru*, the home terminal. What will it be?

The initiative to create a forum like ALICE seems to be a good investment in the future – this especially by creating an opportunity for different stake holders in housing, building and technology to share views on problems and opportunities in our future living.

Information on ALICE Forum is only available in Japanese. http://www.alice-f-or.jp

[39] The Forum also cooperates with The Centre for Better Living – a part of Urban Development Corporation.

Expected, unexpected and, ”take out”

We travel and we tell our friends about new won experiences and impressions and occurrences. We travel with our expectations and experiences. Some expectations might be fulfilled others not. We, may be surprised and enchanted, something may trigger thoughts.

This group went to Japan to study “the future of housing and technology”. We spanned a broad spectrum, we can probably call the group multidisciplinary but with the same focus: HOUSING! Reflecting interests from architecture to usability, from business models to photovoltaic, from handicapped to lifestyle issues and trends this section summarises some the impressions in the words of different group members.

Expected

Our picture of Japan as being efficient society, friendly, and with a very strong electronics industry was commonly shared in the group. Our backgrounds and experiences of Japan, differed, and our focus of what caught our interest as well.

One thing that was expected was the culture of businessmen and few women visible in development. We met women at three places; Nippori Community House – where the leading architect was woman, at Hitachi – a female psychologist leading the usability lab, and at the Institute for Future Technology – one of the researchers. At the other visits we were usually met by men, engineers, and with a strong technology focus. One cannot help reflecting that this might affect the focus of the different projects.

Another observation concerns standards. It has been stated in the report and was not a surprise – the problem of lack of standards and the emergence of de facto standards seem to be global.

> *In the uncoordinated race of electronic makers, parallel tracks are taken towards similar goals. One example is home network systems. Standardisation takes time in Japan. Hopefully this will change in order for consumers to use appliances from different makers in the same system.*
>
> *Andrea Tegstam*

The search for usefulness or the possibilities given by technology is another global issue. As long as the solutions and applications lack connection to “the real world” they will have a problem being accepted as useful.

> *My observation is that a lot of new technology has not yet found any “useful application” in the home environment. The “break trough” will probably come in new unexpected applications – not the beer and rice ordering fridge and extended use of existing solutions/appliances/installations.*
>
> *Kerstin Kärnekull*

Japan’s drive to promote technology was expected by many. The efficiency in developing and promoting new solutions, and the realisation that new business and new application areas, need time to develop – and probably also subsidies.

> *I reflected on the co-operation between the State and the Industry. For me this is an expression of the “Japanese way“ where the State “tell” the companies what to do. A combination of capitalism and central planning that seems to live on in Japan.*

Claes Tjäder

We experienced this everywhere, the mobile phones – used more for surfing and messaging rather than talking and the way people personalised their phones. Even if some of the group were prepared for this the feeling was overwhelming. The fact that the PC does not have a strong position in Japanese home was an eye-opener. Obviously, the offered services differ from fixed access via PC to mobile. Or do they?

> *The strong position of the mobile terminal (mobile phone), and that the mobile phone was used for surfing to a much greater extent than in Sweden or Euroupe*
>
> *Per Thorselius*

O. During the week we saw mobile phones being used; anywhere, anytime…(Photo Anna Hrdlicka)

It has been said over and over again; Playfulness! But, how strong is the cultural factor? Will Swedish business people adopt a design trend with cuddly little phones in yellow and pink with small kittens on it?

> *The Japanese approach to playfulness and all the new technologies and appliances offered on the market.*
>
> *Niklas Brunsberg*

Given the cultural differences the approach might not work all the way in Sweden, but some aspects of it, maybe… It might be worthwhile to study differences in how new technology is advertised; as the new technical miracle with specified number of serial and USB-ports, processors and RAM, or something that can help and entertain you.

And last a reflection that put emphasis on the demands of a future “mega” urbanised society, where technology really is everywhere and always on.

> *Tokyo is urbanisation taken to its extreme in my impression. There seems to be a visible connection between the vision of future cities in*

science fiction related books and movies, where technology seems to be an integrated and "natural" part of every day life.

Linda Bradley

Or is this just in our imagination?

Unexpected

Japan is in recession, unemployment is increasing and the financial sector is struggling. But still there were building activities going on in many places – maybe because these projects have been started before the recession set in. However the size and scope of the projects are impressive.

That Japan and Japanese companies during recession still spend so much money on "urban living" and building, i.e. Roppongi Hills.

Andrea Tegstam

It seems like the Japanese industry have seen the opportunities in home-related issues and home related technology. Obviously the connected home seem to be "re born" and the focus makes Japanese industry work hard to create attractive solutions.

The thoroughness in the procedure of understanding needs and use of technology, i.e. in studying robots they started out with studies of interaction (man-machine). Another example is the Sensor House in Osaka attempting to survey and understand "normal human behaviour". It was also unexpected that they wanted to create within the usability sector.

Claes Tjäder

User orientation is in focus but not prioritised, not in every product. We met people saying, "we make usability testing on things that need to be tested", but we never got a clear picture of the criteria that decided the need to do usability testing.

It was unexpected that Japan, despite its position on the world market, had not come as far as I had expected in the area of user orientation in the development processes.

Niklas Brunsberg

In Japan the companies are not that good at producing user oriented services, with the one paradox – mobile services.

Anders Hektor

The playfulness, exceeding our wildest expectations! But the low PC penetration surprised us, especially on the public sector side – one PC in every five employees.

The low penetration of PC at home was surprising. I knew from before that the Japanese had a strong focus on playfulness. Nevertheless, the scope exceeded my expectations and the total focus on entertainment.

Per Thorselius

"Japanese take out"

What will we take home from this study tour?

The playfulness! Sweden has a lot to learn from the Japanese approach concerning playfulness and energy driving the product development in Japan. The way to present new technology where the focus is not on the complicated technology itself, but the joy of using this gadget. (Vs. the European approach where technology is centred.

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Let us make a significant imprint in the field of housing and technology! It might be worthwhile the effort pursuiting the vision of our future homes, or rather the goal of developing applications and appliances for our homes – with our without visible technology.

P. The good bye from Panasonic! (Photo Anders Johansson)

The participants

The participants were in alphabetical order:

name	organisation	e-mail & web
Linda Bradley	Soul Business Innovation AB	linda.bradley@soul.se www.soul.se
Niklas Brunsberg	Student Uppsala University	Niklas.brunsberg.00999@student.uu.se
Anna Green	Tema T, Linköping University	anngr@tema.liu.se www.tema.liu.se
Anders Hektor	Nationellt IT Användarinstitut NITA	anders.hektor@nita.se
Anna Hrdlicka	Institute for Futures Studies	anna.hrdlicka@framtidsstudier.se www.framtidsstudier.se
Magnus Hunhammar	Royal Institute of Technology	Magnus.hunhammar@home.se
Anders Johansson	SABO	anders.johansson@sabo.se www.sabo.se
Kerstin Kärnekull	BFAB	kek@bfab.se
Andrea Tegstam	Interactive Institute, Trend Studio Åre	andrea.tegstam@tii.se www.interactiveinstitute.se
Per Thorselius	Student, Uppsala University	Per.thorselius.5501@studnet.uu.se
Claes Tjäder	Swedish Handicap Institute	claes.tjader@hi.se www.hi.se

The schedule

The schedule consists of two parts. The first five days were for the whole group. The additional visits the 16th and 17th were conducted by Linda Bradley and Anna Hrdlicka.

	AM	PM
Monday 9 **Tokyo**	Briefing for the program at club room of the **Swedish embassy**	**Workshop**[40] **and** mingling with Swedish foods at Club room of the Embassy, (participants from Waseda University, Hakuhodo, JEITA, Sanyo and IFTECH)
Tuesday 10 **Tokyo**	09.30-12:00 **The Institute for Future Technology**	14:00 – 16:00 Tachikawa, Tokyo **Sanyo Homes**. IT model house tour guided by engineers, and Q&A. Tachikawa, Tokyo.
Wednesday 11 **Tokyo**	09:30 – 12:00 **Community House**, Kankanmori	14:00 – 16:00 Odaiba, Tokyo **Panasonic Center** (Future view showcase)
Thursday 12 **Tokyo**	09:30 – 12:00 Kokubunji, Tokyo **Hitachi Design Center**	14:00-16:30 Hamamatsucho, Tokyo **Toshiba**, Information home appliance
Friday 13 **Osaka** **Kyoto**	09:30 – 12:00, Osaka **Sensor House, Human Stress Signal Research Center** National Institute of Advanced Industrial Science and Technology	14:30 – 16:30, Kyoto **ATR Intelligent Robotics and Communication Laboratories** ATR in Kyoto (Futuristic study)
Monday 16[41] **Tokyo**	10:30 – 12:00, Toshima-ku, Tokyo **Jupiter Telecommunications**	14:00 – 16:00, Roppongi, Tokyo **Mori Building** Roppongi Hills
Tuesday 17 **Tokyo**		13:00 – 15:00, Chioda-ku, Tokyo

[40] The workshop was visited by Dr Mariko Fujiwara and Mr Kazuhiko Washio from Hakuhodo Institute for Life and Living www.hakuhodo.co.jp, Prof. Hiroko Kudo from Waseda University, Ms Katase and Mr Takashi Kikuta from IFTECH, Mr Sugihara from JEITA, Sabine Ehlers and Shigeyuki Naito from the Swedish Embassy.

[41] The visits at Monday 16th and Tuesday 17th were conducted by Linda Bradley; Anna Green (just Mori Building) and Anna Hrdlicka.

		ALICE Forum Industry association for promoting broadband to the home

Former working papers:

- **Arbetsrapport/Institutet för Framtidsstudier; 2000:1**
  Malmberg, Bo & Lena Sommestad. *Heavy trends in global developments. Idea platform for MISTRA's future strategy.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2000:2**
  Malmberg, Bo & Lena Sommestad. *Tunga trender i den globala utvecklingen.* Uppdrag för Stiftelsen för Miljöstrategisk forskning (MISTRA).
- **Arbetsrapport/Institutet för Framtidsstudier; 2000:3**
  Lee, Ronald, Mason, Andrew & Timothy Miller. *From Transfers to Individual Responsibility: Implications for Savings and Capital Accumulation in Taiwan and the United States.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2000:4**
  Mayer, David. *On the Role of Health in the Economic and Demographic Dynamics of Brazil, 1980-1995.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2000:5**
  Galor, Oded & Omer Moav. *Natural Selection and the Origin of Economic Growth.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2000:6**
  Malmberg, Bo & Lena Sommestad. *Four Phases in the Demographic Transition, Implications for Economic and Social Development in Sweden, 1820-2000.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2001:1**
  Lagerlöf, Nils-Petter. *From Malthus to Modern Growth: Can Epidemics Explain the Three Regimes?*
- **Arbetsrapport/Institutet för Framtidsstudier; 2001:2**
  Sommestad, Lena. *Education and Research in Times of Population Ageing.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2001:3**
  Sommestad, Lena. *Health and Wealth: The Contribution of Welfare State Policies to Economic Growth.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2001:4**
  Westholm, Erik. *Det utmanade lokalsamhället.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2001:5**
  Westholm, Erik. *Challenges for the Local Communities.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2001:6**
  Sommestad, Lena i samarbete med Bo Malmberg. *Demografi och politisk kultur. Ett ekonomiskt-historiskt perspektiv på "den starka statens fall".*
- **Arbetsrapport/Institutet för Framtidsstudier; 2002:1**
  Lundqvist, Torbjörn. *Arbetskraft och konkurrensbegränsning: aktörsperspektiv på den svenska modellen och framtiden.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2002:2**
  Simon, Paul. *Demography and Finance – Finance and Growth.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2002:3**
  Lundqvist, Torbjörn. *Den starka alkoholstatens fall.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2002:4**
  Olsson, Stefan. *Vad är nytt under solen? Om problemet med att veta vad som är nytt i historien och samhället.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2002:5**
  Andersson, Jenny. *Alva's Futures Ideas in the construction of Swedish Futures Studies.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2002:6**
  Essén, Anna. *Svensk invandring och arbetsmarknaden. Återblick och nuläge.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2002:7**
  Barnekow, Erik. *Demografi och finansmarknad – en översikt av empirisk forskning.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2002:8**
  Karlström, Anders, Palme, Mårten och Ingemar Svensson. *The Timing of Retirement and Social Security Reforms: Measuring Individual Welfare Changes.*
- **Arbetsrapport/Institutet för Framtidsstudier; 2002:9**
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