

SMART HOME

Digital Planet: how digital technology is changing the world



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Telephone

“An amazing invention - but who would ever want to use one?”

RUTHERFORD B. HAYES , 1877

Computers

“I think there is a world market for about five computers“

THOMAS J. WATSON, 1943

Television

“[...] won't be able to hold on to any market it captures after the first six months. People will soon get tired of staring at a plywood box every night.“

DARRYL ZANUCK, 1946

Computers

“[...] in the future may weigh no more than 1.5 tons”

POPULAR MACHINES MAGAZINE, 1949

Satellites

“There is no chance communications space satellites will be used to provide better telephone, telegraph, television, or radio service inside the United States.“

FCC ENGINEER T.A.M. CRAVEN, 1961

Telephone

“Transmission of documents via telephone wires is possible in principle, but the apparatus required is so expensive that it will never become a practical proposition.”

DENNIS GABOR, 1962

PREFACE

A short story about Jane's day in a smart home

The alarm bell rings. The roller blinds open. Her bed gently places her in a comfortable sitting position. The room becomes illuminated. Jane walks to the bathroom and uses the smart toilet, which analyses her urine. The display shows: "Urine ok but you put on weight!" Then the toilet helps her to stand up. As she enters the bathroom, the shower adjusts to her favourite temperature.

Jane's smart home is equipped with RFIDs. Readers are placed in all rooms, door frames, the stairwell and the refrigerator. Identifying data in microchip tags sewn into Jane's clothes and embedded in the packaging of foods are detected. The data is sent to Jane's computer, which takes action based on that information. A wrist band can determine her location and movements. All the collected measuring data from all the sensors determine special patterns of behaviour and daily routines. Sudden changes are recognized as an indicator for an illness or that something has happened. If required a doctor or contact person is alarmed.

It is time for Breakfast. A (Multi-function display (MFD) as well as Jane's mirror reminds her to take any required medication. The coffee is already done when she arrives in the kitchen and the toaster is warm. A sensor on the medicine box notices the removal of any medication. Marmalade taken out of the fridge is noticed by the RFID Tag. She opens the refrigerator and is reminded by the appliance that she is out of milk and that the tub of coleslaw inside had passed its expiration date

and should be thrown out. After Breakfast, Jane is automatically informed by voice message that her son has tried to call her while she was sleeping and left a video message which Jane watches immediately.

It's time for the Gym and her personalised training video. A Balance Board and intelligent dumbbells help her. Carpets have the capability to notice a fall and immediately alarm the doctor or the contact person. As usual, her physiotherapist calls her via video call to talk about her progresses and plan the training for next week.

Jane is interrupted watching her favourite cooking show, by a television call. No problem. The show will be automatically taped by time shift. She will continue watching the show after the call. While sitting on the couch, windows and doors can be open and closed with a remote control. Kitchen cupboards and bookshelves are movable and can shuttle if necessary. Jane decides to cook this recipe shown in the show. With the push of a button, she orders the required ingredients. She has thirty minutes to find her purse before the delivery service arrives with her groceries. Thirty minutes is not necessary. The MFD will help her. With touch screen, she touches the icon for purse. The position of the purse is shown. Collecting the purse signals that the search has ended.

While cooking, the doorbell rings. She can see via MFD that her friend is in front of the door but as the stove is on, she can not walk to the door. She says

hello by intercom and pushes the icon to open the door. They plan to meet after lunch. After lunch, Jane leaves the house to meet her friend. By closing the door, the stove and lights turn off automatically if they were left on unwantedly. At the same time all doors and windows are automatically closed and locked. The door closes only if Jane has the key with her, which is noticed by the sensor on her wristband and on the key.

After arriving back home, the lights switch on automatically. Jane has dinner. Afterwards she meets some other friends online via video call to play cards. On the way to bed, Jane becomes dizzy and she falls. The wristband, as well as the carpet, notice the fall and alarm the service point and they inform the doctor and her daughter. This type of alarm allows access to the house for her doctor and daughter. Information about Jane's condition is sent to the doctor.

Once Jane is ok, the doctor and her daughter leave. Jane goes to bed. She pushes the button which switches off all the lights in the house. Another button changes the atmosphere of the room. The bed gently swings until Jane falls asleep. A walk to the toilet during the night is no problem for Jane. The light switches on automatically on the whole way to the bathroom, and also switches off automatically a while later.

Digital technology is changing the world!

SMART HOME

Digital Planet: how digital technology is changing the world



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1 INTRODUCTION

What does ist mean, what is it good for?

A smart home is an accommodation with highly advanced automatic systems for many functions such as multi-media lighting, security, temperature control, window and door operations. It appears „intelligent“ because so many aspects of a daily living can be monitored. One Part of smart home is the “Ambient Assisted Living“ (AAL). These are concepts to increase life quality in all phases of life for disabled or elderly people.

Will smart home be tomorrow’s lifestyle? smart home means the development and evaluation of an intelligent interaction concept for innovative building automation with the aim to create a user-friendly environment. It is focused on controlling and visualising the energy-consumption. The target group of smart home are for private persons, nursing homes or even companies. For instance, refrigerators will be able to record its contents and order groceries, suggest menus and recommend healthy alternatives, water the plants and take care of cleaning the cat’s box.

The Article „The Computer for the 21st Century“ was published in the Scientific American by Mark Weiser in 1991 in which he introduced the express „Ubiquitous Computing“ and „Disappearing Computing“. The technology supports humans with their work to make their life more comfortable and easier. “In the 21st century the technology revolution will move into the everyday, the small and invisible.”¹ Mark Weiser expects computers to lose their importance, being replaced by intelligent devises. He continues: “My colleagues and I at PARC believe that what we call ubiquitous computing will gradually emerge as the dominant mode of computer access over the next twenty years.” Now, twenty years after the article, in many devises, computers are embedded and do their job. But devices are not all networked yet.

Thirteen years ago, in another article for the magazine Scientific American, Mark Weiser believed that “small computers would be embedded in everyday objects all around us and, using wireless connections, would respond to our presence, desires and needs without being actively manipulated. This network of mobile and fixed devices would do things for us automatically and so invisibly that we would notice only their effects.” Those technologies would make it easier for us to focus on our work and other activities, instead of demanding that we interact with and control them, as the typical PC does today. Today systems based on radio-frequency identification (RFID) technology are already in limited use. These are systems consisting of silicon chips to identify devices that transmit information and of readers that obtain and interpret that data automatically.

Intelligent living sounds like a vision of the future, but already exists. The Idea “SmartHome” already existed in the 80s. The innovation mainly comes from the IT-Sector. The Xanadu

¹ Mark Weiser (1991), Scientific American

1 INTRODUCTION

What does it mean, what is it good for?

houses in Kissimmee Florida, already showed visions of the future, where computers play an important role. In 2005 the idea of the intelligent toilet was already published in the movie „The Island“, a Science Fiction film by Michael Bay. A man wakes up in the morning and uses the intelligent toilet. The toilet analyses his urine. A computer voice informs him about his health status, tells him that sodium excess was detected and advises a nutrition control. The message has already been sent to the canteen with a diet recommendation.

In the future, elderly people shall be able to live in their own homes independently. The ideal image of life in seniority is an independent life in the familiar social environment. People are assisted with tasks that cannot be overwhelmed anymore. This mediates the feeling of being secure. Routines and requirements of the users as well as their daily schedules are reviewed. Smart home techniques must be suitable for daily use.



Image 1: Example of a smart home.

2 PRODUCTS

The array of products around smart home technology

Key aspects of the intelligent living in smart homes are networking and integration of different techniques and systems to increase comfort, flexibility, security, cost effectiveness, energy efficiency and protection of the environment. It includes energy-management, information technology, telecommunication, security, entertainment, control of house and light, house equipment and medical care. The System also reacts to changes in the requirements. The networking of the technique helps to use energy resources available in the environment and controls if windows and doors are closed. If a window is open, the system informs the heating, air-conditioning and alarm system. If nobody is at home, temperatures are reduced and the illumination in the house is controlled according to the needs. Annoying routine work in the house is taken away by the intelligent networked house. Amongst others, video calls, automatical shopping lists and telecommunicated medical care are part of the standard equipment. A multifunctional display enables the person to control the entire electrical appliance.

RFID tags and readers are orientation-dependent. Therefore tags must be located properly, relative to readers so that the antenna can exchange signals. For the RFID technology an electronic circuit in an empowered tag can be powered from a distance by a reader device that broadcasts energy to it. Manufacturers start to incorporate useful data beyond a mere ID code. In some cars there are tags with sensors assessing tyre pressure and temperature while a vehicle is in motion. Each transaction between reader and tag can record all information for example the time, date and identity of whoever accessed the tag. An audit trail in a tag of a car can be created to indicate where it was manufactured and to record each time it was sold, its previous owners, its service history and its accidents.

The installation of the System is straightforward and easy to use. No special know-how is necessary for the installation. The information of all devices in the house which are integrated in the system can be accessed at home or on the way with Internet using a smartphone or a computer. No wires are necessary. The switches can be adapted to the personal needs. Any single device possessing a plug can be integrated into the house automation. For instance illumination, hi-fi equipment or a television can become part of the system. Each of the integrated devices can be monitored at home or away. If necessary, devices can be switched on or off. The heater, illumination in different rooms, coffee machine, or the radio can be switched on or off by remote control if they are connected to the adapter. Personal profiles can be created per button on the remote control. All electrical devices can be regulated with the broadcast station. Only one touch is enough to switch off all devices if necessary.

2 PRODUCTS

The array of products around smart home technology

In emergencies not only the resident must be able to give alarm but also the AAL-System, in case the resident fallen over is not able anymore. The AAL-System also must be able to recognize the severity of the emergency to set the correct alarm in its graded alarm System.

The control centre communicates with all devices, integrated into the system. Once an instruction is given via a remote control, wall broadcast station, smartphone or internet the control centre puts the instruction through to the Device. The central computer could maintain constant conditions by readers monitoring sensor tags which indicate the temperature in different rooms.

For the Heating control with energy-saving capability a profile can be created telling the Heating control when to heat and when energy can be saved. For example if a profile is set, but the user comes home earlier today, the heater can be switched on, on the way home. This increases the living comfort and saves energy as the heating doesn't have unwanted Stand-By usage.

The Radio system smoke alarm ensures a higher security standard in the house as it starts in the earliest state of smoke development. As all the smoke alarms are able to communicate, the smoke alarm in all rooms e.g. the living room, will be turned on, even if the smoke developed in the basement.

Intelligent networking with the door- and window sensor enables user every time on the way to check if doors and windows are closed as a protection against burglary. Energy can be saved as well. The sensor notices by magnetic contacts whether the door or window is closed. The sensor can also communicate with other devices. The heating cools down after opening the window and reheats after the window is closed.

The Radio system motion sensor notices movements. For example on the corridor the light turns on as soon as the presence of a person is sensed. This makes the walk to the toilet at night easier. The motion sensor can not only communicate with the illumination system but also for example with a coffee machine.

The user can decide which temperature is desirable for each room, for example a colder temperature in the sleeping room and a warmer temperature in the living room. The heating system can be controlled by remote control or can be run automatically. The room thermostat can be combined with the heater thermostat, radiator valve and floor heating. A profile can be set over the whole week. For example the heating turns on shortly before the user arrives at home. It displays all information about the room climate. If the

2 PRODUCTS

The array of products around smart home technology

window is opened, the heater is automatically turned off. This increases heating costs and is environmentally beneficial.

The room temperature can also be regulated with under floor heating control. Having warm feet is a very important factor for cosiness. In this way, the room can only be heated when necessary. This can significantly reduce energy costs. The floor heater can also be turned on, away from home. The floor heating control allows for adjustment to the optimum temperature. Unnecessary costs for energy are eliminated. The floor temperature in one room is independent from the floor temperature in another room.

Garden devices such as garden illumination or lawn sprinkler as well as an electrical BBQ can be integrated into the house automation system. The status of the devices can be controlled and devices can be switched on or off from the MFD or away from home. The radio system motion detector can be used outside the house, in the garden or the terrace. For example if a movement is detected, the garden illumination system and a pump for the pond is switched on.

Living in a smart home enables users to save energy costs by measuring the wind velocity, temperature outside and inside, and solar radiation. Roller blinds can be activated automatically, to regulate the temperature and brightness in a room. The wind energy can also be used for other technical devices. For example the washing machine starts on its own if the wind velocity is strong. It must be possible to close and open doors, roll blinds, windows and so on from more than one location e.g. from the bed, from the corridor, from the living room. The most important factor however, is, that the user takes the centre stage.

3 MARKET DEVELOPMENT

Status quo and projection

The market for smart home in Germany is just at the beginning of its growth phase. At the moment there are many barriers to overcome. Many market players are actively working in the market with the same aim but with varying intensity. The interest and knowledge must be increased while costs for users must be decreased. Standardisation of communication standards must be promoted and clarity must be provided by the regulation of the performance.

According to the statistic in image 2 all polled market participants shared the same opinion: The market for smart home will grow until 2020. A survey was carried out by www.trendresearch.de, questioning 33 manufacturers involved in smart home projects. The following chart shows the results of the survey. As shown in image 2, most of the experts believe that the demand for SmartHome will increase and the extension will increase too. Only about half of the polled experts believe in higher competition and falling costs until 2020. It will probably take a long time, until smart home is well-established and until the costs can fall.

Only 36% of the polled manufacturer believed that the technique will be extended and that new products will come onto the market. Only 12-18% of the polled manufacturers imagine that the generation of customers will alter and that new technical standards and new services will be necessary.

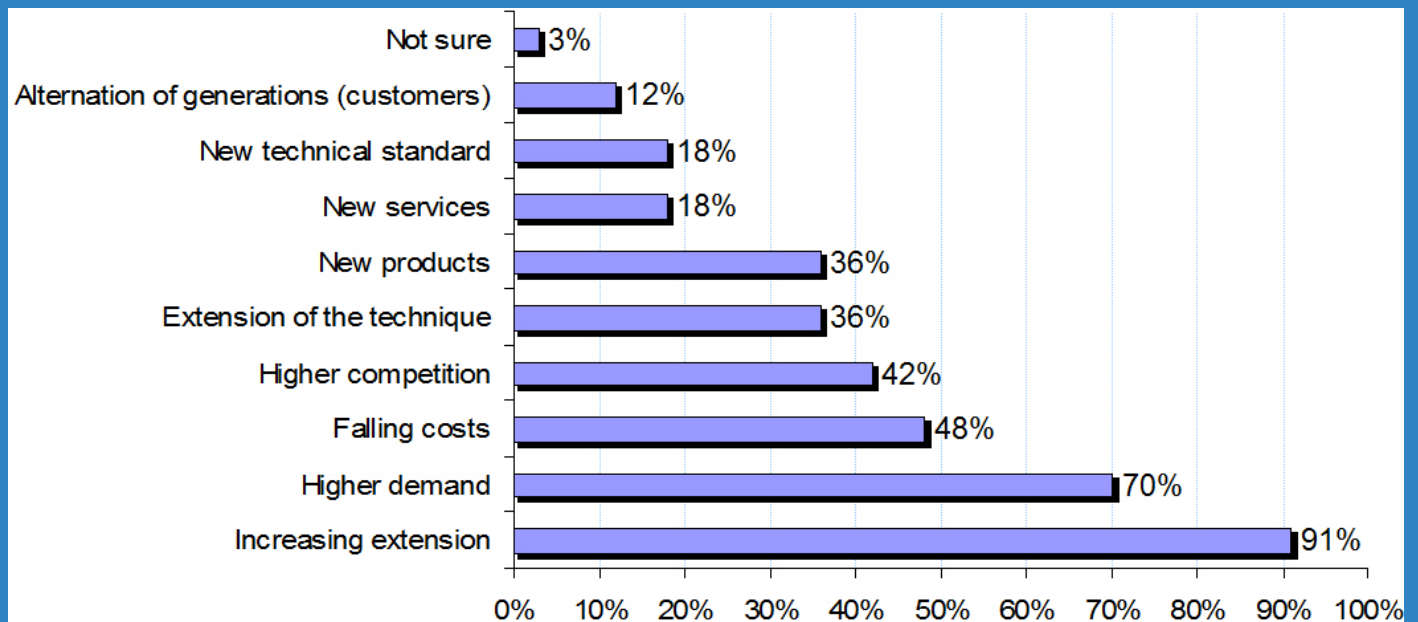


Image 2: How will the market develop until 2020²?

² <http://www.trendresearch.de/studien/12-0443.pdf>

3 MARKET DEVELOPMENT

Status quo and projection

Furthermore, based on the growing number of business sectors, some experts in the field believe RFID will be widely used, especially after the costs fall enough to make them economically viable for labelling inexpensive consumer products. RFIDs could also form the core of networks as its costs fall and the technology improves. It will handle many activities, from monitoring the structural integrity of bridges to reminding you Furthermore, based on the growing number of business sectors, some experts in the field believe RFID will be widely used, especially after the costs fall enough to make them economically viable for labelling inexpensive consumer products. RFIDs could also form the core of networks as its costs fall and the technology improves. It will handle many activities, from monitoring the structural integrity of bridges to reminding you that the food in your fridge is past its due date.

A survey in Germany last year about the general adjustment for using a home networking in Germany led to the following statistic as shown in image 3.

In Germany, 1048 persons in the age of 18-69 were asked about their opinion by Waggener Edstrom. As shown in the statistic more than 40% of the polled people which is the relative majority have a positive opinion towards home networking. 30% have a more doubtful opinion towards it which is the minority.



Image 3: general adjustment about using home networking in Germany in the year 2010³.

³ <http://de.statista.com/statistik/daten/studie/183065/umfrage/grundsatzliche-einstellung-zur-nutzung-einer-heimvernetzung/>

4 CRITERIA

Advantages and disadvantages

ADVANTAGES

When RFID networks are surrounding us everywhere we will have reached the point where computing could be blended invisibly into everyday tasks. If the smart home is easy to use with a system, where not technique is in the spotlight but the user, smart home can have a lot of advantages.

Chronically diseases such as cardiovascular diseases or diabetes are a big disposition for the health care system. The growing rate of pensioners will increase the rate of chronically diseases. Pensioners will be more and more depending on medical care. Image 4 shows the past and predicted rate of retired pensioners over 65 years based in the working population.

It is shown that there will be twice as many pensioners in 2050 compared to the year 2000 in Germany according to the prognosis. With a growing age profile there are higher requirements for medical care and subsequently more associated costs. The rate of retired pensioners will grow enormously.

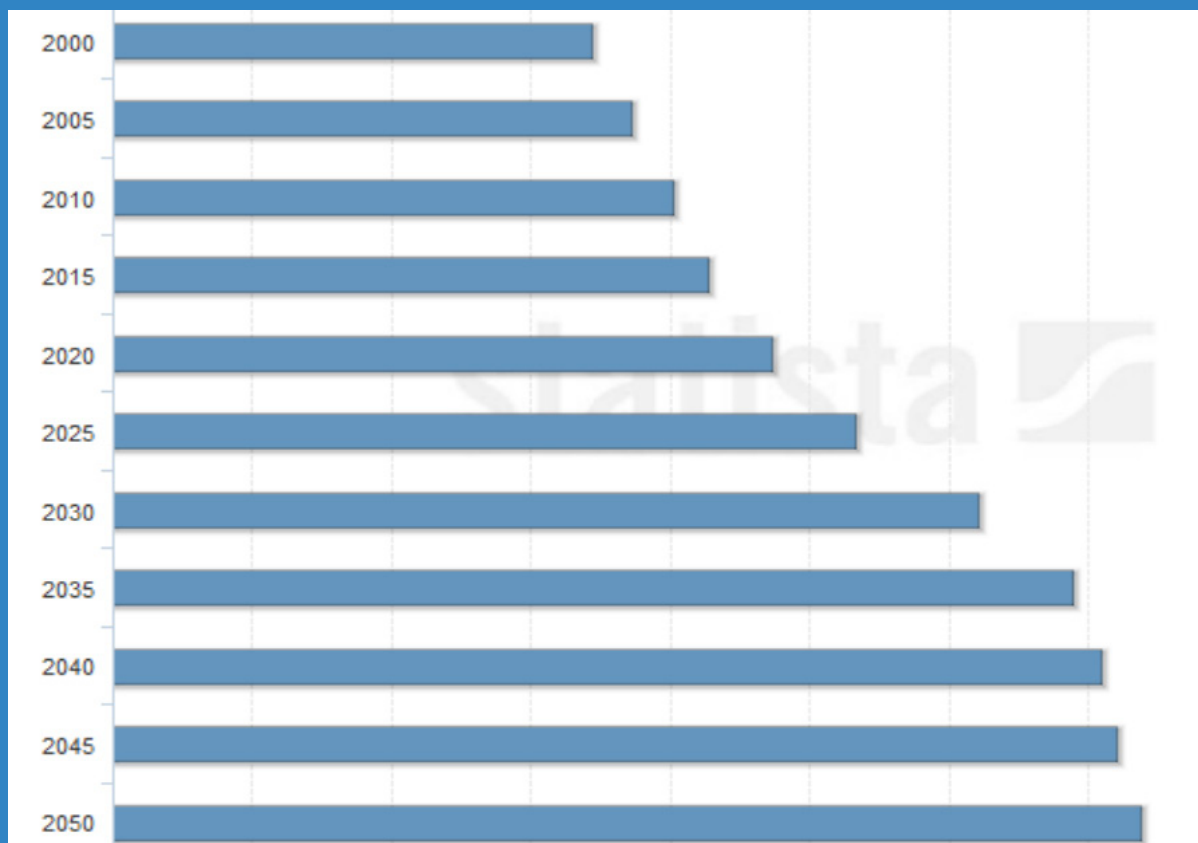


Image 4: Germany's prognosed rate [%] of retired pensioners over 65 years based on the working population (2000-2050)⁴

When pensioners normally would have to move into the nursing home, smart home allows old people to life an independent life in their own house by a combination of assisted techniques. Smart homes are fitted to individual needs and personal likes. The

⁴ <http://de.statista.com/statistik/daten/studie/14177/umfrage/deutschland-anteil-rentner-an-erwerbsbevoelkerung>

4 CRITERIA

Advantages and disadvantages

facade, the room layout and the interior design become individually configurable. The natural material ensures a pleasurable and healthy room climate. The System can be straightforward taken away by moving and it is convenient, as everything comes as a finished unit. Smart home can be the optimum solution for an aging population by the interdisciplinary of technology, medical care, economy and socio-Scientifics. The system is expandable if necessary and it is a flexible room for numerous usages.

But smart home is not only an advantage for pensioners. With intelligent living, energy usage can be optimised and costs can subsequently be reduced. High energy efficiency ensures low running costs and low environmental impact. Smart home also is long lasting and stable in value. Smart home is safe. By encoding data it prevents third-party. At home, the computer and remote control can be used. But smart home devices can also be operated away from home. Besides lower costs, smart home increases the comfort and cosiness in a house or apartment.

DISADVANTAGES

However, many smart homes are not as smart as they seem to be. Many solutions do not perfectly solve the problems of 65 plus pensioners who require solutions. Also RFID inventory systems still fall far short of Weiser's vision: "they do not help us perform everyday tasks."⁵ Re-occurring failures lead people to figure out what went wrong. Devices must be configured and controlled and data must be transferred between them.

Another problem is the interface between the System and the user. There is a lot of irrelevant information available. It can become not only confusing but also time consuming. Complex installation work and rework becomes necessary. It is also shown that elderly people sometimes have enormous problems to learn the new software and the technique, especially because the technique is not unified yet. If children live in the house, it is difficult to explain everything. Users could also be scared to pauperise physically and intellectually. There might be cheaper running cost but the purchasing costs are very high.

And besides the cost criterion, it was not mentioned yet, that personal contacts will get lost when living in a smart home. Doing the groceries, going to the gym, going shopping and all these things are possibilities to meet people and have a quick chat. Not only will users lose personal contacts but also step towards dependence. And the independence of the individual human might decrease enormously. Users will rely on their intelligent living and struggle in the case of a technical breakdown.

⁵ Mark Weiser (2004), Scientific American

5 DISCUSSION

Is smart home worthwhile?

One complicated task that RFID technology could be used for, is to use silicon chips on individual products on store shelves. If retailers can manage to do this, it could pay off royally. RFID smart-shelf systems could help to increase sales by monitoring the shelves. When the computers sense that stocks are running low, they could automatically alert someone to order more. RFID applications could even include assisting people with disabilities such as the Alzheimer's disease. For instance all the objects needed for making a cup of tea are tagged.

There are many issues to be considered if somebody is interested in a smart home. Not every manufacturer can easily calculate the associated installation costs, not every retail specialist has the expertise on the range of networked products and media available and not every architect is familiar with this new modern design technique. Consequently, cooperation is required in the planning phase. This cooperation will consist of manufacturers, retail specialists and architects.

Security and comfort must be considered during the construction phase of the house automation. Medical care systems, are initially individually complied with the resident and could be updated or added to later. Building a house or apartment nowadays requires foresight. Modern electronics such as Entertainment, television, internet, telephone and so on for intelligent living require extensive cabling. Requirements vary depending on the user and their needs. Techniques for security and emergency equipment become more and more important for elderly. In smart homes, users can be contactable everywhere.

But do people actually want to be contactable all the time and everywhere? User's privacy might be more and more eroded. They may feel controlled all the time. User's lives are monitored. It is even thought by some people that smart home controls the user rather than the user controlling the technology. But how feasible is this statement? It is believed by others that people apparently become dependent on the technology. There could be a possibility that RFID equipment will produce automatic audit trails of commercial transactions about what we do and how we spent our time. Consequently, this could affect the workplace and the legal system. Laws could be required to specify who can access data logs and for what purposes.

And besides all the control, there could also be social consequences in a world with embedded RFID tags and readers. The appreciation of nature might move into the background for humans and so might the personal contacts which may get lost. Proper communication vis-à-vis and social life may possibly decrease and become less important. Children

5 DISCUSSION

Is smart home worthwhile?

growing up in smart home might not be able to develop an well rounded imagination and thus creativity. Life in a smart home could most likely not allow the same space for playing, discovering and learning new things.

Obviously this is not how today's youth want to grow up. Surely for elderly people, it is a big advantage living an independent life in their own house. As a result they will only depend on technology, rather than a nursing home for example. RFID technology will support even our simplest activities. RFID-enhanced computer products could "talk" to one another and independently configure connections. But what happens if a mechanical breakdown occurs? Even just for an hour. Elderly people might feel unable to cope once they learned to live with the system. For example they could struggle to find a way of contacting a person.

Another important factor is data security. Will the smart home fashion allows our personal information to be available to others or will security be warranted? It is paramount that user data is safe and secure. Tags are programmable. Their data can include information about where the article was manufactured and sold. The RFID inventory tags could be detected leaving the store to prevent theft. RFID tags could be integrated in airline luggage labels, and in paper currency to inhibit counterfeiters and enable governments to track the movement of cash. The system can detect whether a container has been opened by an unauthorized person during transit. On the other hand, experts expect that criminals could create more sensitive RFID readers and increase the tags' tracking distance. In this way users could be monitored without their knowledge by criminals or the government.

It is very important that residents can live a self-determined life in their familiar environment. Techniques must develop with problems. Residents have to be familiarised as early as possible and they have to practise a lot in a stress less atmosphere. The tenant must be familiar with the system before their health status degrades. It must be noticed, that every single resident has different needs. Technique must be scalable. Only essential techniques should be used. As the need for different techniques increase as people get older, therefore techniques must be easy to upgrade and adapt without any problems.

Also the purchase costs have to be considered. Smart home is cheaper in running costs, but not every single retired pensioner will be able to pay for the initial purchase of smart home.

5 DISCUSSION

Is smart home worthwhile?

One theory is that RFID tags identifying individual items purchased with credit cards could link buyers to specific items in databases. This data could then be used to keep track of exactly what individuals purchase. Consumer products could be kept under surveillance in shopper's homes and on the high street. Such possibilities must be avoided e.g. by putting a kill switch into each RFID tag on a consumer item. This would allow the tag to be turned off after purchasing.

When RFID tags are present in purchased articles, consumers should be notified for instance with a printed notice on a checkout receipt. All tags should be readily visible and easily removable. And they should be placed only on the packaging, not embedded in the product. Besides all that, the new technology may cause conflicts that we cannot even think of yet and these will have to be overcome.

6 CONCLUSIONS

Personal opinion

There are many Research Projects and realisations about smart home in Germany. Also Companies are involved in implementing intelligent systems. We can not exactly tell the influence that the smart home fashion will have. But many opinions and prognoses have been made. In statistics, the manufacturers agree that the market for smart home in Germany will grow and there will be a higher demand once the interest and knowledge has been increased. At the same time costs will decrease. The RFID technology will handle many activities, from monitoring to reminding on important things. Users will have a lot of advantages, such as being independent in an old age instead of moving to a nursing home, health problems as well as danger will be realised in an early stage and can be avoided, energy usage can be optimised and costs are subsequently reduced. smart home has low running costs and low environmental impact and increases the comfort and cosiness and subsequently increases the life quality of the inhabitant. RFID systems might give the marketing industry and others access to more personal information than users would want them to have. It could become difficult to explain elderly or children the system. Smart home will have high purchasing cost which not everybody can afford. It also might become a big problem losing personal contacts and being observed and

“When it comes to the future, there are three kinds of people: those who let it happen, those who make it happen, and those who wonder what happened.”

JOHN M. RICHARDSON, JR.

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ATTACHEMENT

Real projects in Germany

- “Fraunhofer-inHaus-Zentrum”
Duisburg
- House 1 (10764 ft²) was opened on the 3rd of April, 2001. The idea was to save resources. House 2 (37674 ft²) was opened on the 5th of November 2008 as a research laboratory with intelligent roomsystems and is aimed to special-care home, hospitals, offices and hotels.
- “SmarterWohnen®”
Hattingen
- This Pilot project with 50 Apartments ended around 2007. The aim was the development of classical apartments by the integration of microsystemtechnology and House networking in the sector multimedia, comfort, safety and health care.
- “Assisted Living”
Kaiserslautern
- 4 new buildings with accommodations suitable for the elderly opened on the 11th of October, 2006 to support humans living in that house by getting older. Most important factors are Health, safety and comfort.
- “SmartHome”
Paderborn
- This intelligent home network with low consumption of energy and higher security and comfort was opened in 2007 and is used as Information platform for companies which can use the smart home as selling platform and service for their own products..
- “Haus der Gegenwart”
Munich
- This was opened on the 28th of January, 2005. It is about 200m² usable area and used for research about education and cultural events of a time-sensitive living in compliance with landscape protection and environment protection.
- “Versuchslabor für das Intelligente Haus SmartHOME” – Munich: This family home (2530 ft²) is used as a testplatform which opened on the 10th of July, 2000 with concepts for the improvement of security, health, and comfort in the house and around it as well as energy efficiency.
- “VisionWohnen”
Munich
- This modern duplex house was opened on the 6th of October, 2000. One half of this house consists of the “Tele-Haus”, which is a Research laboratory. The other half represents ideas for living in the future. Cosiness, comfort, health, economy and security were main features.

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Real projects in Germany

- “OFFIS Seniorenappartement”
Oldenburg
- It reopened in 2008 to represents all areas of the normal daily life. The focus is humans operating with the technique. The “IDEAAL-Senioren-Appartement” is a 2-rooms apartment on 48m². the senior Apartment demonstrates facility automation and challenging and realistic scenarios with the aim is to improve independence and life quality in higher ages.
- “SmartHome 2.0”
- The project was about Service-Architecture for distributed multimedia and Control-system. The aim was to solve problems of incompatibility of systems in the facility management and Multimedia-range.
- “Assisted living”
Karlsruhe
- In May 2009 another AAL-Living Lab was opened. The apartment has 30 networked sensors and devices. The floor notices falls. The couch measures the EKG of the person sitting in. Furthermore the house consists of a mobile software assistant for the ambulant medical aid.
- “Show Room des DAI-Labors”
Berlin
- The “SerCHo Showrooms” opened on the 5th of June, 2007 and is used as test laboratory to prove content, efficiency and usability under real conditions especially in the areas heating/ climate, energymanagment, facility automatisaton and safety as well as health applications.
- “Demonstrationswohnung”
Berlin
- Seniors are motivated to their own investment in “plug and play” technology.
- “Intelligentes Haus”
FU Berlin
- This house enables people to a view into the future, expressed in a very active living environment. Useful automatisms takes away die monotone Housekeeping duties, many atmospherical elements e.g. a simulated night sky in the sleeping room.
- “Kompetenzzentrum Smart Environments”
Fh FOKUS Berlin
- Aspects of big interest such as office-, car-, home and personal sectors and especially in services such as health, transport, environment and culture are demonstrated. Key aspects are amongst others the Segments Media Management, Digital Home, Smart-IP and Sensor Networks, Moving Networks, Mobile Middleware.

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Real projects in Germany

“T-Com Haus”

Berlin

The “T-Com Haus” in Berlin was open between April 2005 and July 2006. Every week another Team had the chance to live in the “T-Com Haus” with the newest technology and as a central control device a PDA and multifunctional screen.

“Demonstrations- und Versuchswohnung”

Wetter/Ruhr

This Apartment was opened in 1995 and is used for research, testing and advice in all areas of rehabilitation to experiment different types of technical help in practical environment. This can be living, working or freetime. The aim is to improve the life quality for elderly people or those with disabilities.

“Wohnen mit LON“ (LonMark Deutschland e.V.)”

Gütersloh

This modern house opened on the 12th of May, 2005 with LON-WORKS such as Light-, roller blinds- heating control- and alarm system as well as and fire detector are integrated. Energy consumption is measured and can be displayed. High comfort was an important factor.

Tobit Software AG, “Ahaus”

This intelligent house was built in 2001. On basis of an EIB-Systems David.zehn! Products aim about a “Digital Lifestyle”. Besides various communication- and information solution, different scenarios are realized. E.g a weather depending control of roller blinds.

Ambient Assisted Living Lab

“BAALL”

Bremen

This apartment (645 ft²) is a research laboratory of suitability for daily use. Elderly or disabled shall be able to compensate their limitations and create their living situation in early stadiums of their life in which they can live by themselves as long as possible. E.g. the wheelchair is able to bring the user to known destinations and open doors, switch on and off lights and lift up and down the kitchenette. BAALL can also be operated by verbal instructions.

“HIFI-Forum”

Baiersdorf

This exhibition is mainly based on integration of medias, homenetworking, hometechnique and all-embracing living and will be open from 26. September 2011. Besides Entertainment electronics, building-communication, intelligent illumination, swimming pool technique and energy concepts, room arts and more are shown and can be explored.

“Baumedienzentrum”

This exhibition explains constructional mistakes with their con-

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Real projects in Germany

Düren

sequences. For expert planners, installer and user advantages and limits to different solutions are shown. A special E-room shows the applied techniques and solutions to communicate in the building.

“SmartHome”

Sarkwitz

This is an altered and 100 years old school house.

“SmartHome”

Hameln

This family home is in daily use of a family living in there. Different solutions of illumination, heat control, music, video, LED and much more are implemented.

“SmartCaravan”

The mobile smart home Showroom showses networked building services engineering, telecommunication, informationtechnology and entertainmentelectronic and reaches it’s customers, where there are no show rooms or show houses.