Information and Communication Technologies in Care of Elderly – Addressing Care Assistants’ Experiences, Demands and Visions

Title: Hina Mariam
Course Code: 5IK00E
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Supervisor: Prof. Christina Mörtberg
Examiner: Prof. Anita Mirijamdotter
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Preface

In the name of Allah, the Most Beneficent, the Most Merciful. All praises to Allah Almighty, without His blessings it would not have been possible to achieve this goal. Thank you so much my Lord for answering my prayers and for giving me strength for the completion of this research work.

Writing this thesis has been more than just a writing process. I have faced a different type of feeling throughout my research including doubts, frustration, happiness and sleepless nights. But at the end it has led to an extension of my knowledge and experience in the field of Information Systems. This thesis would not have been possible without the guidance and help of several individuals. I would like to take the opportunity to thank all these individuals who in one way or another contributed to the completion of this study.

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First and foremost, my utmost gratitude to my supervisor Prof. Dr. Christina Mörtberg whose inspiration and guidance I will never forget. Without her help it would not have been possible to complete this challenging task. Thank you for your constant and valuable support, guidance, encouragement.

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Thanks you all for participation in my research. Without your involvement it would not possible to complete this task.

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Hina Mariam
Växjö (2013)
Abstract

In Sweden the need to recruit care assistants is increasing because of a growing older population together with their demands to stay in their own homes as long as possible. Swedish municipalities are responsible for organizing the social care and services for elderly with a coordination of some private provider companies. Moreover, to improve the care work a range of information and communication technologies (ICTs) e.g. safety alarm and electronic health record system are used to support care assistants’ daily activities and communication with elderly. Thus qualitative research aims to explore the care assistants’ use and experiences of existing ICTs. Furthermore, it examines the impact of the ICTs on their daily activities. The thesis pay attention also to care assistants demands, ideas and visions about future ICTs. The research found that care assistants were satisfied with the ICTs, they use today. However, the research also identified some problems related to ICT, which the care assistants are confronted with during their everyday work e.g. alarm buttons loosen and falsely triggered sensors. Care assistants expressed their ideas and visions about the ICT’s degree of involvement in their care activities and elderly’s lives. They had contradictions in their point of views related to the use of monitoring technologies for elder’s care. They also had negative feelings about these technologies. In short, the thesis explored two things; firstly, it reflected ICTs and care assistants’ demands and ideas related to the ICTs. Secondly, the daily activities of care assistants were examined. Therefore this research brings forward care assistants’ activities and makes their work more noticeable in order to be used in the development of new IT systems in the social care work.

Keywords: ICT; Technology, Social care; Municipality; Elderly; Care assistants; Demands; Sweden; Monitoring; Safety; Privacy.
Executive Summary

In developed countries like Sweden one of several dominant socioeconomic challenge is the growth of the elderly population. The population of elderly is increasing and the working population is decreasing year-by-year. Therefore, the responsibilities of municipalities of Sweden are also increasing. It is their responsibility to provide social care and services to elderly. All social care and services are regulated by the Swedish Social Service Act (1992, 1993) to enable an independent life for elderly. Therefore, it is important that the care staff is well trained and experienced so they can provide a good quality care of the elderly. However with an overall decreasing working population, managing care work can be a challenge. Therefore, the Swedish government has adopted a national e-Health strategy for presenting and transferring more secure and efficient caring techniques throughout the health and social care sector using ICTs.

Information and communication technologies (ICTs) are providing support for performing social and care services. Consequently, the use of ICTs has been increased in municipalities to support the care of elderly. These technologies can maintain a good level of care services and meet the demands of elderly in home care. Through the technologies the workload of care staffs can also be decreased. So it is important to consider the demands and ideas of care staffs who use ICTs in their care work practice. Care assistants are the part of the staff of municipalities who are assigned to provide care and services to elderly in their homes like cleaning, laundry, walking etc. Care assistants use several ICTs in their daily work activities.

The social care and services are provided to elderly in various kinds of housings. There are two types of special housings available for elderly care in the municipality. These are either home-like institutions or elderly’s homes. In these housings the municipality provides several services to the elderly such as daycare activities, breakfast and evening dinner, safety alarm and accompanying services.

The qualitative research explores the use and experiences of care assistants about existing ICTs. The experiences of care assistants about the use of existing ICTs are examined for the well-being of the elderly. Thus, the research provides knowledge about the experience and needs of care assistants to focus on ICTs. This research also brings forward the work of care assistants and makes it noticeable.

For this study I have chosen the qualitative research strategy to understand and explore the care assistants’ use and experiences of existing ICTs. Semi-structured interviews, documents and websites are used for data collection. Moreover to handle the data from the literature and my empirical investigation I use social constructivist’s approach as research theory. This theory helps to analyse the arguments socially inside a setting to construct subjective meanings.

Care assistants use several ICTs in their work practice for elderly’ safety and monitoring such as the safety alarm system, movement sensors and web cameras. Moreover, care assistants also use ICTs for organizing their daily activities. For instance an ICT memo recorder for scheduling, recording and information transfer, and an electronic health record system for documentation daily care activities. They were satisfied with the current technology. However they mentioned some ICT-problems that they faced and
also gave some ideas and suggestions related to the used technologies. The result of this thesis can contribute to a better development of new information and communication technologies (ICTs). The ICT-problems that participants shared during the empirical investigation are as follows:

- Sometimes the safety alarm does not work because of the telephone lines problem.
- Alarm buttons loose very often.
- There are many false alarms triggered by movement sensors that increase the workload of care assistants.
- The safety alarm system is just a one way communication. Elderly can only call to the care staff by pressing the alarm button. But care staff cannot call to the elderly.
- The care staff cannot communicate with other staff members with a ICTs record system.
- There is no emergency button for care assistants in elderly housings that they can use in emergency situations.

Further, the participants of the research also provided some ideas for future information and communication technologies in their area of work:

- Safety alarm systems should be designed as two way communications systems that can release the care assistants work burden.
- There is a need to define a laser line on a certain area of the elderly’s apartment to decrease false alarms on care assistants’ mobile phones.
- There is a need of a panic button in every elderly’s housing.
- The electronic health record system for documentation should be equally implemented in all elderly housings.
- The use of several alarm systems and web cameras in elderly’s housings is interference with elderly privacy.

Thus, my research provides the understanding of problems in current ICTs use in social care and services. Moreover, care assistants’ demands and ideas that are mostly ignored before the ICTs’ development, are identified. The research is a contribution to decrease the ignorance of the low status job of care assistants. I hope the findings of my research will be either used before the new ICTs development of new ICTs or will be used as follow up study. In the future, there are different aspects related to social care and technologies that can be studied, for example elderly’s ideas about ICTs can be added to the recent research. It could also be explored why care organizations are not connected with each other in Sweden.
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1. Introduction

In Sweden as in many other countries the elderly population is growing. The growth of the elderly is a dominant demographic change in the population, especially with people over 85 years. There are 9.3 million inhabitants in Sweden and among them 18 percent have passed their age of retirement (Swedish Institute, 2009). According to SCB\(^1\) (2011), there could be two factors behind the increase in the older population in Sweden. Firstly, people are living longer in Sweden. Consequently, every twentieth person is over the age of 80. Secondly, the birth rate is decreasing and in the next years it is expected that the birth rate will decline further.

With the growth of the elderly population the need for social care and services is also increasing. This can be a challenge because of a decreasing working population and an increase in the number of people that are receiving social care and services (Socialstyrelsen, 2008). In Sweden the municipalities are responsible to provide social care and services for elderly. This is regulated by the Swedish Social Service Act (1992, 1993) which main purpose is that the elderly should be able to live independent lives with dignity. Thus, they should have a meaningful and an active existence in the company with others. Additionally, the Social Services Act states that the services offered to the elderly should be of good quality and carried out by appropriate, well trained and experienced people (Regeringskansliet, 2011a).

Care and services are provided to elderly to support their well-being and health. Even though elderly prefer to live in their homes other housing forms are also offered such as home-like institution. However, these services are based on the demands and needs of elder people. Information and communication technologies (ICTs) can support the care and services offered to elderly in their homes effectively. Furthermore, ICTs may also improve the communication and information flow between elderly and care providers (Fergus, et al., 2011).

In the health sectors, IT-systems have been used to support the services of home and health care. ICTs may support care workers in their daily activities. Moreover, the technologies can maintain the level of care services and meet the demands of elderly in their homes. The implementation of information and communication technologies in the work practice of care workers constantly affects their work (Jansson, 2007). Additionally, these ICTs are used in elderly’s homes for safety and well-being of older people. ICTs may also support the independent living of elderly in their homes. However, to make the technologies more functional some care personnel are required (Harrefors, Axelsson and Sävenstedt, 2010). Moreover, the use and implementation of information and communication technologies (ICTs) in care of the elderly have increased. According to a statistical estimate 73% of Swedish municipalities are in favour of development of new information and communication technologies for making the home care work more efficient (Jansson, 2007).

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\(^1\) SCB is abbreviation of Statistiska Centralbyrån (in Swedish), in English, Statistics Sweden.
There are several reasons to increase the use of ICTs in social care and services. First, there is a socio-economic challenge in Swedish society depending on the growth of the elderly population and the decline in the working population. Therefore, ICTs can be used to support elderly’s care needs as well as for supporting care workers in their care activities. Second, the society is changing and large amounts of health care services are moving from hospitals to private residences. These private residences provide facilities to elderly to be able to stay in their own homes as long as possible. Therefore, information and communication technologies are offered to overcome the challenge that has arisen in society (Mörtberg, Berg and Elovaara, 2012). Third, care personnel such as care assistants provide social care and services to elder people by using information and communication technologies (ICTs). Therefore, care assistants’ use and experiences of existing ICTs need to be considered in future development and implementation of ICTs. Lastly, another reason to focus on the care assistants’ use of ICT is that they have low status. Since Jansson (2007) argues that care assistant’s knowledge, experience and skills are often ignored before future development in technology. There is a need to listen to the otherwise ignored voice of care assistants and highlight their experiences and situated knowledge.

The Swedish government has developed a National e-Health strategy with the aim to reform and improve the management of information in the health and social care sector through the widespread use of ICTs. The strategy also supports the ICTs for transferring more secure and efficient care throughout the care sector. Care staff may access electronic decision support that facilitates their daily work activities (Regeringskansliet, 2011b and Ministry of Health and Social Affairs, 2011). Therefore it is necessary to bring forward the use of ICTs in social care and services and also to make the care assistants’ work noticeable.

1.1 Aim and Research Questions

The aim of this study is to explore care assistants’ use and experiences of existing information and communication technologies (ICTs). Furthermore, care assistants’ demands, ideas and visions about future ICTs will be investigated. The qualitative research will help to understand the ideas of care assistants and how ICTs work. Therefore, the experience of care assistants about the use of ICTs will be examined in terms of the well-being of the elderly as well as in terms of technological issues that care assistant experience during their work practice. Moreover, care assistants’ ideas about the degree of involvement of technology in elder care will be identified. Hence, the main objective is to understand the existing ICTs and their role in the care assistants’ day-to-day activities. Thus, attention will be paid to the needs and the demands that are required in current ICTs to deal with elder care.

The research questions are as follows:

1. What kind of information and communication technologies do care assistants use in their day-to-day work?
2. How do care assistants use information and communication technologies in their daily work?
3. What kind of demands, ideas, visions and experiences do care assistants express for future information and communication technologies?
The research will be valuable to understand the needs of information and communication technologies in the care assistants’ daily activities. Additionally, this research will contribute new requirements that should be considered in the development of future ICTs. In this way care assistants’ innovative ideas related to the technology can be identified. Through the understanding of the current ICTs and highlighting care assistants’ needs, ideas and visions, significant improvement of current and future ICTs systems can be done. Furthermore, efficiency of future ICTs can be maximized and lives of users of the technologies can be easier. Hence through the research I will first get the knowledge about of care assistants’ experience and needs of ICTs in their work. Second, care assistants’ social care activities will identify and their work will thus be noticeable.

1.2 Scope and Limitations

The main scope of the research is to explore care assistants’ use and experiences of information and communication technologies (ICTs) in their work. Moreover, the aim is to study care assistants’ demands, ideas and visions of future ICTs. The research will be valuable to understand the effects of ICTs on daily activities of care assistants.

The focus of the research is on care assistants’ use of ICTs to support elderly people’s lives in terms of care and well-being. In this age of information and communication technology mostly care assistants and nurses use some kind of technologies in their work. Therefore, it has become essential to examine the impact of ICTs on care assistants to understand their work and demands related to the future technologies. The purpose of the research is to support the ICTs use in social care and services and make the care assistants’ work noticeable. This study may assist in the future development and implementation of more user-friendly ICTs use in the field of social care and services.

There are four occupational groups involved in elders’ care offered by municipalities. Such as care assistants, occupational therapist, personal assistants and personal agents are included. First, care assistants work with social and care services that are offered to elderly in their homes or in home-like institutions. Care assistants support the elderly in service activities like cleaning, laundry, walking etc. Second, occupational therapists are visual and hearing instructor in case of impairment. Third, personal assistants2 give support to people who are suffering in severe disabilities and require a lot of support in their basic needs of life. Fourth, personal agents3 provide support in case of mental disability. My research study is limited to care assistants who work with social care and service for elderly’s support by using some technologies. The technologies are limited to interactive ICTs that work with the help of formal care assistants (Växjö kommun, 2012) (Summarized from the brochure of Swedish version).

It is necessary to mention there are basically there are two types of care, i.e. informal care and formal care. Informal care is unregulated and mostly unpaid. Moreover, it is

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2 Personal Assistants are known as Personlig Assistans in Swedish. It is translated from brochure of Växjö Kommune page 12, in February 2012.

3 Personal Agents are known as Personligt ombud in Swedish. It is translated from brochure of Växjö Kommune page 13, in February 2012.
performed by elderly’s relatives and children. While formal care is regulated by law and contractual agreements. It is a formal provision of care for persons who need care or persons who provide care (Mort, Milligan, Roberts, Moser, 2008). My focus will be on formal care.

As mention previously, the research focus will be on information and communication technologies that care professionals, employed by a municipality, use for the care of the elderly. It is necessary to mention the difference between three of these technologies: assistive technology, ICT and smart home technology. Assistive technologies are used by any old or disable person in order to perform different activities that might not possible or difficult to perform otherwise. Information and communication technologies are used by care professionals to treat patients/elderly and improve the work efficiency of the care staff. In addition care professional use the technology to collaborate with other professionals and provide remote supervision. Information and communication technologies may also improve the administrative task by eliminating paper-based processes (behavior imaging solution, 2010). Smart home technology is a way to communicate between ordinary electronics and appliance. Through smart home technologies all the electronic devices and applications around a house become more automated and communicate with other technologies without the user involvement (Smart house technology, 2005).

My research will only consider care assistants who conduct social care and services for old people in the municipality of Växjö and care assistants who provide support to the elderly4 who do not have any disability and can use several technologies such as automatic scheduled systems or alert systems. Thus, this research is limited to care assistants who work in social care and services to support elderly by using several information and communication technologies (ICTs). The empirical material will be collected through interviews with care assistants, nurses, and one middle manager. The language can be a barrier in my research because I do not speak Swedish. Therefore, I performed the interviews with care assistants who speak English. For this purpose I visited Växjö municipality, home-like institutions and elderly’s homes. Moreover, I conducted interviews of the middle manager of the municipality to extend my understanding of social care and services.

1.3 Thesis Structure

The rest of the thesis is structured as follows: In Chapter 2 I will describe the social care system and the role of municipalities in Sweden. Particularly I will discuss how the elderly care is organized in Växjö, where my research is conducted. It is followed by Chapter 3. There I will present ICTs in social care especially in Sweden. The chapter will start with a discussion of assistive technologies. Furthermore there will be a discussion about ICTs. In this subsection the reasons of using ICTs and the influences of the technologies on elderly care will be presented. This discussion will develop an understanding of several ICTs and their needs and demands in elderly care. The chapter ends with a discussion of smart house technologies that help to differentiate the ICTs and smart house technologies. In Chapter 4 the introduction to my research’s theoretical

4 There are two kinds of support and care provided in the municipality, elderly care and disabled care. For more detail, see Fig. 6.1.
lens, social constructivism, will be presented. The Chapter will include the concept and definition of this theory. In Chapter 5 the research strategy, data collection techniques and data analysis will be presented. The chapter ends with an ethical consideration of the conducting research. The empirical material and research findings are presented in Chapter 6. In Chapter 7 the research findings will be discussed through social constructivism epistemology. In Chapter 8 the concluding remarks and results on the basis of discussion are presented. This chapter ends with the research contribution and suggestions for future research.
2. Social Care and Services

In the following chapter a brief description of social care and services in Sweden will be presented. Firstly, municipalities of Sweden and their rules and laws will be explained. The municipalities’ responsibilities in general will be discussed with more emphasis on social care of elderly to understand the care work. Then Växjö municipality and its care organization will be explained. Lastly, social care and services for elderly in the municipality will be discussed.

2.1 Municipalities in Sweden

There are 289 municipalities in Sweden. In Sweden municipalities are independent local authorities governed by the law of self-government. This law, known as Local Government Act (SFS 1991:900), was developed in order to give the freedom of action to all members of municipalities. Swedish municipalities are governed by politicians who are elected by the citizens every fourth year. The municipal council is the highest body of a municipality and a parliamentary decision-making assembly. Further, the municipal executive board is elected by the municipal council. The latter is elected in direct elections of the municipality registered residents. Municipalities’ main responsibilities are social services, state school system, water and waste management, cultural issues and so on. The responsibilities are illustrated in Fig. 2.1.

![Figure 2.1: Responsibilities of Municipality (Human Rights in Sweden, 2011)](image)

The various areas, e.g. social service, are governed by a board consisting of politicians with a chairperson and a number of members. Moreover, the politicians also decide and are responsible for the budget of their municipality. Hence, municipalities provide all significant public services in the fields of social services, education, and infrastructure and so on (SKL, 2011), see also Fig. 2.1 and Fig.2.2. In addition to the politician level a municipality has officials employed to perform the work of the municipalities, see Fig. 2.2.

Furthermore, all municipalities also have some special laws to follow. For instance, the Swedish Social Services Act (1992, 1993) and the Swedish Planning Act, etc. The
system is financed through taxation. On municipality level the politicians decide which taxes can be charged from public. However there are some additional municipal taxes that can be charged on the municipality level. Although the municipal council is the highest decision making authority that decides how many additional taxes can be charged and how the tax money should be spent (Human rights in Sweden, 2011).

The municipalities’ health and social care services are regulated by the Social Service Act (1992, 1993). The county councils are responsible for health care provided at hospitals and primary care centers. The municipalities are responsible to provide social welfare e.g. care and services facilitate elderly people to live in their home. Moreover in elderly care the municipalities’ focus lies in efficiency and quality (SOU 2004:68). Since, it is stated in the Elderly Reform\(^5\), 1992 that the focus on elder care should be on enabling elderly people to live their lives to feel the sense of well-being (Regeringskansliet, 2011c).

Apart from various Acts, Swedish government also follows a strategy for establishing better basic conditions for implementing information and communication technologies in health and social care sectors. From 2006 the Swedish government has developed the National e-Health strategy with an aim to create better and secure information management through use of ICT in all care sectors. Since through user-friendly ICT support, more secure and efficient information can be presented and transferred throughout the care sector. The strategy maximizes the possibility of achieving physical, mental and social well-being for citizens, health and social care staff and decision maker in all care services using ICT support. Such as through e-health strategy social and care staff can access electronic decision support that facilitates them in daily work activities (Regeringskansliet, 2011 and Ministry of Health and Social Affairs, 2011).

Additionally, the Elderly Reform (Ädelreformen), 1992 allowed Swedish municipalities to include the private providers to be able to overcome the rising demands due to a growing proportion of older people in the population. These alternative private companies are allowed to organize the care services for the elderly according to their own terms and conditions. However, they also follow the rules and laws of municipalities (Gustafsson and Zsebehely, 2007).

Moreover, the Act on system of choice, LOV\(^6\) has been developed by the current national government with the aim to serve as a voluntary tool for local governments. The Act can be applied to health services and social services to offer services for disables, elderly and health care. According to the LOV, municipalities may give elderly choice to different kind of providers of home care and care services. Thus, elderly can choose whether they prefer to go to public or private health care center (Regeringskansliet, 2008) (translated from Swedish version).

Therefore, the Swedish welfare service is an important resource for the well-functioning care of the elderly. Everyone who has old age family member who needs care and assistance can use this resource. In addition, there is an action plan for elderly people. According to this action plan elderly people need to maintain their independence and

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\(^5\) The Elderly Reform states that municipalities are responsible for providing the health care and social services for the elderly and disabled.

\(^6\) LOV stands for lag om valfrihetssystem in Swedish that is Act on system of choice.
will have access to good care and medical treatment. Moreover, elder care should not be provided to elderly on their personal wealth and purchasing power. Instead, elder care should be available as needed. Therefore, in Sweden elder care is a public responsibility (Ds 2002:32).

2.2 Social Care and Services

The main goal of the municipalities is to provide services to elderly so that they can live in their home and look after themselves. Thus, municipalities should offer homes to elderly with additional services according to their needs (Swedish Institute, 2009). Moreover, a short term care is provided to the elderly who need rehabilitation and care, temporary housing or relief and alternative care (Regeringskansliet, 2011c). In addition, social health services may vary from one municipality to another municipality. In the municipalities there may be four kinds of social health services available that are ordinary living, home-like institutions, functional impairment and social services (Jansson, 2007). The social services are further divided such as home help services and home nursing, daytime activities and short-term care, special housing accommodation and private care. These social care and services are provided to elderly according to their needs. For getting assistance elderly need to apply for care and services in the municipality. Case officers- social workers make decisions about the goal and the volume of the social care needed by the elderly (Regeringskansliet, 2011c).

There are two types of housing facilities available for elderly in municipalities of Sweden. The first housings are home-like institutions where staffs remain on duty day and night. These houses are for elderly or persons who need around the clock care and support or who have problem of dementia or physically disabled. The second elderly housings are known as elderly’s homes. The elderly can apply for these elderly’s homes after reaching a certain age. They can also apply for additional services such as home-help services and home medical care. There are various kinds of the home-help services that municipalities offer for elderly. Most of municipalities provide personal care, emergency alarms and meal services. However, some municipalities also provide technical aid and transportation services for elderly. Elderly can also apply for home-help to perform various tasks like laundry, cleaning, shopping etc. These both housings are accessed and allocated by the municipalities (Regeringskansliet, 2011c).

It is necessary to mention that elderly have to pay a small percentage of the actual cost to avail the care and services. However, every municipality decides its charges depending on those municipalities are self-governed. Therefore, it might be different charges for the same type of care in one municipality compared to another. Generally, municipalities’ charges are related to citizens’ income or pension. However, more than 80% of the elder’s care and services are financed by taxes that are charged by the municipality from its residents (Regeringskansliet, 2011c).

2.3 Växjö Municipality Organization

Växjö municipality, where my research was conducted, provides several services such as social services, cultural activities, children & education, environment, energy & traffic, support & care and safety, security & health and so on (Omsorgsnämnden, 2012). For more understanding the structure of the Växjö municipality organization is given below. See Fig. 2.2 (summarized from the Swedish version).
However the focus of my research is social care and services provided to the elderly for their well-being.

Växjö municipality, like other Swedish municipalities, offers social care and services to their citizens. For organizing these services Växjö municipality has a director of the social welfare services (social chief). The director and politician discuss the care situation of elderly people who belong to the municipality, for instance, what is needed to do and how it will be done. The municipality - Växjö, where my research was conducted, has two middle managers as subordinate to the director of the department. One is responsible for social care and services offered to elderly and the other is responsible for the care and services offered to persons with disabilities. These both middle managers have their own separate units and team, see Fig. 2.3. The municipality is further divided into subdivisions which are managed by assistant managers of the specific area.

### 2.3.1 Care Organization in Växjö Municipality

The organization of social care and services in Växjö municipality can be divided into elder and home care, care of disabilities and resource unit. The structure of the elderly and disable care unit of municipal organization is as follows:

http://vaxjo.se/upload/www.vaxjo.se/Kommunledningsf%C3%B6rvaltningen/Kommunikationsenheten/Dokument/Organisation_skiss_v%C3%A4xj%C3%B6_kommun.pdf
Figure 2.3: Elderly and Disable Care Services Unit in Växjö Municipality (Omsorgsnämnden, 2012)

Växjö municipality sees the services for elderly in several ways:
The main focus is, according to Omsorgsnämnden (2012, p. 6), given by the motto:
“Those we are for”/ “What we do for those we are for” (My Translation)  

2.3.2 Social Care and Services in Växjö Municipality

The proportion of elderly over 80 years is also very high in Växjö. The numbers have been increasing gradually for many years. The population in Växjö is estimated to grow by 15% between 2012 and 2019 and the pensioner’s population is estimated to be 18% of the total population. Therefore, the municipality is giving special attention to provide several different facilitates for elderly to make their life functional (Omsorgsnämnden, 2012).

Växjö municipality provides several services to older people like day care activities, breakfast and evening dinner (meal and wheel), safety alarm and accompanying service. In day care activities elderly get assistance related to personal care, e.g. dressing, cooking, motor activity or hygiene, walking, laundry, cleaning and shopping. Safety alarm is for the security of the elderly, through this alarm service elderly can connect the municipality’s staff all the time by an alarm button and can call to care assistants whenever they are needed. The municipality also provides meal and wheel service including breakfast and evening dinner. Furthermore, there is accompanying service also available in the municipality for need of social contacts. There is a meeting place for the elderly that is known as the pensioners’ house. This service helps the elderly to visit friends and participate in cultural and recreational activities (Växjö kommun, 2012b).

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The Swedish version is: ”Dem vi är till för” / ”Det vi gör för dem vi är till för”.
There are two types of accommodations available in Växjö municipality. These housings are divided in home-like institutions and elderly’s homes. The home-like institutions are for elderly who need to be closer to care staff around the clock. The elderly’s homes are for those who want to live independently. However, social care and services are offered to elderly for making their lives more functional. Elderly’s homes are further divided in housing categories such as ordinary housings (hemlinjen in Swedish), houses and senior housings (senior boende) (ibid).

In 2012, there are 82 special service apartments (home-like institutions) for elderly who need around the clock care and support in Växjö municipality. Moreover, there are 304 special housings (elderly’ homes) apartments for elderly who live independently but avail additional social care and services. These elderly’s housings are mediated by the care-management of the municipality and distributed in the city usually close to restaurants and support facilities. In addition, in these different kinds of elderly’s housings care assistants provide assistance to elderly according to needs (Växjö kommun, 2012b) (My translation).

In short, similar social care services are provided in several kinds of elderly’s housings. However, the degree of needed care differs between the elderly. Therefore, if older people need special care and services or older people want to live closer to care staff, then they can apply for apartments in home-like institutions. However, sometimes elderly do not want to move to home-like institutions or they do not need extra care then they can take services and care in their own homes.

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9 For more detail See Appendix F.
3. Information and Communication Technologies in Social Services and Care

In the following chapter a range of information and communication technologies used in the area of elderly care will be presented. The chapter starts with a presentation of some concepts used to characterise the technologies in home care. First, assistive technologies are described and then some kinds of ICTs used in social care for the elderly will be presented. In this subsection I will discuss the most common reasons to use ICTs for social care of elderly. Challenges related to the use ICT in social care will also be presented. At the end of the chapter the concept of smart house technologies will be presented to give an extended understanding of the technologies provided in home care. The chapter ends with a summary.

3.1 Concepts Related to Technologies in Home Care

There are several kinds of technologies such as assistive-, smart house- and information and communication technologies that are used to provide social care and services. Assistive technologies allow a better and independent life for the physically disabled persons and old peoples. Through these technologies they can perform their daily activities on their own. Examples of such technologies are electronic wheelchairs and visual- or hearing aids. Smart home technologies are fully-programmed like automatic lighting, door locks, smoke and temperature alarms etc. Information and communication technologies are used to communicate with care workers and support of elderly. These technologies may improve the cooperation between the elderly and the social care providers (Koch, 2010).

In addition ICT based care technologies can be divided in structured technologies and less structured care technologies. Structured care technologies are used for pre-programmed tasks. While less structured care technologies are used for multiple tasks. These technologies might be very supportive and flexible and used for supporting, monitoring, delivering and maintaining health and social care of the elderly (Mort, Milligan, Roberts and Moser, 2008). Moreover in home care some wireless technologies are used to monitor elderly from a distance, e.g. smart phones, tablets and computers with web cameras. Thus, now care assistants can rely on technology; they can monitor the elderly at home from long distance. An elderly who does not know the use of a computer can receive and print email on simplified printers. There are elder-friendly mobile phones also available. Through this elderly can connect far away care assistants (Menack and Cress, 2012).

3.2 Assistive Technologies

There are many assistive technologies provided to the elderly to be used in their homes to facilitate their daily life and stay in their homes as long as possible. These technologies support the elderly in organizing their daily activities. Sometimes elderly forget to perform their household task with increasing age. Similarly elderly often need

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10 In the thesis care technologies, technologies and information and communication technologies are using as synonyms.
reminders for their health and support activities. Assistive technologies can help the elderly in these situations such as if the elderly forgotten or ignore their physical training reminder can inform the elderly about the training. Thus, assistive technologies might reduce the external help of the elderly through assisting them in daily activities and improve their well-being. The elderly can stay longer in their homes independently with the support of the assistive technologies. These assistive technologies can support in monitor, organize and structure the elderly’s daily activities (Boll, et al., 2010). Mobile and assistive technologies may provide independent living to aged and also improve their quality of life. Home assistive technologies can connect the elderly and their homes with the outside world. For instance, mobile phones with features of Bluetooth, RFID and WLAN are using as trial in Sweden to handle alarm calls. Two types of calls can receive on these mobile phones that are soft calls with oral response and rescue calls that need more complex operations (Doukas, et al., 2011).

However, most of the assistive technologies are designed without taking into account the elderly’s needs and skills. These assistive technologies just take over the responsibility for elderly without considering the particular needs of elderly in their homes. Consequently, the interface of the assistive technologies does not feel natural due to this old people’s become frustrated. In other words, assistive technologies should be designed carefully with the focus on the context of use and particular needs of elderly (Boll, et al., 2010). Moreover, the assistive technologies focus on elderly’s independence without considering human’s care. As a result assistive technologies might lose the human contact while good care is linked to social interaction (Zwijesen, Nieneijer and Hertogh, 2010).

3.3 Information and Communication Technologies-Used in Social Care of Elderly

There is a broad spectrum of ICTs to be used for elderly care e.g. safety alarms, electronic sensors, door monitors and bed detectors, video monitoring, etc. These ICTs and services may increase the safety of elderly and their security and ability to cope at home. Moreover, all these devices may support and facilitate the care assistants’ work and improve the organizational tasks that are unable or difficult to perform otherwise (Mort, Milligan, Roberts, Moser, 2008; Miskelly, 2001). Moreover, ICT is used to improve communications between care staff and elderly for example, video conferencing. Through video conferencing application nurses and care assistants may visit elderly’s homes virtually. It is felt that video conferencing provides equal care like physical meetings. Furthermore, elderly isolation may also reduce through accessing the care assistants easily (Nilsson, Skär and Söderberg, 2009).

Miskelly (2001) argues some information and communication technologies for elderly care such as portable alarm, fire alarm, movement sensor mats and door alarms. Persons can use portable alarms in their own homes. But this service can only be effective if the person recognizes an emergency and also have mental and physical capacity to press the alarm button. Sometimes people fail to distinguish the safety alarm. Fire alarms are used to measure the rate of change of temperature. It is used for people who have risk of producing fires e.g. smokers or who do their own cooking. Video monitor is also a technology that is compatible and it can be linked with other alarms such as a fire alarm. It generates video calls that are accessed by some authorized person. This authorized person sees the situation and calls for help. Movement sensors are also an
electro-mechanical device. This device detects the pressure as the person moves from bed or chair in any direction. It is mostly used for the alerting the caretaker to a person’s movement e.g. night time wandering. Moreover, door alerts are also useful for persons who wander at night.

A remote monitoring system— an ICT system is used to surveilled elderly for their safety and security. The remote monitoring system is a combination of wireless mobile technology, global positioning system and geographic information system. Elderly can communicate with care providers through this system. These wireless sensor devices are helpful for the elderly, who have dementia problem. In case of an emergency alert signal is sent to care assistants through phone calls. Elderly only need to wear a wireless sensor device that detects if an elderly falls and it communicates automatically with the care staff (Fergus, et al., 2011). Moreover, there are some surveillance–monitoring technologies and ICTs that establishes the network between elderly and care assistants such as the webcams and infrared sensor technology are used to monitor the elderly’s movement. These monitoring technologies are sometimes linked to the internet also for the use of care workers. Through these monitoring systems care assistants can keep an eye on the elderly’s movements or on those with dementia. This can increase the elderly safety and also reduce the care assistants’ work burden (Kenner, 2013).

In Sweden digital pen is used for information transfer and documentation of elderly daily activities. Nowadays the digital pens are introduced with universal serial bus (USB) that helps to transfer the information in computers and make the care work more convenient. Moreover for making the information sharing easier, the digital pens are also available with Bluetooth wireless technology (McKinney and Desantis, 2012). In addition, care workers use the augmented binder with digital pen to provide information to family members of elderly and other care professionals. Care workers need to open the binder in their everyday visit to access the elder person’s situation and health condition. In this binder one page is reserved for each day. The care worker writes the elderly situation of that particular day. This binder is used for collaboration and information transfer including care professionals and family members. All the information that care workers write on the augmented binder with the special pen is also recorded digitally. This recorded information supports the documentation activity related to each particular elderly person and store in the electronic health record system for further use (Christensen and Grönvall, 2011). In addition, digital pens are used in the settings where electronic health record systems or mobile technologies are not available. These special pens are a unique way to capture and record information (Mastrian, et al., 2011). There is another ICT technology known as digital key also used in social care and services. The digital key makes it possible for care workers to unlock the door with the digital key share a mobile phone. In this technology the lock motor is placed inside the door that is activated and interacts through Bluetooth (Askergren, 2011).

Moreover, care assistants also use an improved care system known as a palm pilot system to store information related to daily activities. Previously the care system was manual that increased the risk that client information would be lost. However, now the care system has improved with ICTs that facilitates the daily activities of care assistants and stores their daily work task information. The improved system- palm pilot system conducts the rescheduling for the care assistants’ day-to-day activities that have increased the security and privacy of client information (Jansson and Mörtberg, 2011).
3.3.1 Why Information and Communication Technologies in Social Care and Services?

ICT systems are developed and implemented with the aim to support the well-being of elderly. But these information and communication technologies may support care staff also and provide tangible benefits to care assistants and nurses (Gray, et al., 2008). The advance ICTs, like safety alarms, are necessary for the well-being of elderly. Through this system a person can self-manage her/his conditions assisted by formal and informal care assistants as needed. Therefore these technologies may move healthcare from hospitals and professionals setting towards homes (Mattke, et al., 2010).

Matthews (2006) describes that technology has been an integrated part in providing social services and care. With the increase of aging population and the rise in health care costs, care workers are paying attention to making the shorter stay of elderly in hospitals. The main scope of shorter stay in hospital is that the elderly can support their ability and engage in various daily activities. In other words, the elderly can also expand their ability to remain independent and functional for as long as possible. Therefore, some modifications are required in healthcare devices for the use of the elderly according to their needs. In addition, technologies are available in many forms for example technology for safety feature at home and technology for healthcare etc. Through the safety features technologies elderly can measure and support health status. Also, elderly can communicate and interact with others.

Mort, Milligan, Roberts and Moser (2008) relate the need of ICTs with decrease in working population and increase in the elderly population. They have investigated that the population of all the European countries is progressively growing older. It is estimated that the present ratio of working population to 65+ aged populations is 4:1 but it is expected that by 2050 this ratio will be shifted to 2:1. So the demands of ICTs and care workers both also increasing for provision of care. In addition Skovdal, et al. (2008) study the workload of care staff in their daily care activities. They use the term shelter housing for elderly housing. Shelter accommodation e.g. nursing homes, services homes and residential homes are elderly homes in general. The residence in most of the elderly housings has increased without an increase in staff. Furthermore, demanding behaviour of people above 65 years has also increased. This demanding behaviour of elderly is closely associated with the work burden and workload of care staff. Thus, the care staff’s workload has increased with the increase in social demands of the elderly.

Su and Chen (2010) move the discussion towards the decrease in birth rate that is another reason of increase in the elderly population. In most of the nations continuous fall in birth rate is promoting aging population. Therefore, it is becoming vital to improve the elderly’s long term care services related ICTs.

3.3.2 Challenges for ICTs in Care and Service of Elderly

There are several challenges related to providing social care to older people. For instance, elder persons demand more ability to roam freely in their homes. Yet technology that is used for home care services, such as wires, heavily built sensors and complicated interfaces, have some obstacles. These obstacles restrict the free movement and roam of patients and elder persons. This is a surveillance that is interference in
elderly privacy (Plank, et al., 2011). With the passage of time, aging and need of care has a very strong impact on society. Since technology has involved in the society- in the lives of people to provide them care. Therefore the expectation of people about quality of life has also been increasing. Through information and communication technology (ICT) the life of aged people, who are above 65 years, may improve significantly. Moreover, ICT has an impact on social care and services and ways to organize the care services. This may also influence positively on the relationship of the care workers and clients (Melander-Wikman, 2007). Nevertheless, artificial intelligence (AI) technologies that deliver care do not care about human feeling. These technologies are bad alternative of care and cannot provide real care without a human’s encouraging pair of hands. Such as monitoring systems are bad care systems that are making fools of the people who think that they are receiving real care without reducing their isolation and loneliness (Coeckelbergh, 2010).

Coeckelbergh (2010, P. 182) describes it as follows: “Good care necessarily requires contact with human since we have social and emotional needs.”

The elderly safety alarm system has some challenges. For instance, a portable alarm button that elderly wear around the wrist or neck as a pendant operates within a restricted range. Elderly can only use these alarms buttons in their home. It does not work when elderly go outside. Wide range alarm buttons should be introduced for elder person that can work with a tracking device in it. Although an organization started using these alarms (with tracking device) in 2010 but it was not used successfully. Often elderly forgot to recharge the mobile alarm. As a result, organization stopped to promote these elderly alarms (Joore, 2010). Most of the elderly who have a fear of falling used the safety alarms. But the traditional safety alarms are in the limited range that is also a problematic issue. The mobile safety alarms could be used to decrease the functional limitations (Melander-Wikman, Fältholm & Gard, 2008).

There is the design challenge of mobile technology systems that are used to support the home health organization and to enhance the efficiency of work environment. In Sweden, there are different technical support systems especially in home care of the elderly. According to the research conducted in Gothenburg (a city of Sweden) most of the care professionals want to use the technology in home care and their attitude about technology is positive. However, there are many professionals who feel technology does not support in their work but it hinders them. For example, there is the limitation of usability in mobile IT systems. Mobile IT systems are used in social services and care but there is a lack of technical support systems. There is a need to understand the problem of usability of the mobile support system. For instance, mobile screen should be large to get a large amount of information (Johansson, Lind and Sandblad, 2006). In addition, there is issue related to false sensor alarms. There are several pressure sensitive mats used for the support of elderly with dementia e.g. bed- sensors. In bed-sensors alarm foot mat is used under the bed-legs or it may use as the bedside mats. Sometime elderly may miss the step on the mat when they are getting out of their bed. Consequently alarm cannot detect the elderly movement and care workers may not know where the elderly is. Further, there is the issue of light that is activated whenever the elderly get up from bed. This light does not turn off automatically that increase the chance of alarming. Thus if fade up light would be used possibility of alarming can be reduced as it will turn the light off automatically in a gentle manner (Orpwood, 2006).
ICTs have a great impact for designing the environment for elderly and enhancing the quality of life. These technologies may support older people who are dependent of care and services performed by care assistants and health professionals. Nevertheless, ICTs has an impact on elderly person's privacy. The reason for this is that the effectiveness of ICTs is depended upon various care personnel such as doctors, nurses, care assistants etc. Therefore, there remains the risk of elderly privacy lost (Remmers, 2010). There are many communication technologies that help to support in elderly monitoring if needed. However same time these technologies have challenges of privacy and confidentiality. There is need to handle these privacy issues ethically e.g. surveillance technology for distant treatment and tracking technology (Hofmann, 2012).

Video surveillance system e.g. webcam is used for elderly safety however in addition to safety the technology also has an impact on elderly privacy. No surveillance system is without interference with elderly privacy. There is a need of automated and privacy respecting surveillance system. Such as in visual privacy, it is possible through automatically obscuring faces in real time (Fleck and Straber, 2010). The usability of surveillance technology can be increased by making sure that the information related to elderly should only be ‘real time’ and should not be stored. With future information and communication technology (ICT) development, cameras can be connected to mobile safety alarms for more safety of the elderly. But it can only be implemented if the elderly do not have the issue of being watched and surveilled (Melander-Wikman, Fältholm & Gard, 2008). Some elderly, who are surveilled through monitoring technologies, view the surveillance as positive services; they do not feel uncomfortable by being watched. Nevertheless some elderly have negative view since they think monitoring technologies are interrupted in their privacy. Due to the monitoring they have the feeling of being watched or intruded. Therefore it is needed to construct the surveillance technologies in the way that make the feeling in the surveilled elderly that they are being cared (Essen, 2008).

Similarly Fergus, et al. (2011) have studied the technological challenges of data privacy and security of elderly information. In elderly care organizations, elderly demands and requirements are gathered from a number of sources. For documentation of their demands and requirements a technological documentation system is required. Through this documentation system health care workers can get information regarding elderly’s care and services and elderly’s privacy can also maintain. Additionally, Remmers (2010) discusses the ethical issue of loss of elderly privacy. Elderly privacy is underestimated during use of ICTs in elderly homes. There is need to be careful and not to overestimate the importance of care and communication technologies.

Additionally, mobile care work also has some challenges related to documentation. Home care is a mobile work however there is no portable IT-system for mobile care professionals to register the record. Thus, an offline virtual record system is required for ease of care professionals. However implementation of the virtual record system is difficult. Since it is problematic to keep the offline system updated and there are some security issues also (Hägglund, Scandurra and Koch, 2007).

According to Mort, Milligan, Roberts and Moser (2008) it is necessary to consider the needs and desires of old people for developing new ICTs. There is huge variation between old people needs and demands. These demands and needs depend on the differing forms of ill-health that older people experience. It is essential to focus to the
improvement of life situation of older people with the emphasis on monitoring and risk avoidance. Therefore, the ICTs should be flexible enough to enhance the communication and social contact of old people. There is a need to bring different key groups, e.g. care providers, family carers, service users etc., together in the development of ICTs. Furthermore, Koch (2006) argues that challenges in system development are because of less knowledge about the elder people. It is common and bias believes of care professionals that older people cannot use technology or they do not want to use new technology. Most of the decision makers also think that the ratio of accepting ICT based services among older people is very less. However, according to SeniorWatch (old population and decision maker survey) 44 million older people have computers in their homes and 33 million old people regularly use computers. In addition, Mort, Milligan, Roberts and Moser (2008) describe that in the provision of care a lot of local knowledge is important for local care such as old people’s usual habits.

In short, there are various technologies are used by care professionals. However, for better utilization of these technologies all involved care staff should have access to internet through tools, e.g. web browser and e-mail. There is a need for new communication services for understanding all involved care workers’ tasks. Thus there should be regular meeting, workshops and training of these care workers (Winge, Johansson, Waterworth and Wangler, 2007). In addition, it is important for the successful implementation of technology to reflect the users’ situations and needs. There must be some rights to users of technology to influence on their working condition (Jansson, 2007).

3.4 Smart House Technologies

Smart houses are equipped with several devices that interact with each other. In these devices sensors activators, heating sequence and safety alarms are included. Further, a central computer is used to monitor all the equipped devices (Mort, Milligan, Roberts and Moser, 2008). The concept of smart houses is not novel but elderly in smart homes is novel. Smart houses can be divided into two types, fully automated smart house and home for elderly with a digital infrastructure. Fully automated smart houses are changed into autonomous elderly. A home for elderly with digital infrastructure offers security, trust and autonomy to elderly in their homes (Finken and Mörtberg, 2011).

Smart homes are mainly intended to monitor elderly with visual, auditory and cognitive disabilities. With all kinds of smart houses electronic devices have been fitted with sensors and/or biomedical monitors. Telecare and hospital at home services are set up in smart houses of the Europe e.g. emergency alarm and ambulatory monitoring (Chan, et al., 2008). Smart houses consist of different interactive devices. These devices are monitored with the help of a central computer. In these interactive devices sensors-activators, alarm systems and tele-care or tele-medicine systems may include (Mort, Milligan, Roberts and Moser, 2008). In addition, homes are automated through technologies to improve the elderly lives with more safety and better communication. Therefore motion sensor systems are used to maintain a good level of care for the elderly. These motion devices keep an eye on the activities of the elderly and detect the difference in lifestyle of elderly. If the difference is observed, it is informed to the caregivers (Zaad and Allouch, 2008). Smart houses can be equipped with a temperature sensor, light sensors, microphone, and pressure sensors. Older users are supported by
lifestyle monitoring system for their independent living. Moreover, sensors are used in smart houses for avoiding obstacles and to preventing dangerous conditions (Chan et al., 2008).

In this age of information technology elderly can be monitored with a lot of intelligent devices such as sensors, remote management systems and electronic applications. Sensors can be implemented in elderly homes for the continuous mobility assistance and non-obtrusive disease prevention. Through the remote management home comfort systems, such as heating, air condition, ventilation, lighting, doors and windows all can be automated and manipulated by remote control. Various electronic applications can also be programmed to carry out elderly tasks e.g. dishwashers and washing machines and cooking devices. These smart house technologies reduce physical functions of persons. Nevertheless these technologies assist elderly and help them in resolving the social isolation that they face. Smart house technologies provide safety and independence to elderly in their home. In addition, the robotic sick room can also be the part of smart houses that can give comfort to elderly and disables. It provides many useful services to its residents in order to ease their daily life. The robotic sick room includes robotic bed with smart hand and intelligent wheelchair and a robotic hoist to transfer the user from bed and wheelchair. Similarly, there are several human-machine interfaces that can control the electrical appliances automatically. These robotic systems are human friendly and help to guide the resident in all operating subsystems of the smart house (Chan et al., 2008).

The smart houses technologies are progressing by cost reduction in electronics. Likewise, information technology and communication technologies (ICTs) have also made the smart houses more cost effective and feasible. Major problem of smart houses is reliability of measurement systems. Therefore, several methods are used to decide that when an alarm should be triggered (Chan et al., 2008). Recently, smart home as a concept appears again and now it is in relation to care of elderly. The smart homes mean home embedded with computer systems, sensors, and applications. Sensors can be installed to detect the falls or to monitor health. Cell phones and two way video-conferencing tools are also being used in smart homes. These smart homes improve the feeling of comfort, enhance security and also save time (Maitra and Vasquez, 2012).

**Summary**

In this chapter I have presented a range of technologies and their concepts used in the care of elderly. However there is still need more efficient and user-friendly technologies for elderly care activities. Melander-Wikman (2007) has described that efficient ICTs have become essential to fulfill the elderly’s demands to stay in their home. Users of the technologies also have high hope on the developed technology. Thus, it has become critical to put more focus on health and social care to meet the demands of elderly and maintain the level of social care and services. Technology influences the home care of the elderly by providing social functioning and life satisfaction to older people. Through technology elderly’s public and active life can be improved. Moreover, it also helps to develop a relationship between the care staff and elder persons.

The use of information and communication technologies (ICTs) may increase the quality of elder care. Through the implementation of ICT organizations can provide
well-functioning care for elderly persons and support the professional work of care. ICT is also used to perform the administrative task responsible for elder care at municipalities. ICTs may enhance care workers' efficiency and improve the information security. Moreover, these technologies make flow between elderly and care workers. Therefore the relationship between care assistants and elderly has become unrestricted (Hedström, 2007). Nevertheless technology is not the replacement of human attention and care. But through technology elderly’s lives as well as care work can be improved (Menack and Cress, 2012).
4. Social Constructivism – a theoretical framework

In the following chapter social constructivism and its various approaches will be presented. The interpretative research within social constructivism paradigm will be discussed. Furthermore, the relationship between social construction, information system research and ICT will be discussed.

4.1 Social Constructivism- various approaches

Social constructivism\(^{11}\) is a sociological analysis of the reality of everyday life. This reality is available in the common sense of an ordinary member of society. It is important to mention that members of society do not take everyday life for granted but it is a world that is created in their thoughts, activities, and maintained in reality. Knowledge is constructed by clarification of the reality. Researchers of social constructivism take this reality as the object of her/his analysis (Berger and Luckmann, 1966). Knowledge is constructed socially through individuals who are active in a practice e.g. in a research process. Researchers try to understand the complex world with the point of view of the experience of those who live in it. Moreover, the researchers do not believe that there is any objective reality that can be known. Hence, objectivity is replaced by the concept of conformability in constructivism approach because the researcher cannot discover an objective reality but a subjective way of understanding reality. Consequently, the researcher's purpose is to understand the meaning and knowledge of various ways to construct the reality (Mertens, 2005). Moreover, it is worth to mention that in social constructivism approach, knowledge is constructed rather than to find and tightly connect with the individuals thinking (Salomon, 1998).

In addition, social constructivism is a perspective in which people seek understanding the world in which they live and work. In short, a subjective understanding and multiple meanings of the world are constructed. Multiple meanings lead the researcher to look at the complexity of views rather than reduce these meanings in specific categories. Located in the social constructivism approach, researchers focus on the specific setting and context in which individuals live in to understand their historical and cultural norms (Creswell, 2009). Social constructivism pays specific attention to and how knowledge is constructed through social interaction. Personal experiences shape the social interaction. Moreover, social constructivism shapes the way according to that we, as a researcher, see things (Ramanathan, 2008). Social constructivism is the situations in which people build their own meanings through interacting with each other. Therefore, it is an active and constructed process of learning where the knowledge is constructed within the social context in focus and people’s activities (Kelm, 2011). Often through social constructivism existence of social objects are recognized such as gender, emotion and social role (Sismondo, 1993).

\(^{11}\) There are different terms e.g. social constructionism, social constructivist, social constructivism and social constructionist. In this research they will used as synonym.
According to Mitev (2005) social constructivism helps the researcher to gain an understanding of the experienced world that each person in a society shares with each other’s.

Mitev (2005, p. 76) explains:

“Socially constructed knowledge is a ‘constitute factors of social power and the concept of power provides a central link between the construction of knowledge and social order’.”

In addition, Mitev (2005) argues that there are three main approaches of social constructivism: mild constructionist, stronger constructionist and extreme constructionist. The various approaches are characterised in the following way:

1. The most common form of constructivism is mild constructivism (Sismondo, 1993). Mild constructionist identifies the factors that influence the content or form of technology. Moreover it affects the direction of technological innovation. The mild constructionist approach is e.g. the social shaping of technology (SST) that explored how the technology is shaped in various practices. In the social shaping of technology it is believed that there is a division between the social and the technical (Mitev, 2009, p. 72). Mild social constructivism approach focus tends to be on the technological innovation rather than on the impact of technology. It is often concerned with analysing the range of techniques to identify additive solutions and to stabilize new technologies. Moreover the SST analysis can take the political incline in which particular technologies are designed to use within a particular environment (Baird, 1997).

2. In the social construction of technology (SCOT) technical artifacts do not exist without the social interaction within and among social groups that shape the artifacts (Bijker, 1992, p. 76). The social construction of technology (SCOT) is located in strong constructionist. In SCOT, knowledge is treated and the related social group assigns meanings to technological artifacts simultaneously. Furthermore, there is a division between the social and the technical same like SST but without effects or powers of the technology (Mitev, 2009, p. 72). Moreover in the SCOT approach, the focus tends to be on the social impact of technology and alteration of the technological frame of a social group (Baird, 1997).

3. Extreme constructionist perspective is known as actor network theory (ANT). It does not divide the social and the technical and reality is constructed in the interaction of human and non-human as both come together (Mitev, 2009, p. 73).

In addition, Mitev (2005, p. 71) argues that mild constructionist relates to the socially contingent form of technology. In this approach the factors that influence the content or form of technology and direction of technological innovation are identified. Moreover, Sismondo (1993) and Mitev (2005) believe that there is a separation between the technical context and the social context. Therefore, through social construction we can explore the effects of technology related to the social context in focus.
Bijker illustrates that in the social construction of technology (SCOT) approach it is difficult to apart the technical and social relations because the shape of technology is also the shape of society. However, different social groups expect different things from technology because they have different concerns and practices. Therefore, for understanding the impact of technology professional knowledge, daily practice and organization arrangements play an important role. Moreover, these factors are significant in understanding and analysing the development of technology (Bijker, 1992, p. 105). Moreover, in SCOT analysis technological changes are explained by reference to social practices especially through interpretations and closure of different social groups (Baird, 1997).

It is worth to mention that, my thesis is located in a social constructivism epistemology because the main intention is to explore the care assistants’ use and experiences of ICTs. The care assistants may not equally articulate and perceptive about the ICTs and their demands and ideas related to these technologies. Therefore social constructivism approach is used as a theoretical framework to underline the importance of the research phenomenon- use of ICTs in social care and services. In the research a strong social constructivism (SCOT) theoretical lens is used to understand the day-to-day activities of the care assistants in the context of social care and services. Moreover, social constructivism helps me to understand how ICTs impact the care assistants’ daily activities and what kind of ideas and demands they have about future ICTs. Creswell (2009) states that with a social constructivist approach the persons develop subjective meanings of their experiences after seeking to understand a specific context in which they live and work. In a social constructivism worldview the focus is on the participants’ view of the phenomenon in focus or how they create meanings in their actions. Similarly, Ramanathan (2008) argues that in a social constructionist approach, knowledge is generated that is based on the people and their way of perceiving and interpreting a context.

4.1.1 Interpretative Research within the Social Constructivism Paradigm

Interpretative research is a qualitative approach with a focus on the creation of meanings. At the same time social constructivism is qualitative approach and also deals with meanings. Nevertheless, there are some profound differences also in both approaches. Firstly, interpretative approach focuses on subjective understanding and experiences of people. Whereas social constructivism research explore that how such understandings and experiences are derived. Secondly, interpretative research focuses on outside language (subjective experience) over the language itself. Yet, social constructivism treats language as an object of study, and does not assume it neutral and transparent. However it is difficult to specify the difference between social constructivism and interpretative approach. Therefore, social constructivism and interpretative approach both can be transformed into each other (Blanche, Durrheim and Painter, 1999).

Interpretative approach treats people as the basic source of their feelings, experiences and thoughts. In interpretative studies it is assumed that people have their own subjective and inter-subjective meanings according to the world in which they live. Therefore, the focus in an interpretative approach is on the subjective understandings
and experience of individuals or groups. Hence, an interpretative study does not focus on the factual account of things (Blanche, Durrheim and Painter, 1999; Orlikowski and Baroudi, 1991). An interpretive approach provides a deep understanding into “the complex world of lived experience from the point of view of those who live it” (Schwandt, 1994, p. 118).

Since, the interpretative approach and social constructive approach both have some similar properties that make the proper combination of these approaches (interpretative approach and social constructive approach) in the research. Therefore, it is worth mentioning that, with the assumption of social constructionism the focus will be on understanding subjective meanings of participants. For instance, this thesis focuses on how the care assistants enact their particular reality of ICTs and how they enhance them with meanings. This will help me to understand how care assistants’ meanings and intentions support to make up their social action. Thus, the choice of using social constructivism as a theoretical framework in my interpretative study will examine how ICTs emerges from subjective meanings of care assistants.

4.2 Social Construction of Technology

In social construction reality is socially constructed. The reality is the subjective reality, people’s beliefs and/or people’s wishes about the world. As a result of socially constructed reality, human knowledge is developed, conducted and maintained in social situations. Thus in social construction, society as subjective reality maintains the knowledge that is constructed within the social context in focus (Sismondo, 1993). There are three approaches of social constructivism that I had discussed above are: mild constructionist, stronger constructionist and extreme constructionist. However in the social construction of technology there are different perspectives regarding the fact that technology is a product of human efforts, for instance, the local perspective and the global perspective. In the local perspective, like research programs within companies or universities, it appears true that technology is a product of human efforts. In other words social factors like human wishes, needs, and values are elements that involved in the development of technology. In contrast, in the global perspective of technology appears as an autonomous agent in which there is no social influence of the elements (social factors) like human wishes, needs and values etc. Therefore, the social constructivist approach rejects the perspective that technology can be developed autonomously. According to the theory of social constructivism people play an important role in the development of technology. These people belong to some particular social group. And this specific social group made a choice that influences the development of technology (Vermaas, et al., 2011).

Howcroft, Mitev and Wilson (2005) explore the relationship between society and technology. According to them a social constructivism approach helps to examine the impact of the technology and try to explain the relationship between the society and the technology. As mentioned above it is considered that every social problem has technological components and every technological problem has social components. Therefore, technology is assumed as effective and reliable vehicle that changes the society and organization. In addition, Jackson, Poole and Kuhn (2002) describe that constructivism approach is used for the understanding of ICTs in the work environment. Moreover, in an organizational context a constructivism approach constructs knowledge from individuals’ experiences that help in the design and implementation of ICTs.
In short, according to Howcroft, Mitev and Wilson (2005) social constructivism examine the technological artifacts that are constructed socially with the involvement of the social group. Different social groups define technology and its problems differently however there is no defined good way. However, a better understanding of technology is possible by identifying the meaning that the relevant social group attributed.

According to Bijker (1992) the artifacts are emerged out of meanings that are assigned by different social group. Various social groups have different ideas about technological artifacts and their use. In my research work, care assistants are the relevant social group. For a better understanding of ICTs I will identify and trace the meanings that will be expressed by the interviewed care assistants.

4.3 Social Construction in IS Research

The role of information system (IS) is changing gradually and has become an integrated part of peoples’ daily activities (Mitev, 2009). The information system is not the information technology only but can also be manual. It is actually the system that develops from the mutual interactions between information technology and the organization where the organization is conceptualized as the collection of people. For example: information technology consists of the technical system and organization consists of the social system. The social system poses information requirement of the technical system. The technical system poses an organization's requirements to the social system (Lee, 2005).

According to Lee (2008, p. 11)

"Information system is which results from the intervention of an information technology into an already existing system."

Technology and society have been studied by Lee (2008). He states that in information system there is needed to unfold the mutual transformation and interaction between technical systems and other systems. There are information requirements that technical system poses, similarly there are organizational requirements that the technical system poses. Therefore, designed and implemented technical system provides information that is needed by social system. Through this social information technical system changes itself. This change in technical system sets off new requirement for the organization to satisfy the social system.

In any organization there are different stakeholders with their own views or understandings about technology. When ICT is adopted, designed and/or used, its meanings are socially constructed (Lim, Sia and Yeow, 2011). There are several ways to understand the relationship between different technologies and social systems in which these technologies are developed. Technologies are not only the physical artifacts but they are also developed and used in social relations in these artifacts (Gil-Garcia, 2012).

In information system’s research the main benefit of the social constructivism approach is to consider the viewpoints of different social groups. Moreover, social constructivism approaches contribute in the understanding of different social groups and give the shape
to the features of information systems. Furthermore it helps to understand the relationship between social structures and information systems (Gil-Garcia, 2012).

In this research my focus will be on the ICTs used in social care and services with some care assistants’ point of views especially in Växjö municipality Sweden. Hence the main focus will be the participants’ use and experiences of ICTs and their interpretations. A theoretical framework that is suitable for this approach is social constructivism for a deeper understanding of the impact of existing ICTs according to the social group of care assistants. Furthermore, it will be useful to consider the care assistants’ demands, ideas and visions about future ICTs for technological innovation. Therefore, strong social constructivism as an approach and theoretical lens will be used to understand and interpret the literature, the research setting and my empirical material. The approach will underline the importance of studying the phenomenon, that is, use of ICT in social care and services. As a strong constructionist my focus tends to be on the impacts of ICTs through interpretations and closure of care assistants. I will identify the factors from existing ICTs that will help in stabilization of future ICTs and will affect the direction of ICTs innovation. Moreover through a strong social constructivism approach - social construction of technology (SCOT) it will be explored that how social group of care assistants assign meaning to ICTs use in practice of social care and services.

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12 Technical change is the stabilization of a technology together with social relation.
5. Research Strategy and Methods

In the following chapter the research strategy and method/s used in this research will be presented. First, the research strategy will be presented followed by the different methods of data collection used in the research. Then the data analysis method will be presented. Last, ethical consideration of my research will be discussed.

5.1 Research Strategy

My aim is to explore care assistants’ use and experiences of ICTs in social care and services for elderly. The strategy that I have chosen for my research is a qualitative and interpretative study. Creswell (2009) argues that in a qualitative research the researchers make an interpretation of what s/he exploits, observes and understands. In a qualitative research the researchers focus on the meaning that participants create when they tell about their day-to-day activities. The qualitative research method helps to understand how ICTs is used by care assistants in performing their day-to-day activities in the elderly’s homes and home-like institutions. Furthermore, it also helps to examine the care assistants’ demands, ideas and visions about ICTs to be used in their work practices. Hence, a qualitative research approach helps to understand the participants in a social and a cultural context. Myers (2004) states an interpretative study helps to create an understanding of the research phenomenon. For example, how the meaning is created in the interviews and in other used empirical material.

The qualitative method is used especially for gathering and analysing exploratory data. This is a very efficient method to use when the aim is to study human behaviour and behavior changes. It helps also to study a complex practice. Further, by using a qualitative approach and methods the results can be enriched with human action and behavior (Stevens, 2003). The motivation for using the qualitative research method is to gain an understanding, and to explain a social phenomenon, that is, the use of ICTs in social care and services for elderly.

According to Strauss and Corbin (1996, p. 8) “methodology is: vision, where it is that the analyst wants to go with the research. Techniques and procedures (methods) furnish the means for bringing that vision into reality.” Hence, in my research the qualitative research methods will be used together with the social constructivism research methodology as a theoretical lens. As mention previously, the reason to use the social constructivism as a theoretical lens is to gain an understanding of the care assistants’ use and experiences of ICTs in their day-to-day work.

5.2 Data Collection Methods

There are several data collection methods that are used in a qualitative research e.g. interviews and document analysis. Interviews are useful for finding out the participants' thoughts, observations, perceptions and feelings. Moreover, it allows the researchers to gain understandings of the phenomena of the others’ perspectives under study (Goodwin and Goodwin, 1996). Moreover, Goodwin and Goodwin (1996, p. 132) write about interviews as follows:

“We conceptualize interviewing as the process of getting words to fly.”
This research work consists of gathering and analysing data in order to gain an understanding of the phenomenon in focus and to address the research questions. The research work started with a planning and diagnosing of suitable method/s that would be appropriate for the data collection in relation to the aim and the research questions. It was concluded that data will be collected through a number of semi-structured face-to-face interviews. Thus, this data collection method, semi-structured interviews, will be appropriate in my examination of the care assistants’ use and experiences of ICTs.

Another technique of qualitative data collection is document collection. Goodwin and Goodwin (1996) state that in the document collection approach information is collected from a variety of existing material such as newspapers, dairies and policies etc. Similarly, Creswell (2009) describes that in a qualitative research documents can be used as empirical material such as books, journal articles, newspaper articles and videos. In the research different documents will be used e.g. books, journals, articles, newspaper reports, government/organizational policy documents and videos. The Swedish government websites will also be browsed to get an understanding of social care and services provided.

5.2.1 Semi Structured Interviews

The research interviews are a special kind of conversation that is designed to reveal the knowledge about the topic. Moreover, the interview is a joint production of the researcher and the interviewee when the methodology is social constructive (Wengraf, 2001). Interviews are also performed in social relationships in which it is necessary to consider the awareness of the complexities of emotions and intentions (Seale, et al., 2007). Accordingly, the interview is a research method that requires preparation, time to conduct the interviews, and also time to transcribe the interviews (James, 2007).

Interviews can be categories in several types such as structured, semi-structured, informal and retrospective (Goodwin and Goodwin, 1996). Semi-structured interviews are conducted when the researcher knows about the topic and has conducted a literature review. Semi-structured interviews give the opportunity to the researcher to ask additional questions to understand more clearly what the interviewee is telling. Therefore, researchers prepare an interview guide before s/he conducts the interviews (James, 2007). Thus, if the questions of the interviews are partially prepared in advance then it is called semi-structured interviews. However the prepared questions are designed very open and the subsequent questions do not plan in advance. Very often it is considered that semi-structured interviews are easier to prepare than fully-planned interviews. Nevertheless, the semi-structured interviews require more mental preparation to be asked additional questions (Wengraf, 2001).

I will use semi-structured interviews since they give the opportunity to the researcher to modify the interview guide as the interview proceeds (Bryman, 2006). In my study data was collected through semi-structured face-to-face interviews with care assistants, nurses and the middle manager. The interviews were conducted between January 2012 to July 2012. Seven care assistants, who worked in home-like institutions or elderly’s homes, participate in my research. Two nurses, employed at home-like institutions, were also interviewed. In addition, two interviews were conducted with a middle manager who is responsible for elderly care in the municipality. The first interview was
conducted in February 2012 and the second in June 2012. The interviews with the nurses and the middle manager were conducted to understand how the care work is organized in the municipality. All the participants were employed in Växjö municipality or by private providers located in Växjö.

The recruitment of the informants was carried out in the following way. Some participants were contacted through the Växjö municipality office and other directly by using some friend’s contacts. The interviews were conducted face-to-face in the participants’ preferred setting e.g. in private spaces or the participant’s offices that is in accordance to the feasibility of the participants. An interview guide was used in all interviews, see appendix B. The interviews lasted between 35 to 45 minutes and they were recorded after the permission of the participants. These recordings helped in the later transcribe and analysis as well as social construction. I began the interviews by explaining the participants about my research, issues of confidentiality, asked them to read and to sign the inform consent\textsuperscript{13}. Moreover, I asked the participants’ permission to record the interview, see appendix A.

5.2.2 Documents- organizational policies and websites

Documents can be used to explore the social phenomenon in focus. Creswell (2009) describes that in qualitative research; books, documents, newspaper articles and videos can be used to understand and explain social phenomenon. In my research I have used documents such as policy documents of the municipality, a care brochure and organizational chart\textsuperscript{14}, that is, budget and business plan of care organization of the Växjö municipality. The documents were used to understand what and how social care and the services Växjö municipality offers to elderly. In addition, newspaper articles were used, I selected the articles that had information related to new developments in ICTs. These news articles gave me understanding about current ICTs and modification that should bring in the future technology, see appendix D.

Furthermore, websites were also helpful for gathering data to some extent. Through government and the municipal websites I came to know how social care and services are organized in Växjö municipality and what kind of services the municipality offers to elderly. These websites provided a more complete understanding of the structure and stakeholders of the social care and services in Sweden. The following websites were used: www.vaxjo.se, www.manskligarattigheter.gov.se, www.sweden.gov.se and www.SKL.se. These websites were browsed between February 2012 to May 2012. I have selected the WebPages that were related to the social care and services and the Swedish social care policies, see appendix E. Further, some YouTube videos such as Anotogroup (2009) were also viewed to understand how different ICTs such as digital pen, related to my research, are working.

\textsuperscript{13} Two participants labeled Nurse A and Care assistant F did not sign the inform consent.

\textsuperscript{14} Care brochure and organizational chart of Växjö municipality both I translated from Swedish version to English language. Care brochure is title with omsorg I Växjö kommun (Care in växjö municipality). And organizational chart is title with budget och verksamhetsplan omsorgsnämnden (budget and business plan of care board).
5.3 Data Analysis

As stated in the previous section, a qualitative approach has been used. In the following subsection I will discuss the data analysis used to capture and understand the empirical material. Strauss and Corbin (1996) state that, data analysis is similar to interplay between the collected data and the researcher. The analysis is the ability of the researcher that to identify categories, make comparisons and extract the innovative scheme from the unorganized data. In addition, Creswell (2009) describes that qualitative data are analyzed as follows: firstly the data is organized. Secondly, raw data is transcribed. Thirdly, the data is categorized after throughout reading in a number of themes. Fourthly, each theme is described and a comprehensive analysis is made about what the themes contribute to understanding the data. Lastly, themes are interpreted and its meaningful sense is made.

The analysis process is explained and visualized in Fig. 5.1.

![Diagram of Identifying Pattern and Developing Themes](Forest and Meunier, 2005)

Figure 5.1: Visual Representation of Identifying Pattern and Developing Themes (Forest and Meunier, 2005)

Morgan (1997) states that thematic analysis means themes emerge out of the data through the research questions. By reading the text, themes come out to organizing the item in similar themes. These themes are related to one another and used for further analysis to detect themes and making patterns. To make the analysis close to the text, data examines back through and relate to the original text.

Boyatzis (1998, p. vii) states about a theme as follows:

"A theme is the pattern found in the information that at a minimum describes and organizes the possible observations and at maximum interprets aspects of the phenomenon."

Thematic analysis is a coding process in which important information is recognized and before the process of interpretation it is encoded. Thus, a good coding process is important for getting qualitative richness of phenomena (Boyatzis, 1998). In addition, states that the transcript of the interviews into text themes is identified from the textual data. Rereading and examine the transcribed interviews line-by-line helps in micro analysis (Morgan, 1997).
The transcribed interviews were read many times to identify patterns in care assistants telling about their work and use of ICTs. Through a thematic analysis I have found some meaningful contributions of the themes that emerged out from the transcribed texts of my research. I have performed the thematic analysis in the following way:

1. After listening all the recordings of the interviews, I transcribed them.
2. I read and re-read all the interviews to recognize similarities and difference in the interviews with an aim to identify patterns.
3. The identified patterns were highlighted by assigning labels in order to create themes and documented where and how patterns occur.
4. Following on, to identify and develop themes, I organized this encoded information by combining the related patterns in one place to make one category. Thus, I listed the themes for future analysis.
5. Finally, I concluded the analysis by making themes and describe each theme within a few sentences.
6. A thick description of the results was presented for understanding which themes are making a meaningful contribution.

5.4 Ethical Considerations

In this subsection I will present the ethical issues that I considered in my research. One of the most common ethical issues is not developing the quality of interaction between the researcher and the participants. The lack of quality of interaction associated with low response rates in a research. A qualitative research explores and examines peoples’ experiences and makes the relationship between researcher and participants and creates trust. The quality of the social interaction between the researcher and the participants helps in accessing information to understand the phenomenon in focus. Further, this close link between the research and beneficence is important for the well-being of participants and avoiding to harm them (Creswell, 2009). Another common ethical issue is to declare the purpose of research to the participants and to inform them about their contribution in the research. The participants must be adequately informed about the research in which s/he is taking part and what kind of benefits from the interviews are supposed to result in (Jacobsen, 2002). Similarly, the autonomy principle is the respect of others’ confidentiality and privacy. Every participant in the interview has equal right to make her/his own choice and take action according to her/his belief system (Key principles ethics, 2012). In addition, this is the ethical responsibility of the researcher to consider the importance of participants’ time if they are not easily accessible. Interviewers should not disturb the personal routine of the participants of the research. In my research, the interviews have been conducted according to participants’ feasibility on personal setting of participants or their chosen place where they feel comfortable. Further, as a researcher, respect of the research site was also considered without disturbing the participants’ activities (Opdenakker, 2006).

There are always some ethical issues in research that researcher need to pay attention. There has not been a violation of human right and participants should not involve in any type of legal, social, psychological harms. In my research participants were adequately informed of the research aims and objectives. The participants were also informed about the main features of the research, its overall purpose and the research benefits, before the interviews were conducted. The informed consent was followed for taking
permission before conducting interviews. All the participants were informed that the focus is on their use and experiences of current ICTs and their demands and ideas about future technologies. Further, the interview time was booked in advance, before the participants’ visits to minimize the disruption in the flow of participants’ activities. In addition, I informed that they have liberty to withdraw from participation in the research and that s/he is also free to withdraw her/his consent to participation at any time without any explanations.

The ethical aspects such as a written permission from participants, confidentiality, privacy of participants, respect the autonomy principle, saving participants’ time has also been considered. Since, the research is about social group of care assistants so as an interviewer I considered how to improve their situation during participation. Therefore, for more ease of participants I focus on stress-free interviewing technique and created the low stress interview questions. Participants’ privacy was protected to convey protection to all individuals involved in the study. Furthermore, the confidentiality of participant’s identity and place of work must be under consideration. Therefore, all the information related to participants was kept confidential. It was expected that participants may feel hesitate to share their experience and want to have their identity confidential. Therefore, I used the Autonomy principle in my research. There was no sensitive information collected in my research however, As I have mentioned earlier that voice recorder was used in the research interviews. However, permission was taken from interviewees’ whether they are convenient in using it.

The research topic is related to a social issue, that is, the use of ICTs in social care and services. Hence, there are also some research challenges and in my research. Firstly, there was a challenge to get access to the care assistants who worked for social care and services offered to elderly. Therefore, I contacted Växjö municipality’s office to get participants’ contact. Secondly, language was also a challenge as I cannot speak Swedish; maybe some participants do not understand English. Thirdly, the research was conducted in Sweden where the dominated language is Swedish. Thus, it was expected that the participants may not speak English properly and not express their ideas in English language. Fourthly, it may be possible that participants never thought about changes that should be made to improve the ICTs in the future. Fifthly, it was difficult to focus on all technologies that were used for social care of the elderly such as transferring technologies, domestic technologies and ICTs. Therefore, I have chosen only ICTs to examine. Since it would not be easy to examine all the technologies that nurses and care assistants used to assist the elders.
6. Empirical Findings

In the following chapter the analysis of the empirical material will be presented. First, the organization of the social care and services for the elderly together with the procedure to apply services will be described. This builds on the interview with a middle manager. Second, the interviewed care assistants’ daily activities will be presented. Third, the identified themes of the ICT memo recording and other services, documentation, safety, monitoring will be presented. This will describe the ICTs that care assistants use in their daily activities. Fourth, the emerged out the theme of demands and improvements to existing ICTs with the sub-themes problems related to safety alarm, movement sensor and suggestions electronic health record system will be described. Lastly, the identified theme of ideas and visions about ICT with the sub-themes, degree of involvement in the development of ICT and privacy of the elderly will be presented. In every sub-section first I will discuss the arguments of the care assistants who worked in home-like institutions following with the arguments of the care assistants who worked in elderly’s homes. Moreover, I will list the research themes and their contents will be presented in the summary at the end of the relevant subsection.

6.1 Organization of Social Care and Services for Elderly

The research was conducted in Växjö municipality, Sweden. The middle manager explained how the social services and care for the elderly is organized. The Växjö municipality organizes the elderly care into subdivisions. There are two middle managers who are responsible for the care offered to elderly and persons with impairment. One of them is responsible for elderly care and the other for care and service for persons with disabilities, see Fig. 6.1. Additionally, there is a director of the social welfare services (known as a social chef in Swedish), see the top of Fig 6.1. The director communicates with politicians who are responsible for the whole department. The middle managers work as subordinates to the head of the department.

The municipality divides Växjö in ‘30’ town district units with an assistant manager responsible for each unit, see chapter 4 for a more detailed presentation of the organization. There are 18 assistant managers who are working under the supervision of the interviewed middle manager, see Fig 6.1. They are responsible for each town district unit of Växjö municipal. The assistant managers are assigned according to the area size of the town district. For instance, there can be two assistant managers in one town district if the area is big, depending on how many elderly live in the area?

In general, 22 to 25 care assistants are assigned to each town district unit. The number is dependent on the number of elderly in the specific area. Moreover, it can vary according to the services the elderly of that area are offered. The middle manager explained it in the following way:

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15 Elderly can live in traditional apartments, houses or senior housings. In this research, all these housings are presented together as elderly’s homes.
16 Middle manager is known as omsorgschef in Swedish
“The assistant manager of the specific area of municipality decides how many care assistants are needed; it can be 22 to 25 numbers of care assistants in any area.”

Furthermore, there are 500 care assistants who are employed to conduct care work for the elderly in home-like institutions and in elderly’s homes. The middle manager explained the care assistants in following way:

“The assistant manager of a town district assigns care assistants for different elderly persons and give them instruction what they have to do.”

The organization of the care and services provided to the elderly is illustrated in Fig. 2.3. The interviewed middle manager illustrated the detailed organization by drawing the diagram, see Fig. 6.1.

The care is also provided to elderly by private providers. Växjö municipality has an agreement with five private providers\(^\text{17}\) that provide care for elderly. One provides services and care for elderly people in their homes. The other four provides services and care in home-like institutions. Hence, Växjö municipality has implemented the LOV-the Act on System of Choice, developed by the current national government to give choice to elderly to select different kinds of elderly care and services.

6.1.1 The Procedure to Apply Care and Services

As stated previously, in Sweden the Social Service Act (1992, 1993) regulates the care and services provided to elderly persons (Regeringskansliet, 2011a). The interviewed middle manager explained that municipalities are responsible to get information about the elderly who reaches 75 years. When an elderly person needs care or service s/he can

\(^{17}\) Private providers companies are known as partnerskap in Swedish.
contact the municipality or their relatives or neighbours can contact the municipality. Furthermore, when an elderly’s application for care and services come to the municipality the municipal staff, care assistants, social workers, physiotherapists and occupational therapist all discuss the elder person’s physical condition with municipality’s employed nurses and make decisions about the care and services that elderly should take. Moreover, when a person gets older, the municipality staff visits the person in her/his home to explain about the municipal services that elderly can obtain. The middle manager explained it in the following way:

The municipality has a system, when elderly is 75 years then special staff go and visit elderly to inform them about services. Everyone over 75 years gets this information from the municipality.”

Hence, social workers visit elderly in their homes to explain what services the municipality can offer. The middle manager explained that there are 15 social workers in Växjö municipality who are responsible for the care and services to elderly persons. The social workers also decide what kind of care and services will be offered to elderly person according to her/his requirements. It is worth to mention that the social worker registers the application and decision in an electronic health record system to be used for the further process and providing the services to the elderly.

6.2 Care Assistants’ Daily Activities

The participants of the research explained, as I also mentioned in chapter 4, that there are two kinds of housings for elderly in Växjö municipality, home-like institutions and elderly’s homes. First, home-like institutions are for the elderly who need extra care and attention and want to stay closer to care staff. Second, in elderly’s homes are for the elderly live independently with additional care services. Care assistants are assigned to perform additional services and support for elderly. The elderly’s homes can be any kind of private housings, e.g. houses, traditional apartments and senior housings.

The aim of exploring the daily work activities of the care assistants was to explore how do care assistants used number of information and communication technologies (ICTs) during their everyday work routine. There were seven care assistants, two nurses and one middle manager, who participated in my research. The care assistants will be called care assistants A-G, and the nurses; nurse A and nurse B.

There are a variety of ways to organize the daily work of care assistants. In the municipality where my research was conducted, care assistants work is organized differently in home-like institutions and in elderly’s homes. In home-like institutions care assistants work in a same building and remain available around the clock. Nevertheless, in elderly’s homes there is no around the clock services are performed through care assistants. Only offered social care and services are provided to elderly only on their demand. Therefore, in the following subsection I first present the way to schedule care assistants’ daily activities with technology or manual. Then care assistants daily routine will be presented.
6.2.1 Organization of Work in Home-like Institutions

The middle manager explained that same social care and services are provided to elderly in home-like institutions and elderly’s homes for instance, food serving, cleaning, washing and shower etc. However, the degree of needed care is different in home-like institutions and elderly’s homes. Further, s/he explained that sometimes elderly need more care and attention therefore they want to be closer to the care staff. Sometimes elderly want to live independently and do not want to stay in home-like institutions. Therefore, care activities are organized in different ways in both houses. The middle manager of municipality explained it as follows:

"Växjö municipality provides same services that are given to elderly people in special houses and elderly's homes."

Every home-like institution has one head manager (a nurse) on every floor of the house. The nurse A explained that there are eight to nine care assistants available at a time in the house. However, the number of care assistants may vary, it depends upon the workload. Nurse A explained it as follows:

"We have one manager (head nurse) per floor who is responsible for the schedule and making sure that we have enough care staff etc."

Thus, there are several floors (known as units) in a home-like institution where the elderly live in their own apartment. The number of staff per floor differs depending on the elderly and their specific needs, that is, residents may have different needs. The home-like institutions where I conducted my research used a scale from 1-5 to the care coordination. The elderly are placed on a scale from 1-5 depending on how much care and attention they need on a daily basis. Care assistant A, explained it in the following way:

"There are 9 apartments per unit and usually we are 2 workers per unit. On other units we are 3 workers because of the workload. Sometimes in the afternoon we are alone during the hours when the activity is predicted to be relatively low. We are also alone on our unit for approximately the first hour in the morning and the last hour at night."

In home-like institutions care workers worked in shifts. One interviewed care assistant F described the shifts as follows:

"We start our shift at various times depending on if we are working days or nights. If you have a day-shift you start at 7:00, 7:30, or 8:00. If you are working night-shifts you start at either 13:00, 14:00, 15:30, 16:00, or 16:30."

There is the constant communication necessary for care work in the team. Care assistants of the home-like institutions of elderly discussed that they do not communicate with their manager daily but only on specific days. However, they have
daily contact with their colleagues. One of the interviewed nurses, the nurse A, explained it as follows:

“It is important that we work as a team with our colleagues so there is a constant communication. We do not communicate as often with our managers as they are not always in the office, only on specific days.”

The daily routine of the care assistants and what they do in their work practice was also discussed in the interviews. Participants who worked in home-like institutions said that they sit in their office. And during the day they visit the elderly in their apartments several times or whenever the elderly needs care. Care assistants start their job according to the shift. For instance, if they start work at 7am then they begin by getting a report from the night-personnel’s report. For this purpose, the care assistants use some technology.

Furthermore, each unit in a home-like institution has their own routine in the morning and evening. Such as if a care assistant starts her/his job in the morning they begin to prepare breakfast and start to give medication to those who need to take medicines. The interviewed nurse, nurse-A, explained the daily routine in the following way:

“Every day a nurse gives medication, takes pills from pharmacy and gives this to care assistants and after that care assistant gives medicine to elderly.”

The participant who worked in home-like institution also explained they use a medicine bag. This bag is called manufacturing bag. In this bag there are medicines that are already arranged in a proper way by district nurses. Care assistants only need to open this medicine bag and give the medicine to elder persons according to the order in the bag. Care assistant C, who worked in home-like institution shared her/his daily activities in the following way:

“Daily we go to elderly and we do cleaning, cooking food, washing, help in shower, bath and give food delivery. We give the medical facility sometimes.”

The interviewed participants of home-like institutions explained that some older people get up early, other later. Also, some manage all of their morning routines on their own and some need help with everything. However, most of the older people have had breakfast at 10-11 am. Those who are scheduled to take a shower that day will have that done between breakfast and lunch. The lunch is served at 12:30. Hence, the routines are customized according to the elder wishes. There are some special activities also arrange for the elderly in home-like institutions. For instance, the priest or hair cutter etc. comes if needed.

The care assistants of home-like institutions of elderly explained that there are various activities which they perform. For instance, some of the elderly might need help with getting some rest, go to the bathroom, have their apartment cleaned, getting clothes washed, clean the kitchen and/or set the table for lunch etc. Furthermore, after the lunch the care assistants need to clean up the kitchen and send back the rest of the food carried
with all the containers. Also, this is the time when the majority of the elder people will want to get some help to go to bed and doing some rest. There may be medication time also for some elders for instance, 12:00 and 14:00 which care assistants will hand out. Care assistant G, who worked in a home-like institution, explained the daily routine as following way:

“There are different appointments of elderly daily like psychiatric nurses, dietician, occupational therapist and physiotherapist. Also priest, and hair cutter comes if needed.”

6.2.2 Social Care and Services in Elderly’s Homes

Care assistants who provide social care and services in elderly’s homes explained that they only perform care activities in daytime. Further, another participant explained that the work is divided in the morning shift and the afternoon shift however there is no night shift. Moreover, care assistants can work a maximum eight hours in a day. Care assistant E, who performed care work in elderly’s homes, explained it as follows:

“There are three care assistants work at a time and one care assistant serves almost 9 elderly persons.”

In elderly’s homes the daily routine is different from home-like institution but the care services that are provided are similar. Care assistant B who provided social care and services in elderly’s homes explained that every morning before the start of work they have a meeting with the assistant manager of their area in which s/he tells to care assistants that what they have to do today. A care assistant spends around one and half hour to two hours to one elderly’s home. However, the time they use in a person’s home is actually based on the services that elderly are offered. Some elderly need help once in a week and other needs care and services 5 days per week.

Furthermore, when the question was asked about the daily routine of care assistants who worked in elderly’s homes, one of the participants explained that they clean elderly cloth, make food for them, give food delivery, help older people in the shower, and give them medicine if needed.

Another care assistant who worked in elderly’s homes explained that the morning shift care assistant reads the previous day report of the elderly such as if there is any special event related to elderly or any instructions about the elderly health condition. Further they help the elderly in washing, shower, and bath. Moreover, care assistants make food for elderly person and arrange tables for them. The interviewed care assistant E explained it as following way:

“We cook and bake food for elderly and serve them. Elderly can come in the kitchen and help us in cooking but it is not allowed to elderly to cook themselves without our assistance.”
6.2.3 Schedule with Technology or Manual

Schedule and attendance systems are different for care assistants of home-like institutions and elderly homes. In this subsection first I will present the schedule system in home-like institutions. Then schedule system in the elderly’s home will be described.

Participants who worked in home-like institutions explained that they have manual schedules about their daily job. In addition, they have various dairies for all plans and schedules. Moreover, the schedule is in the form of a binder which contains the schedule of the staff for approximately 1-1½ weeks onward. In these binders one sheet is assigned for one day, on which all workers and their times are listed and it is also mentioned which day, in which floor and with which co-workers the care assistant will work. Further, participants explained that head managers give out the schedules to care assistants that they can also access online from their home computers. Nurse A, who worked in the home-like institution, described schedule as follows:

“We have binders where each day is given one sheet where all the workers and their times for that they are listed. It is also on this page where you can see where you will work that day, in which unit, and with which co-workers.”

Further, the care assistant F, who worked in a home-like institution, explained that if personnel is sick and cannot come at job to perform duty, s/he must have to contact with the group manager or it is also possible that personnel find her/his substitute for that day. In case, if any care assistant was ill but feel healthy and ready to come back to the job, it is necessary for her/him to report herself/himself before the next shift approximately before 12 o’clock noon.

Nevertheless, in the elderly’s home schedule and attendance system is organized in a different way. Care assistant B, who worked in elderly’s homes, explained that s/he used electronic schedule system. S/he explained that her/his work is mobile therefore technology is use for scheduling and attendance. Care assistant B explained about schedules and job timing in the following way:

“Job timing is different, every day its change.”

However, electronic scheduling and attendance system is not equally implemented in all elderly’s homes. In some elderly’s homes the technology is used for care assistants’ daily attendance. Nevertheless, in other elderly’s homes schedule and attendance system is manual. The care assistants explained that care workers do not sign any attendance notes or not log-in anywhere to show that they have entered the workplace on time. This is every personnel own responsibility to keep track of them. Care assistant E, who worked in elderly’s homes and employed by municipality, explained it as follows:

“Schedule system is manual. Some people have kids they want weekend free. It is not possible to manage by technical system. The manual system is good for these colleagues but it is time consuming.”

Care assistant E explained the schedule system in the following way:
“Schedule is manual, we also have access to a program called Medvind, which we can access online from home, where all our duty hours are registered.”

Similarly care assistant D, who worked in elderly’s homes, explained the attendance system as follows:

“There is no attendance system. If anyone cannot come for the job they report to reception.”

In short, schedule and attendance system varies from housing to housing. Information and communication technology (ICT) system is not equally implemented in all kinds of elderly housings. Care assistants who work in home-like institutions, either under municipality or in private company, did not have to sign any attendance or log-in anywhere to show that they have entered the workplace or have started their job. Nevertheless, the care assistants, who work in elderly’s homes, used ICT for attendance that I will discuss under subsection 6.3 of the chapter. However, there are some elderly’s homes also where schedule and attendance system is still manual.

Hence, daily activities are the scheduled tasks that care assistants perform in their everyday routine. Daily activities are the overall theme of the presented material. The contents of the daily activities are cooking, food serving, washing, shower, cleaning, lives, work in shifts, monthly staff meetings.

6.3 Information and Communication Technologies

The aim of my research was to explore the information and communication technologies the care assistants use in their daily activities. However, there are many technologies that care assistants used in their social care activities e.g. domestic technologies, ICTs, lifting and transferring technologies e.g. bed controller and electronic chair. The domestic technologies and the lifting technologies are excluded from my research. Since, my focus on the research has been ICTs. Therefore, in this subsection ICTs that emerged out from the analysis will be presented. The theme of the ICTs are an ICT memo recorder, electronic health record system, safety alarms and monitoring technologies.

ICTs that are used to support the care assistants in their work practice and for elderly safety were discussed in the interviews with care assistants. All the care assistants and their colleagues used several technologies during their everyday activities. The interviewed care assistants explained that for using these technologies only one or two days training is needed. Moreover, they also get some paper notes about how to use the technology. Meanwhile whenever any care assistant forgets the use of technology, s/he can read the given notes.

6.3.1 ICT Memo Recording and Other Services- digital pen

The ICT memo recording- digital pen was an ICT used by care assistants who performed their work in elderly’s homes. Digital pen is a device that is used by care assistants who has a mobile care work and visit elderly’s homes to perform their care and services. It is used for recording the elderly’s health condition and their daily events
and activities. Moreover, it is also used for information transfer and time scheduling of care assistants. Thus, the digital pen increases the sense of security for elderly and makes the utilization of time more efficient through surveillance and control of care assistant’s daily routine. They use a digital paper and the digital pen to record the elderly condition and their daily activities. In contrast, care assistants, who work in home-like institutions, do not use any technology for time scheduling and recording the elderly’s daily conditions and activities. Since, they work in the same building where the elderly live. Therefore, they can easily go to their office and can note down the elderly condition. Afterward they can again go to the next elderly if needed. Care assistant B explained that the digital pen is known as ‘mobi pen’ in the municipality, s/he said:

“The mobi pen is based on the digital pen and special digital paper.”

In addition, care assistant B described the digital pen, s/he said:

“Mobi pen is used to register the care assistant time at elderly homes. Every day care assistants take the pen before starting their job.”

Further, the care assistant discussed that every morning s/he checks the work schedule on her/his work premise. S/he can also read on the computer what had happened to the elderly during the last visit. After that the care assistant picks a digital pen so called “mobi pen” and goes to an elderly home. Care assistant B explained the digital pen in following way:

“We have pencil called Mobipen, It’s a pen with memory inside. When I start my work, I have sign than I said start. I punch the pencil than it fixes. Then offices and all staff know I am starting job.”

There are a number of tasks that care assistant perform simultaneously. The care assistant B discussed the procedure of time scheduling and recording of the elderly’s condition during the interview. S/he explained that when s/he reaches the elderly’s home first s/he punches the digital pen on the entrance door. This punch records the starting time and also show to other staff that the care assistant has started to work. Moreover, s/he said all the services that care assistants perform during the day, in the elderly’s home, are documented in a paper-based binder with digital pen. The digital pen simultaneously recorded this information. The paper copy of the information is put in a binder to be left in the elderly’s home. Hence, it is also used as a receipt of service. Other assigned care assistants and elderly’s relatives can get information from this binder. The care assistant records information about cleaning and showering and can also record any important observation during her/his visit. The interviewed care assistant B described the procedure of recording, s/he said:

“We have to write on the digital paper using the digital pen known as mobi pen. Everything we write on the paper is registered in mobi pen. During the day we look around and ask the elderly “are you ok” then we go to the next
elderly. I only use mobi pen. I write on mobil pen and attached it with the computer that is located on my office. All the recorded information is transferred to the computer for later use. All the related staff can see that during the time that I was working and had no problem.”

After finishing the daily activities, the care assistant again punch the digital pen in the entrance door before leaving the elderly’s home. By doing this the total visiting time of the care assistant in the elderly’s home is recorded and stored in the digital pen. At the end of the working day the care assistant goes back to her/his work premise and transfers the information from the digital pen to a computer and can see the information on user friendly environment. The care assistant B said:

“Care assistants write on paper and then they transfer it to computer after going back from job.”

Care assistant B explained the report procedure, s/he said:

“If I write with the digital pen that this person need more morning help. Then when I return to my office and connect my digital pen to a computer to transfer the information. When the information is transfer to the computer it would tell everything that I did during the day. This information is accessible to the manager or other relevant staff.”

The middle manager of the municipality, where my research was conducted, said that digital pen is used by mobile care assistants only, who visit elderly’s homes for providing care services. S/he explained that digital phones, so called “mobi phones”, will replace the digital pens in the near future. These digital phones will be applicable after one year. Through digital phones, care assistants can register elderly’s conditions and daily activities on the phone. There will be no need of digital pen and paper. S/he said:

“In place of the mobi pen there will be mobi phone, now care assistants write on paper by using mobipen but in the future after one year they can write on the mobi phone and then transfer the data directly to a computer.”

Thus, digital pen is used for time scheduling of care assistants, recording the activities and information transfer. However, it is only useful for mobile care assistants who work in the elderly’s homes. It is not used in home-like institutions since they can easily go to their work premise for documenting elderly conditions and events. However, it is necessary to mention that the digital pen is not equally implemented in all elderly’s homes. Care assistant D, who work in elderly’s homes, and was employed by municipality explained that the scheduling system is manual they never use digital pen for scheduling.

Hence, the Mobi Pen is an example of ICT that capture handwriting with an aim to digitize the data and support the care assistants in recording and information transfer.
The information registered and transferred are: time scheduling, recording, surveillance and control.

6.3.2 Documentation - electronic health record system

A technology that is used for organizing the administrative task is the electronic health record system. This is a system that is used by care assistants for documentation of the elderly care activities. The electronic health record system is used for the documentation of the elderly’s needs, services and everyday activities. Every day after finishing their duties, care assistants need to give a short report to the care assistant who is in-charge of the next shift.

Documentation System in Home-like Institutions

In home-like institutions, care assistants log-in to the electronic health record system for documentation of everyday activity. Through the use of electronic health record system very less time is spent on administration since the system provides guidance for elderly’s specific health care needs. Moreover, it is a security system that increases the elderly safety. The care assistants report directly in the electronic health record system. Care assistant F explained the documentation with an example, s/he said:

“We document all social and medical happenings in a system called Safe Doc. The nurses, occupational therapist and physiotherapist can also document in this system. We can also communicate verbally with our co-workers about what has happened and what needs to be done before the end of the day. We can also communicate by writing notes to the staff, these notes are saved in the system for the concerned staff to read, this might include information such as; elderly X is interested in getting her hair cut, please see if there are others which are also interested so we can call for a hairdresser to come to the service building.”

Care assistant G explained:

“No oral feedback is given at the end of the day. But we register all activities and information related to the elderly’s condition in the computer e.g. if there is a need to give medicine.”

Care assistants document in the ICT documentation system what had happened during the day. Moreover, they also document if there were any specific events or medical situations for any of the elder. Care assistant A explained it as follows:

“When care assistants start her/his shift then they update themselves on the customer’s situations and log-on to the system called Safe-Doc where all personnel register both social and medical events of each individual living in the
Care assistant A, further explained:

“At the end of a working day care assistant give a short report to the personnel which are going to work the afternoon/night-shift. The care assistants log-on to the Safe-Doc system again and document what had happened during that day, if there were any specific events or health problem.”

The interviewed care assistant A explained that the electronic health record system is a program/application that is installed on a computer where care staff documents the social and medical activities of elderly. Through the electronic health record system all care assistants can read the elderly’s everyday activities and health condition if needed. For instance, what has been done and what do they need to do related to elderly. Care assistant A discussed that electronic health record system is known as ‘Safe Doc’ in the home-like institution where s/he worked, s/he said:

“We use Safe Doc that is an electronic health record system; it is a huge database with different search files. In this system all personnel documents both social and medical events of each elderly. So that care assistants who had not been at work that day, can be updated can read and know the elderly’s condition.”

Care assistant F explained also the electronic health record system through an example, s/he said that the elderly are checked by a medical doctor and the doctor refers the old person to an orthopedist, who examine the elderly and give her/him right treatment. Meanwhile a lot of different things also could happen. Perhaps the orthopedist might need some extra information about the elderly in order to feel confidence in her/his decision about treatment. Afterward the orthopedist can prescribe a pain killer for elderly or may a medical doctor has suggested the elderly is in need of psychotherapy treatment. All the information is recorded in the electronic health record system called ‘Safe Doc’. This ensures that no information will be lost and the medical process will work smoothly during the whole treatment. The interviewed care assistant A discussed the electronic health record system in the following way:

“When care assistants sit in their office, they see the day to day condition of older persons with the use of an application that is called Safe Doc. The care assistants can see if there is anything wrong with the elder persons.”

**Documentation System in Elderly’s Home**

The interviewed middle manager explained the electronic health record system that is used by care assistants who work in elderly’s homes. S/he said care assistants transfer details of elderly’s health condition and everyday events from the digital pen to the electronic health record system. This system is accessible by care staff only. However, it doesn't allow any care assistant, to whom elderly is not serving, to read/see the detail
about elderly. In addition the middle manager added that electronic health record system is the municipality electronic documentation system that is not connected with hospitals. Medical doctors are not allowed to access the detail about elderly through electronic health record system. For instance, if any medical doctor needs some detail about an elderly then first the municipality take permission from the elderly person. If the old person gives her/his permission, the detail is provided to the doctor. The middle manager said:

“Only care assistant and assistant manager who work for an elderly can have access to her/his detail, no other care assistant can read that information.”

Hence, electronic health record system is an example of ICT that is used for documentation with the aim to increase security of elderly's recorded information as well as improve the care assistant’s administrative tasks. The contents of the documentation are to register the performed services, less time spend, security system, documenting elderly needs and documenting daily activities. The WebPage www.safecare.se also provides information about electronic health record system- Safe Doc that is used for documentation.

### 6.3.3 Safety- alarm system

Safety alarms were also a theme identified in the empirical material. In this subsection I will first present the safety alarm in home-like institution then safety alarm in elderly’s homes will be presented. These alarms are ICT that is used for the communication between elderly and care assistants. The safety alarms enable the longer stay of elderly in their homes and improve their well-being and independence living. In the municipality where my research was conducted safety alarms were also used. The elderly can take the service of safety alarm at 75 years or over without any decision. However, the elderly can also take the facility of safety alarm after 65 years in case of physical disability. The use of safety alarm system was also discussed in the interviews with the care assistants.

The safety alarm system consists of three components a portable alarm button, a mobile phone and a speaker. These safety alarms are connected to a wall socket of elderly’s digital telephone and internet connection. Whenever elderly need help, s/he presses the alarm button to get in touch with the emergency response center. The alarm button is a portable alert button. Elderly wears the alarm button that resembles with a wristwatch or a necklace to be used in an emergency or if something urgent happens e.g. elderly falls down or become ill. However, the alarm button only works when a person is at home.

**Safety Alarm In Home-like Institution**

In home-like institutions the portable button is connected to a speaker. Further, the speaker is connected to the care assistant’s mobile phones. The interviewed care assistant A told about the alarm button, s/he said:

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18 These mobile phones are not like ordinary mobile phones, these are special cordless phones with big and easy to read buttons and screen options.
“The elder has an alarm button as a bracelet around the hand wrist that they can press. It is also available as a necklace if they rather want that.”

Another component of safety alarm is the mobile phone care assistants use for communication with the elderly. These mobile phones are special phones that work with batteries and they need to be charged. Care assistant A explained the phone, s/he said:

“Mobile phone needs to be charged. It is not very often happening that mobile phones are not charged but it happens very rarely, if something is wrong we have special people that are responsible for the alarm at my work who can fix it.”

Care assistants explained that mobile phones are only for communication with elderly. They have an internal system and care assistants can only use the mobile phones in the building. They cannot use these mobile phones for their personal use. Further, these mobile phones are one way phones as care assistants can only receive calls of elderly but they cannot call the elderly with the phone. Care assistant F explained the use of the mobile phone:

“Care assistants use special mobile phone. These mobile phones work with batteries and the need to charge. Whenever, any elderly presses the alarm button. The person’s house no. and floor no. appears on the mobile phone.”

The third component of safety alarm is the speakers that are connected to portable alarm buttons and care assistants’ mobile phones also. It looks like a box that is placed in the elder persons’ residences. After pressing the alarm button the elderly can talk with the care assistant through speakers. Care assistant F discussed the alarm system, s/he said:

“There is a small speaker-box in the elderly’s if they take the facility of alarm system. When the elderly press the alarm button care assistant can talk to the customers through the mobile phones.”

In addition, the care assistant F explained about speaker as follows:

“Elderly also get speakers to talk through if something happens or if they need anything. When care assistants answer on the alarm they always say, we are on the way, etc. Speakers are good for communication and for the elder who cannot talk or are blind”

Further, an interviewee explained that whenever elderly press the alarm button, care assistants receive calls with elders’ room numbers on mobile screen. The computer registers the care assistant activity if s/he attends the elderly call or not. Care assistant F explained the alarm system, s/he said:

“When the elder presses the alarm button a ringtone come to the care assistant’s mobile phone with the room number
presented on the screen, example room 123, then the care assistant goes to that room. Care assistant also presses a button that's on the mobile phone. This shows that s/he went to the alarm. As a result the connected computer registers the care assistant’s presence.”

Safety Alarm in Elderly’s Homes

In the interviews I also discussed about the safety alarms with the care assistants who worked in elderly’s homes. The safety alarm system is connected in a different way in elderly’s homes but its utilization is same as in home-like institutions. In elderly’s homes, alarm buttons do not directly connect to care assistant’s normal mobile phone. In some elderly’s homes the portable button is connected to the speaker but further the speaker is connected with the emergency response person/center. Nevertheless in some elderly’s homes the speaker is connected to the care assistant’s mobile phone similar to home-like institutions. Elder persons have a portable alarm button in the form of a bracelet or necklace. When the elderly need some help in an emergency situation s/he can press the alarm button.

The care assistants, who use the safety alarm system that is connected with the emergency response person/center, explained that they use mobile phones to communicate with the elderly and also with their other colleagues. Since, in elderly’s homes care assistants have mobile work and they need to contact with their colleague. Therefore, as contrast to home-like institutions, the care assistants can use mobile phone to make calls outside the elderly’s homes. Moreover they can take the mobile phone with them at home and also utilize it for personal use. Care assistants mentioned that the alarm button only work when the elderly are inside their homes.

The interviewed care assistant B discussed the safety alarm:

“We are connected to elderly with the help of a safety alarm. The older person has a bracelet with alarm button. Elder person can press it if they need any assistance. This alarm is connected to our mobile phone. Whenever we receive the call from the elderly we go to their home directly but sometimes we talk to them on mobile phone according to their condition.”

The interviewed care assistant who worked in elderly’s homes described that in case of an emergency or in case that the elderly need any service they press the alarm button. The call goes to the emergency response center. In the center the person ask to the elderly if there are some emergency then the emergency response center 112 calls to the care assistant. As a response the care assistant goes to the elderly’s home and provides assistance. Care assistant B explained it as follows:

“The older people have alarm watch they press it if they need some help. We have mobile phones that connect to SOS alarm that is emergency 112.”

However, in some elderly’s homes the portable alarm button is connected to the speaker, care assistant’s mobile phone and the computer similar to home-like
Institutions. The only difference is that the call appears on two care assistants’ mobile phones at a time. Care assistant D said:

“In the elder person's home there is some type of box like a speaker that is connected with our mobile phone.”

In this case, when the elderly presses the alarm button a call appears to computer and it also sent to two care assistant’s mobile phones at a same time simultaneously. If none of care assistants answer the call then computer registers that the care assistants did not receive the elderly call. The care assistant D explained about their particular elderly’s home that in each floor there are two mobile phones. When elderly call two care assistants take the call at a time on their mobile phones and one of them receives who is not busy with other work. S/he also explained that if any alarm system is not working properly it automatically appears on the computer. There is the special staff who is responsible to check the alarm system is working properly or not.

In short, service of safety alarms is available in both kinds of the elderly housings, home-like institutions and elderly’s homes. However, these safety alarms work differently and are connected in different ways. In home-like institutions the alarm is directly connected to a care assistant an in-house mobile phone and a computer. In elderly’s homes, the safety alarm is connected to the emergency response center. The personnel at the emergency response center contact care assistants in case of the emergency. Additionally, in some kind of elderly’s homes the alarm buttons are connected to two care assistants at a time and a computer.

Hence, the safety alarm is the example of ICT with an aim to increase the elderly’s safety. In addition by the safety alarm’ practice care assistants put on the quality of work and provide the quality of care. The contents included in the theme are: elderly need help, urgent happenings, fall risks, physical disability and more functional elderly lives.

6.3.4 Monitoring- movement sensors

Monitoring technologies are used to improve the safety of elderly and increase their independence living. These technologies were also identified in the empirical material. Monitoring technologies are used for surveillance and control, that is, to keep an eye on elderly activities from longer distance. Web cameras and movement sensors e.g. bed-alarms and door-alarms are ICTs-monitoring technologies used in the care work where my research was conducted. Through these technologies care staff can monitor elderly from longer distance. Elderly can access the monitoring services when reaches 75 years. In addition, elderly can be offered the services if s/he suffers from dementia or has any physical disability.

First I will discuss the bed-alarms and door-alarms that are used to monitor the elderly in home-like institutions and then I will discuss about the monitoring devices in elderly’s homes. There are several kinds of movement sensors used in beds and doors to detect the person mobilizing from bed or chair or going outside from the house. Moreover these movement sensors are used for fall prevention. The functionality of the
alarms is that the pressure mats\textsuperscript{19} (pad) with electro mechanical devices are being used with elderly’s bed or chair. These pressure mats are electromechanical devices that automatically communicate the link between care assistants and elderly. The pressure sensing panel is placed in mattress, chair cushion or on bedside carpet. Whenever the pressure changes it is identified that the person is moving from her/his bed or chair and the alarm raise. These are known as movement sensor alarms. The movement sensors are used for surveillance the elder persons to control night time wanderings, problem of dementia and risk of falls. Similarly the door-alarms with electro mechanical devices are used in the elderly’s door entrance to generate an alarm in case the elderly goes out of her/his home.

The interviewed care assistant of home-like institution described in the interview that they use bed-alarms and door-alarms for the more safety of the elderly. These alarms inform the care assistants about the activities of elder persons when they get down from their bed or when they go out of their apartment. Without these alarms the elderly may risk to fall and hurt themselves. Care assistant F who worked in a home-like institution described bed-alarm and door-alarm, s/he said:

\begin{quote}
We also use alarms such as bed-alarms or door-alarms which tells us when a customer is getting out of bed or going through a specific door. These are most often used when the customer is very unsteady when they walk and need help and support to get around or to go to the bathroom. Without these alarms the risks of the customers to fall and hurt themselves increase significantly.
\end{quote}

One of the interviewed care assistants, who worked in elderly’s homes, described the procedure of moment sensor alarms. S/he said that care assistants receive the alarm call on their mobile phones and try to reach as soon as possible. However, if care assistant is far from elderly home or stuck with some other elderly then care assistant call to any other colleague to tell her/him to go to the elderly. When the care assistant reaches the elderly home and the elderly person is not inside their homes then the care assistant call the assistant manager, if s/he doesn't reply then the care assistant call to the emergency response center, 112, that is known as SOS alarm.

In addition, movement sensors, such as bed alarms and door alarms, also help the care assistants, who work in elderly’s homes, to monitor elderly. These movement sensors monitor the elderly if they are weak enough or have problem of dementia. In case elderly open the door or try to go outside then the alarm started ringing. Care assistant B, who worked in elderly’s homes, explained that a special alarm with door is used for the elderly’s safety, s/he said:

\begin{quote}
If elderly open the door a silent alarm on my mobile phone indicate to me that s/he is opening doors. If elderly is senile\textsuperscript{20} then care assistant goes there as soon as possible. So they do not leave the home.
\end{quote}

\textsuperscript{19} Pressure mats are place under the carpet or mat at the door entrance or near the bed where a person wants to monitor.

\textsuperscript{20} Senile person means the person is old. His senile hands trembled, wrinkled and weak with old age.
In addition, care assistant E, who worked in elderly’s homes, explained the movement sensor, s/he said:

“There are movement sensors used in some elderly’s apartments. If elderly move in her/his apartment the signal goes to the care assistants mobile. So the care assistants can get the warning about elderly’s movements and can go to their apartment to check or talk to them.”

Hence, movement sensors are example of ICTs with an aim to increase elderly monitoring and surveillance. Care assistants are also affected by these technologies. Monitoring technologies is the overall theme that covers activities such as the monitoring of dementia, fall risks, night time wanderings, watch from long distance and detect the mobilization.

6.4 Demands and Improvements of Existing ICTs

In this subsection the overall theme demands and improvements are divided into three sub-themes such as problem related to safety alarms, problem with the movement sensors, and suggestions to improve electronic health record system. In each sub-category first I will present the ICT related demands of care assistants who work in home-like institutions and the demands of care assistants who perform their work in elderly’s homes will be discussed.

Care assistants demands and suggested improvements about information and communication technologies (ICTs) are also in focus. However, it is necessary to mention that care assistants shared some problems they faced with the ICTs. In addition, they provided some suggestions for improvements of the current ICTs they used in their work practice. In the interviews care assistants’ stated that the technology is easy to use and not difficult to understand. The participants express that they are technologically unskilled and did not suggest much changes of the technology. However there are some suggestions related to their used ICTs. The interviewed care assistant A, who worked in a home-like institution, said:

“I never experienced that safety alarm are not working but if anyone forget to charge the alarm then it does not work. Elderly need it daily they cannot live without it.”

Participants explained that mostly there is no difficulty arises in ICTs of their work practice. The technology is checked daily by some special staff. The care assistant E, who worked in elderly’s homes, explained:

“We have a daily check-up of the information and communication technologies that we are using.”

6.4.1 Problems Related to the Safety Alarm

There are several problems and suggestions related to safety alarms and its components-mobile phone and portable alarm button. In this subsection first I will present problems related to safety alarm in home-like institutions and then in elderly’ homes. In addition,
firstly I will discuss the some problems with safety alarm and its components. Afterward I will present suggestions that care assistants discussed to improve the safety alarm system.

**Problem of Safety Alarms in Home-like Institutions**

There are some problems related to the safety alarm that were discussed by care assistants who work in home-like institutions. The care assistants expressed that sometimes the safety alarm does not work properly e.g. there is the voice problem in the connection of telephone and safety alarm. Care assistants cannot hear the elderly’s voice properly. Care assistant A, who worked in a home-like institution, explained the problem of the safety alarm, s/he said:

> “Safety alarm does not work sometimes. It could be some problem between the line of telephone and safety alarm. May be it is a telephone problem.”

The interviewed nurse A, who worked in a home-like institution, also discussed the problem with the telephone line, s/he said:

> “Sometimes mobile phone\(^{21}\) does not work properly. It becomes difficult to hear from the mobile phone, what the elderly is saying.”

Care assistant A also discussed the problem with the portable alarm buttons that often become loose. These alarm buttons are quite expensive and the elderly have to pay for it every time whenever it loose, s/he said:

> “For some reasons bracelet break so often and we do not have so much. I do not know why it goes off, get destroyed and even button loose.”

**Problems of Safety Alarm in Elderly’s Homes**

As I mention in in subsection 6.3.3 that safety alarms is connected in different ways in elderly homes. In some elderly’s homes the portable button is connected with the emergency response person/center. However in some elderly’s homes the speaker is connected to the care assistant’s mobile phone similar to home-like institutions.

Another problem related to the safety alarm was discussed by the care assistant who worked in elderly’s homes, where portable alarm buttons are connected to care assistants’ mobile phones directly. S/he said elderly press the safety alarm button that is in their wrist or neck and care assistants attend their call in response. However, the connection between elderly safety alarm buttons and care assistants’ mobile phones is one way communication. Care assistants can only receive the elderly calls they cannot call to the elderly through their connected mobile phones. Consequently, care assistants need to go to the elderly’s apartment personally even if they just want to inform the elderly that dinner is ready etc. The interviewed care assistant E explained it as:

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\(^{21}\) These are in-house mobile phones that only work inside the housing building. Care assistants cannot use these mobile phone for their personal use.
“Elderly press the alarm button if they are in need and we receive the call, but we cannot call to elderly from mobile phone ourselves.”

Moreover, care assistant B said that safety alarms are actually a fake technology that does not provide real care. Since a care assistant, who work in elderly’s homes; needs 30 to 40 minutes to reach at the elderly home. In this duration anything can be happened with the elder person. The care assistant B explained in the following way:

“Elderly person uses information and communication technology, they feel more safety but we need 30 to 40 minutes to go to elderly home. So it is like fake security not real.”

The interviewed care assistants also gave some suggestions about the safety alarm system. First, the care assistant, who worked in elderly’s homes, suggested that mobile phones that are used to connect with the elderly through the safety alarm are not the latest ones. These are normal phones. The care assistant suggested that if the municipality or the company provides Smart Phones it can be more helpful for care assistants. Since the care assistants, who work in the elderly’s homes, have mobile work. They go into various elderly’s homes therefore they need some assistance to find the shortest path. Through Smart Phone care assistants can see the nearest elderly home in case of emergency and go to nearest place first that is closed to the care assistant. Care assistant B said:

“If the care assistants have smart phones then s/he can see which call is from nearest place, then s/he goes to her/his nearest place first.”

Care assistant E expressed one demand that there should be emergency (panic) alarm buttons in all housings. Since sometimes elderly become very aggressive and one care assistant cannot able to manage it. In case, if care assistants face such aggressive behaviour or have an emergency situation then they can press the emergency button to get help from other staff.

6.4.2 Problems Related to Movement Sensors

In this subsection, I will present problems related to the movement sensors that were found in the analysis of the interviews. This is following by suggested improvements of the movement sensors. First I will present the problems in home-like institutions and then in elderly’s homes.

First, care assistant E who worked in elderly’s homes discussed a problem related to movement sensors. S/he said, there are a lot of false alarms because of the sensitivity of the movement sensor. Sometimes the movement sensor is triggered if the elderly move their blanket or they move their legs at sleeping times. These false alarms increase the workload of the care assistants. Care assistants have to go to the elderly’s home to check every time the alarm is triggered. The interviewed care assistant E explained it in the following way:
“There are a lot of false alarms that increase work stress in some cases. These moment sensors are sensitive enough that get a signal when the wind blowing.”

Second, the problem related to sensor mats (pads) was also discussed by care assistant E. S/he said, it is possible that sometimes the sensor mat is on one side of elderly bed and elderly go from the other end of the bed. In this condition care assistants cannot know where the elderly is. This can increase the risk if elderly is patient with dementia.

During the interviews the care assistants suggested for improvements of the movement sensors. Firstly, care assistant E gave a proposal to minimize the false alarms of movement sensor. S/he suggested that the sensor problem can be solved if the certain area is fixed through laser lines. Hence, if the elderly will cross the area inside the laser line then the sensor signals will receive on care assistants’ mobile phones and alarm will trigger. Care assistant E expressed the idea in the following way:

“Problem with the moment sensor can be solved by defining certain areas by laser line. It would be better in some cases but it may be bit costly.”

Secondly, another interviewed care assistant who worked in the elderly’s homes said that door-alarms and bed-alarms are fixed in elderly’s homes only on demand or need of elder persons. Elderly, who do not avail the facility of door alarms, can go out any time and staff does not know this. It would be a good idea if the door alarm will fix on every elderly main entrance. Then care assistants can locate easily that the elderly is going out of the home. The interviewed care assistant D said:

“There is no alarm on every elderly room door. There should be alarm on every elderly home door. Then elderly cannot go out.”

6.4.3 Suggestions Related to Electronic Health Record System

An electronic health record system is used for documentation of social and health activities of the elderly who lives in home-like institutions and elderly’s homes. All the care staff, nurses, therapists and physiotherapists write the reports about elderly in the electronic health record system. In the interviews care assistants pointed out some deficiencies in the existing electronic health record system and also shared some suggestion related to it. First I will present suggestions of care assistants who work in home-like institutions and then elderly’s homes.

The interviewed care assistants, who worked in home-like institution, said that the current electronic health record system is working satisfactorily. However, there is the deficiency in the system that care staff cannot communicate with each other through it. Care assistant F suggested that there should be a platform by which the staff can communicate about their daily activities and services which are not being performed or which are not working. Care assistant F said:

“The only thing I miss a little bit is the possibility to have a platform similar to electronic record system but only for
staff to communicate in, about the daily activities and services which have been done or not and routines which are not working. However there will be the risk also of being too much as one should always assume that all care activities are done when they are supposed to be done."

Nevertheless, in some elderly’s homes documentation system is still manual. There was no electronic health record system for documentation in a particular area’s elderly’s home. The care assistants who provided services in that particular housing write report about elderly everyday activities on the paper-based binder. Care assistant D demanded that documentation system should be electronic, s/he said:

"Documentation should be on the computer now it is on paper passed register where care assistant writes about elder person activities daily."

However Nurse B of the same elderly’s home said that we have planned to update the manual report system by electronic health record system. S/he was hopeful that may be in one year, reports will be written on digital report system.

Hence, demands related to problems and suggested improvements have been presented with the overall theme demands related to ICTs and the sub-themes problems related to safety alarms, movement sensors, and suggestion related to electronic health record system. The contents of these themes are alarm button looses, voice problem in the telephone line, false sensor triggered, deficiency of staff communication and paper-based register.

6.5 Ideas & Visions about ICTs- care assistants’ point of view

In the following subsection I will discuss the ideas identified in care assistants’ stories about ICTs that they used in their work practice. It will help to understand care assistants’ thoughts and views about present and future ICTs. Moreover it will give understanding how much technology should be implemented in care assistants’ work practice as well as in elderly lives. In this subsection I will present the ideas and visions that emerged out from the sub-theme of the degree of involvement of the development of ICTs in care assistants and in elderly lives. Following on the sub-theme of elderly privacy will be discussed. Both sub-themes are divided in home-like institutions following with elderly’s homes.

In the interviews care assistants exchanged some ideas related to existing and future ICTs in their area of work. They said that coming technology should be simple and easy to understand as currently. The middle manager explained that they have updated the technology recently and it is safer and easier to use. For instance, there are new mobile phones for care assistants. S/he explained:

“We have just changed in November-December 2012. Now there are new phones and we have made everything new and safer.”
In the interviews care assistants said that elderly persons do not want to go to special housings such as home-like institutions. They want to live in their own homes independently. The care assistant B, who worked in elderly’s homes, shared the vision that ICT support independent living for elderly. It has decreased the distances since the care staff and the elderly can communicate constantly from longer distance that enable elderly’s independent living.

6.5.1 Degree of Involvement in Development of ICT- care assistants’ and elderly’s lives

The degree of involvement in the development of ICTs, e.g. how much technology should be implemented in care assistants and elderly lives, was also discussed in the research interviews with the care assistants. Most of the participants were satisfied with the degree of involvement of technologies in elderly lives and the distribution of technology between elderly and care assistants. Care assistant B explained that there should be the minimum amount of technologies are used by elderly. S/he added that in Sweden distribution of the technology is very good as fever technology is operated by elderly themselves e.g. the elderly only use safety alarm buttons. The rest of the technologies are operated by care assistants.

However, the interviewed care assistants A argued that some elderly find it harder to understand how to use the technology. The care assistant talked about some, but not all, elderly of around 65 years. S/he said sometimes the elderly become confused and if the training is given to them even then they forget again and again. For instance, the interviewed care assistant A, who worked in the home-like institution, had an adverse understanding about elderly, s/he said:

“Elderly people do not know how to use touch mobile. How many times we explain them, they forget. Even 60-65 years elder cannot understand how to use technology.”

In addition, care assistant A exemplified about her/his mother.

“My mother is over 65 years and do not know how to use a computer.”

Further, the participants said that distribution of technology between elderly and care staff is satisfactory. Since most of the technologies are supposed to be used by care assistants for well-being and support of elderly. However, care assistant A suggested that care assistants’ work is very tough and stressful. Therefore, there should be a simple system for care assistants also, s/he said:

“The information and communication technology should not be too complicated. It has to have simple because we have to do other works too.”

The degree of elderly involvement in the development and implementation of the technology was also discussed with the interviewed care assistants who worked in elderly’s homes. Care assistant B explained:
“Elderly do not know how to use technology. You can give smart phone to them, but they do not understand how to use it, therefore it has to be a simple phone that they can call to SOS alarm-112.”

Further, care assistant B, who worked in elderly’s homes, explained the rapid change in technology is the reason that elderly become confused and frustrated. S/he said the ICTs are updating very quickly and it is difficult for the elderly to learn often. The care assistant B explained through her/his own example, s/he said:

“Perhaps in 40 years when I will be old I will know what to do, but since the technology is still updating continuously perhaps I will not know how to use it.”

Care assistant B also gave the idea that all care assistants should be informed about development of new ICTs and what is happening with the technologies, s/he said:

“Information and communication technologies should be easier to use for older people. It is difficult for older persons to use several technologies. Elder and care assistants both should know what is happening with technology. A machine is given to older persons but they do not how to use the machine. They always wait for the young people to come and help them with computer and everything.”

In short, there is a rapid change in information and communication technology (ICT) since it is updated very quickly. The elderly cannot learn the technological changes with this speed; therefore technology should be very simple and in less numbers. Most of the technology should be used by care assistants. However, care assistants work is also very tough; therefore the technology should be simple and easy for themselves also to minimize their workload.

Hence, ideas and visions related to the degree of involvement of ICT have been presented with the overall theme degree of involvement related to ICTs in care assistants and elderly lives. The contents of the theme are the elderly confusion and frustration, minimum number of technologies, simple technology, minimum involvement in elderly lives, distribution of technology and rapid change in ICTs.

6.5.2 Privacy of Elderly- use of web cameras and movement sensors

Privacy was also an identified theme in the empirical material. It was related to movement sensors and web cameras. Movement sensors and web cameras are used for surveillance and monitoring of elderly. The movement sensors are used to detect the motion of elderly and the web cameras are used to monitor them from long distance. As discussed previously, the use of the web cameras to monitor and control a person’s home and what s/he does, was also discussed in the interviews with the care assistants, nurses and middle managers. There was a contradiction between the interviewees’ thoughts about the use of the web cameras in elderly’s housings. Most of the care assistants said that the web cameras should not be placed in elderly’s homes, since elder persons need
privacy. Others thought more positives and said that web cameras can escape elderly from disturbance in their privacy. The web cameras are surveillance cameras that interfere with elderly privacy. In place of the web cameras, personal assistance is better for the well-being of the elderly, that is, to make them feel that they are being cared. Moreover, through personal visit care assistants can see what has happened to the elderly as well as their feel of loneliness can be reduced since the elderly may want to talk to somebody. Nurse A, who worked in the home-like institution, was against the use of web cameras, s/he said:

“Web camera should not be implemented in elderly homes. We should give personal attention to elder. Sick persons and aged need some personal help since web cameras are not the replacement of personal attention.”

Care assistant F, who worked in a home-like institution, said that currently as much ICT we use for elderly care is sufficient. Use of numbers of technologies e.g. web cameras and number of alarms can be interference in the elderly privacy.

Web cameras discord the elderly privacy but the elderly want independent living with privacy. Care assistant E, who worked in elderly’s homes, linked the use of the web cameras with violation of the elderly privacy, s/he said

“We have to think about old person's integrity. Elderly want to have their own life so we should not want to take a camera inside; by doing this everybody can know what is happening inside the elderly’s home.”

Nevertheless, some participants were also in favor of surveillance through web cameras. But they also knew that the use of web cameras crosses the integrity line of the elderly and interference elderly’s privacy. Care assistant E explained:

“It is really convenient for staff to see the elderly from the web cameras where they are and what they are doing. But it will cross the privacy line of elderly”

Middle manager of the municipality enlightens these aspects, s/he said that through implementing web cameras we can escape elderly from disturbance of irregular visits of care assistants and other care staff. Since care staff can see elderly activities from their office. Nevertheless s/he also added that web cameras intrude on elderly privacy therefore should only be used on elderly’s demands. The manager said it is not a good idea that the elderly are being watched through cameras and their activities are observed, s/he said:

“Maybe sometimes we go to elderly’s homes and they are sleeping. If we go out and close the door then maybe they wake up, it is not good. Some time for some people we may have web cameras to see. It could be nice if the elderly needs.”
Further the middle manager said:

“I image that we need cameras in the elderly’s home, because sometimes it is good to see what is going on with old people in their home.”

In addition, the movement sensors are also a kind of surveillance technology. Most of the care assistants discussed about the web camera surveillance. However care assistant E pointed out that the movement sensor surveillance may also discard the elderly privacy. S/he said:

“If we go every time to the elderly’s apartment, whenever they move, we do the violation of elderly’s privacy.”

Moreover the care assistant said that movement sensor-bed alarms and door alarms are not for all elderly persons; these are only for the elderly who is really unstable or suffering from dementia. S/he emphasised it is against the privacy of elderly to use the sensor in the every person's home.

Hence, web cameras and movement sensors are examples of ICT that can interfere with elderly’s privacy. Ideas and visions of care assistants related to influence of ICT on elderly’s privacy have been presented with the overall theme of privacy of elderly by using web cameras and movement sensors. The identified and discussed issues related to privacy are: violation, monitor and control, interference, surveillance and integrity.

Summary

It is necessary to mention that the link between the themes that emerged out from the research. For organizing the care work, Care assistants use digital pen and electronic health record system for ICT memo recording and documentation in their daily activities. Moreover care assistants use safety alarm system for elderly safety and movement sensors and web cameras are used for elderly monitoring. Care assistants have ICT-demands and suggestion related to current ICTs. They have different ideas and visions about the degree of involvement of ICTs so that it does not interfere with elderly privacy. After this research I view the link between care assistants and identified themes. The following diagram represents the involvement of care assistants in daily activities using information and communication technologies.
Figure 6.2: Link between the Identified Themes and care assistants.
7. Discussion

In the following chapter I will discuss my research findings that are based on my theoretical framework, supporting literature and analysis of empirical material. The discussion will be based on the themes that were emerged out of the empirical material. Firstly, the current ICTs and daily activities will be discussed. Following on the demands regarding current problems of ICT will be presented. Lastly, I will discuss the participants’ ideas and visions about information and communication technologies. At the end, the summary will be presented to illustrate the links between emerged themes.

The outcomes of my research are the themes, that making a meaningful contribution, that are care assistants’ daily activities, ICT memo recording system and other services, documentation, safety, monitoring, demands and improvement of existing ICT with the sub-themes, problems related to safety alarm, movement sensor and suggestions related to electronic health record system. Moreover, the theme of ideas and visions about ICT with care assistants’ point of view with the sub-themes degree of involvement in development of ICT and privacy of elderly.

7.1 Current Information and Communication Technologies and Daily Activities

The aim of this research was to explore the care assistants’ use and experience of information and communication technologies (ICTs) in social care and service of the elderly. Further to get an understanding how care assistants may work using ICTs. Furthermore, to get an understanding about the procedure of organizing care assistants’ daily activities through technologies. Therefore, social constructivism approach was chosen to develop the meanings of care assistants’ experience after understanding their daily care activities. Kelm (2011) argues that in social constructivism is the active and constructive process of learning. In this construction process people build their own meanings through interacting with each other. Moreover, knowledge is constructed within the phenomenon in focus and peoples’ activities. In addition, Creswell (2009) states through social constructivism approach the individuals create the subjective meanings of their experiences after understanding the precise context in which they live and work. For more understanding and underline the importance of phenomenon, that is, the use of ICT in social care and services I choose the strong social constructivism - social construction of technology (SCOT) approach. Bijker (1992, p. 105) states that different social groups have different concerns and practices. Therefore they assume different things from technology. The strong constructivism- social construct of technology (SCOT) help in understanding the impact and development of technology, it is important to consider professional knowledge, daily practice and organization arrangements. Moreover, these factors are significant in understanding and analysing the development of technology. In the municipality where my research was conducted care assistants use several ICTs such as digital pen, electronic health record system, safety alarms, movement sensors and web cameras. These technologies are used for memo recording, documentation, safety and monitoring respectively. Jansson (2007) mentioned that the use of technologies has gained significant importance in the everyday life of people. There are various technologies that are used by care assistants and managers for the care of the elderly. For instance, care assistants are connected with elderly through some mobile technologies in their work practice.
Various information and communication technologies (ICTs) are used by care assistants and staff in an area where this research conducted. The outcomes shown the care assistant’s attitude about the use of the technology was positive. They expressed that they are highly satisfied with the current ICTs. My findings are not consistent with Melander Wikman, et al. (2007). She argues against that users of the technologies have high hope and expectations for future development of technologies. Johansson, Lind and Sandblad (2006) arguments are corresponding to my study. They argue that most of the care workers use technology and are satisfied with the technology that they use. Nevertheless there are some care workers who feel that technology hinder them in their care work. Since the range of use of some technologies is limited such as mobile screens are small and do not get a large amount of information. Furthermore, Jansson (2007) described care assistants use technologies in normal households and for their comfort and efficiency. But, they are not used to information and communication technologies (ICTs) for assistance in their home care work. However, managers of the municipality use ICT for performing their management and administrative tasks.

Care assistants became silent when a question was asked about technologies. Although when they talked about their everyday work routine they were able to explain several kinds of technologies in their work practice. However it is worth to mention that the research does not aim to explore the daily activities of the care assistants but their use of technologies in these activities. Social constructivism approach was used because it focuses on the participant’s view of the phenomenon and how they observe and interpret meanings in their actions. Since Ramanathan (2008) state through social constructivism knowledge is generated based on the people and their way of observing and interpreting a context. Social constructivism is therefore a way to construct knowledge based on the participants’ way of observing and understanding.

The municipality, where my research was conducted, care work is organized in two housing categories. These are either home-like institution or elderly’s home. In all two housings similar services are provided to elderly, except degree of needed care is different. For instance, home-like institutions are for elderly who need round the clock care and services and want to stay closer to the care staff. The services of elderly’s homes are for those who prefer to live independently. The elderly’s homes can be any kind of housings such as ordinary housings, houses or senior housings (For more detail see appendix F). In these housings several technologies, i.e. safety alarms, are used for elderly safety as well as for assistance of care assistants in their tough care work. The outcomes of my research are accordance to Jansson (2007). She states the care work is organized in various ways depending on it is performed in home-like institutions or in elderly’s homes. However in both housings similar services are provided to the elderly. Moreover there is no special distinction between kinds of technologies used in these housings.

The daily activities of care assistants are organized with the involvement of ICTs such as digital pen and electronic health record system. From the start of the job until the end of their working day, care assistants use technologies to complete their daily tasks and to support elderly in their homes. The purpose of asking about the daily activities of care assistants was to understand what kind of ICTs they are used in the performance of their routine tasks. The findings can be compared with Jansson, Mörberg and Berg (2007).
They argue that care assistants might also improve the living condition of elderly who prefer to live in their homes through an appropriate use of technologies.

During discourse care assistants explained their *daily activities* are organized in various shifts such as morning shifts and evening shifts. Moreover, the care assistants’ daily schedule is still provided in a manual form there is no automatic system to schedule their work. The staff’s daily schedule is available in a paper-based binder. However, this schedule is also available online and care assistants can access it from their homes by using a computer. Further, the interviewed participants explained that this scheduling system is based on paper because some of care staffs have children; hence they want to have free weekends. If the schedule system would be automatic then schedule will not be according to care assistants wishes. Thus, a manual scheduling system is good for these staff members; however it is a time consuming system as well. My research outcomes show the involvement of ICT in daily care activities. Winge, Johansson, Waterworth and Wangler (2007) argue differently, they say that care workers communicate with each other using various information and communication techniques such as mobile and handheld devices. However, for better utilization of these IT support and communication tools new way of working should be used. Care workers should use several internet tools such as web browser for email. Moreover regular training, meetings and workshops for care professionals are also needed for understanding each other’s work task.

In addition, attendance is also the part of *daily activities*. In the municipality, the attendance system is not identical in home-like institutions and elderly’s homes. In home-like institutions, there is no automatic attendance system for care assistants. They neither sign in somewhere nor log-in on any mobile before they start their work. It is every employee’s own responsibility to do their work. Reason behind this is that they do not need this kind of system because they perform their work in the same building. However, care assistants who work on the elderly’s home use digital pen to schedule their work. In the municipality digital pen is used as the *ICT memo recording system*. It is used for care assistants’ time scheduling and recording the elderly’s daily activities. The digital pen is known as “mobi pen” in the municipality. However digital pen is not used equally in all elderly housings. In home-like institutions care assistants do not need the digital pen for recording elderly’s health and social activities. The care assistants discussed the reason they perform care and services in home-like institution therefore, they can easily go to their office to write reports of the elderly activities. Nevertheless, the care assistants who worked in elderly’s homes discussed that they use digital pens for time scheduling and recording elderly situation during the everyday visit because they have mobile care work. However the digital pens are not used correspondingly in all elderly’s homes also. Some care assistants who worked in elderly’s homes told that they never used digital pens for recording elderly activities. My research outcomes are consistent with Jansson (2007). She states most of the elderly housing units do not use any ICT for their staff’s time schedule. Only a few units use *Timecare system* to schedule their work. In the interviews care assistants explained that whenever the care assistant goes to the elderly’s home s/he logs the visit by touching a special place at the elder’s person’s entrance door with the digital pen. By touching the start button the visiting time and place is stored in the care assistants’ digital pen. When care assistants touch the stop button with their digital pen, their total visiting time is stored on the digital pen. It indicates when care assistants have to start her/his job and also records total time of the care assistant’s visit in an elderly’s home. However I have identified the
difference in implementation of digital pen in elderly’s homes. Since, in some elderly’s homes digital pen is used for time scheduling however in some elderly’s homes no ICT system is operated for the scheduling. Middle manager told that digital pen is only used by mobile care assistants\(^{22}\) who visit elderly’s homes. In addition, the interviewed care assistants who worked in elderly’ homes believed that there is mainly a relationship of trust between staff and manager. However managers can check for surveillance and control the care assistant that who is on duty and where the specific care assistant is at any time. Further, one care assistant works around eight hours daily. The daily amount of time of care assistants for each elderly is based on the service(s) that the elderly are taking. Some elderly take service once in a week and some need help five days in a week. Thus, the number of elder persons who are daily served by a care assistant depends upon the elderly’s needs and the number of services that elderly are taking. My results show the role of the digital pen in the municipality. However arguments of McKinney and Desantis (2012) are important for more understanding the functionality of the digital pen. They describe digital pen improves the elderly care and capture writing or drawing digitally. In addition, it makes the documentation work more efficient and transfer of information more convenient. To capture the writing that someone writes with digital pen, a special digital paper is needed. Digital paper has dots that allow the digital pen to capture what one is writing. The digital pens work with battery and mostly has a universal serial bus (USB) interface. There are different models of the digital pen that are available. Now wireless technology with Bluetooth is also used to send captures directly to the computer. In addition, Christensen and Grönvall (2011) state that the digital pen is used with the combination of augmented binder in home care work. In these binder care workers write and read information at every visit to the elderly home. Further, the information that is written with this special digital pen is also recorded digitally that is used afterward for documentation of elderly activities. In the interviews care assistants explained that digital pen is used to register the care assistant’s time in elderly’s homes. This device is also used to record services and activities in the elderly’s home such as health and social events of elderly. In case, elderly needed any medicine or any special event occurred, care assistant document this on a paper-based binder and also record in the digital pen. The binder copy is used as a receipt of service for the elderly and her/his relatives. The middle manager told that in place of the mobi pen there are now plans to introduce “mobi phone”, an application for Smartphone, in the near future. Through mobi pen care assistants writes on paper but through mobi phone with a large display screen they will be able to write on the mobile phone in place of paper.

In addition, these recorded activities information is used afterward for documentation of elderly daily activities in electronic health record system. Participants of my research explained that they use the electronic health record system for documentation in their care work practice. This electronic health record system is the electronic record system. Care assistants, who worked in home-like institutions, directly write reports on a computer using an electronic health record system. However, care assistants who worked on the elderly’s homes transfer recorded report and information from previously mentioned digital pen to the electronic health record system. This information is used for further documentation and thus makes elderly care work more efficient and secure. Nevertheless there are some elderly’s homes where documentation work is still manual. The interviewed care assistants explained that they do not have

\(^{22}\) In all elderly’s homes care work is not mobile e.g. senior housings. For more detail, see Appendix E
any electronic health record system for documentation of elderly social and care activities and use paper-based binders. It is not secure enough and the information can fall into the wrong hands. Because the binders are put in the cabinet and can be available to any unconcern care assistant. Jansson and Mörberg (2011) describe that before the usage of information and communication technologies (ICTs) care assistants had notes and recorded their work task manually. In manual system there was risked of loss of client’s information and services that are to be performed daily. Through implementation of ICT system, information was stored in the Palm Pilot that facilitates the care assistants’ day-to-day activities. However according to previous research documentation system was completely paper-based in care work. Outcomes of my research show that the manual documentation system has improved with the electronic documentation system. The findings can be compared with Hägglund, Scandurra and Koch (2007). They argue that in elderly private homes and nursing homes where the home care is provided, home health services personal did not use any digital system for documentation. Moreover they had not any mobile documentation facility or had not access any tool for information sharing. Documentation is mostly done on paper-based systems which are incompatible and also time consuming. If some information is misplaced, there are risks that a care professional spend inadequate time for searching in paper-based documentations. While the nature of the work of home care professionals is mobile but; they can access electronic record system rarely. There is an option of virtual record system to access the information offline. However, offline systems have some problems such as there are some security aspects and updating the system is also difficult.

There are different kinds of alarms that are used for the elderly persons’ safety. In the municipality where my research was conducted, the elderly are equipped with safety alarms that are used for elderly safety to allow them to live independently. Care assistants are connected with elderly through a mobile phone that is connected to the speaker and the safety alarm button that resembles with wristwatch or necklace and elderly wears around their wrist or neck. In home-like institutions, care assistants’ special mobile phones are directly connected with the elderly when an alarm is triggered. The elderly’s call is registered on the computer and the mobile phone of the care assistant. Nevertheless, in elderly’s homes the alarm button of elderly is connected with the emergency response center. First this staff confirms that elderly need any help by asking the elder person after that the staff calls the care assistant of that area. The available care assistant then goes to the elderly’s home. As I mentioned above that whenever elderly press the alarm button the call is connected to a computer and the care assistant’s mobile phone. If the care assistant will not attend the call, the computer will register this activity of the care assistant. In this way the municipality surveilled and controls the care assistants and they cannot ignore any elderly’s call. However in some elderly’s homes, the alarm is connected directly to the care assistant’s mobile phone similar to home-like institutions. The only difference is that two care assistants get the elderly’s call at a time on their mobile phones. One of these colleagues receives the elderly’s call that is not busy with other deeds. Moreover, for surveillance and control the care assistants activities call is also received on the computer same as in home-like institutions. Jansson, Mörberg and Berg (2007) arguments are important for more understanding of the safety alarm system. They describe that alarm systems assist the elderly so they can reside in their own home and feel secure and safe. Alarm system services are open 24 hours a day and elderly can call their care staff any time if they need. Further, the interviews of care assistants showed that the overall use and purpose
of the safety alarms are the same in any kind of elderly housing. In addition, it is necessary to mention that if the elderly want to ask the alarm service in their homes they need to pay a fix amount for the alarm service every month. The alarm service is given to elderly on demand or need over the age of 75 or if the elderly is in a physically bad condition.

My outcomes show that in the municipality ICTs are used to help the care assistants in monitoring the elderly from longer distance such as movement sensors and web cameras. Elderly can get these monitoring services when reaches 75 years or has any disability or problem of dementia. Movement sensors are available in the form of bed-alarms and door- alarm. These movement sensors work through placing the pressure sensing mats (pads) in mattress, chair cushion or on bedside carpet. These sensors detect the elderly mobilization and alarm triggered. Care assistants receive the call on their connected mobile phones and try to reach elderly as soon as possible. Care assistants also explained that in case if they reach to elderly’s home and do not find her/him inside then they first call to their assistant manager, if s/he does not respond then care assistant call to the emergency response center ‘112’. In addition, web cameras are also used for video monitoring of elderly from longer distance. The web cameras help to decrease irregular visits of care assistants that can become the reason of the disturbance for elderly. Both of these monitoring technologies are used for surveillance of elderly however they also interfere with the elderly privacy. Kenner (2013) also describes that surveillance- monitoring technologies such as web cameras and infrared sensors are used to keep an eye on the elderly movements or those who have dementia. Through these technologies elderly safety is increased as well as care assistants work burden is reduced. The research findings of this subsection related to ICTs and care assistants’ daily activities are summarized in the table 7.1 below.
1. Care work is organized into two types of housings (Jansson, 2007).
2. Care assistants had high expectation for future development of technology (Melander Wikman, et al., 2007).
3. Schedule work is manual only few units use timecare system to schedule care professional work (Jansson, 2007).
4. Care assistants had notes and recorded work manually (Jansson and Mörtberg, 2011).
5. Care assistants not used to electronic health record system (Jansson, 2007).
6. Documentation was done on paper (Hägglund, Scandurra and Koch, 2007).
7. Safety alarms are used for elderly safety (Jansson, Mörtberg and Berg, 2007).

<table>
<thead>
<tr>
<th>Literature Review</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Care work is organized into two types of housings (Jansson (2007).)</td>
<td>1. Care work is organized in two kinds of housings. They either work in home-like institution or elderly’s home.</td>
</tr>
<tr>
<td>2. Care assistants had high expectation for future development of technology (Melander Wikman, et al., 2007).</td>
<td>2. Care assistants are satisfied with the technology.</td>
</tr>
<tr>
<td>3. Schedule work is manual only few units use timecare system to schedule care professional work (Jansson, 2007).</td>
<td>3. Time scheduling is manual in elderly housings. Digital pen for ICT memo recording and time scheduling is used only by mobile care assistants who work in elderly’s homes.</td>
</tr>
<tr>
<td>4. Care assistants had notes and recorded work manually (Jansson and Mörtberg, 2011).</td>
<td>4. Care assistants are using the electronic health record system for documentation of daily care activities.</td>
</tr>
<tr>
<td>5. Care assistants not used to electronic health record system (Jansson, 2007).</td>
<td>5. The electronic health record system is not equally implemented in all elderly housings.</td>
</tr>
<tr>
<td>6. Documentation was done on paper (Hägglund, Scandurra and Koch, 2007).</td>
<td>6. The safety alarm system is used for elderly safety.</td>
</tr>
<tr>
<td>7. Safety alarms are used for elderly safety (Jansson, Mörtberg and Berg, 2007).</td>
<td>7. Movement sensors and web cameras are used for elderly monitoring.</td>
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Table 7.1: A Summary of Current Used Information and Communication Technologies

The table 7.1 presents the summary of the outcomes of my findings that are discussed above. The findings show that there are two kinds of housings, home-like institutions and elderly’s homes, where care assistants provided care and services to elderly. These findings are consistent with previous research. When findings are compared with previous studies, care assistants had high hope and expectation with the development of technology. However according to my research findings now care assistants are satisfied with the technology. According to the literature meetings, training and workshops should be regulated for better utilization of ICTs. Findings show that in the municipality care assistants have monthly meetings with their managers. Similarly, in previous studies scheduling, recording and documentation were manual system in care work. My findings are not consistent with previous research, it shows manual systems have improved by electronic systems. Care assistants perform scheduling and recording by digital pen and for documentation they use electronic health record system. However, findings show that these systems are not equally implemented in all elderly housings. Digital pen is only used by mobile care assistants who visit elderly’s homes. But it is not equally implemented in all elderly’s homes. Moreover, there is still some elderly housing in the municipality where documentation system is manual and care assistants use paper-based register for documentation. Findings about safety alarm, movement sensors and web cameras are consistent with previous studies. Safety alarm systems are
used for elderly safety and to monitor elderly, care assistants use movement sensors and web cameras but only if elderly need. In this research I have found that care assistants use several ICTs in their daily activities, however there is need to implement these technologies correspondingly in all elderly housings. When findings are compared with literature, the findings show that use of technology has improved and more technology has involved in social care work.

7.2 Demands and Experiences Regarding Current Problems of Information and Communication Technologies

The purpose behind this research is to bring forward care assistants’ thoughts and wishes about the ICTs and constructs the subjective reality. Though social constructivism, knowledge relevant to the care assistants’ wishes and demands will be developed. Sismondo (1993) argument is corresponding to social constructivism. He says subjective reality is socially constructed on the bases of individuals' beliefs, and/or wishes and thoughts about the world. By examining the beliefs and wishes, knowledge is constructed and developed that maintained in the social situation. Thus, demands related to current ICT were discussed with the research participants. The aim was to explore and bring forward what the care assistants have ICT demands, but most of all, perceived as problems. They also give some suggestions relevant to their discussed problems. Social constructivism helps to identify the meanings from care assistants observed problems and suggestions. Howcroft, Mitev and Wilson (2005) argue that different social groups define problem related to technology differently. Every individual has her/his own thoughts and observations according to which s/he interprets the problem. There is no hard and fast rule or specific way to define the problem in a good way. However through identifying the meaning of the relevant social group a better understanding of technology is possible.

The interviewed care assistants stated that in social care quite simple technologies are used since these are easy to use and simple in understanding. Overall they were satisfied with the technologies as much they have today. The research outcome can be compared with Berg, Mörtberg and Jansson (2005). They state that in Swedish society, there is great hope that technology will create great services. Technology can be seen positively or negatively. In the positive sense it provides several opportunities for people, like remain easily in touch with others in their daily life. In the negative sense, technology can intrude on people’s private life. In addition, Jansson (2007) argues that expectations of the users of technology are not surprising since their belief that ICT will be developed and secure growth in the society. My findings show satisfaction with care assistants’ attitude about ICT rather than expectations.

The research participants expressed that the ICTs that are used for care activities should not be too complex. Since, they do not have lots of time to learn, as their normal work with the elder people is very stressful and tough. Therefore, technology should be easy to use and easily understandable. My findings are corresponding with Jansson and Mörtberg (2011) arguments about the demands of ICTs. They said there is the shortage of staff in the care sector of Sweden, with the increase in the elderly population decrease in working populations. This shortage of care staff might overcome by using information and communication technologies (ICTs) that simplify the work of both care assistants and their administrative task. Technologies support the care staff in their daily activities. Care assistants wish that technology system should be improved because they
do not want to return to the paper-based manual system. However my results are more than this and show that the care assistants demands about stress free and easy to use ICTs.

During the interviews, asking for their demands on technology some of the care assistants define themselves as technologically inexpert and some of the care assistants feel that it is a difficult question because they never think about their demands for ICTs. Therefore they remained silent. Nevertheless, the interviewed care assistants identified some existing problems that should be resolved from current technologies that are used for social care of elderly. My research gives consideration to the demands of care assistants, Su and Chen (2010) argue about this that nurses and care assistants are gaining importance with the increase in global population of aging people. Care assistants are staff that provides personalized and comprehensive care services to older people. Thus, it is important to consider the demands of care assistants and elder people. In addition, Jansson, Mörtberg and Berg (2007) describe that there is a critical approach required in order to solve the problems with the already existing care technologies. Accordingly, social services can be structured through standardized technologies.

During the interviews care assistants explained some imperfections that they face in the current ICTs-alarm system during their care practice. The care assistant pointed out some technical problems of the safety alarm that may be a problem of the telephone line. It becomes difficult to hear the voice of elderly sometimes. But this type of problem happens very rarely. Additionally, care assistants were surprised that the portable alarm button of the elder people becomes loose and is damaged very often. It is the only thing by which elderly people are connected to care staff. Participants said that the alarm button should not be loose often because it is expensive and elderly have to pay for it. The findings can be compared with Joore (2010), he states there is a need to improve the functions of the elderly alarm system as it can only be used inside the home. Thus there is a need of a mobile alarm system that can work outside the elderly homes as well. Moreover, the mobile alarm system could be a good replacement of indoor alarms.

In interviews some care assistants demand that mobile phones that are connected to elderly’s safety alarms should be replaced by smart phones. Care assistants who work in elderly’s homes can find the shortest path first by using smart phones. Participants pointed out that the connection between mobile phones and elderly alarms is one way. Whenever elderly need any care in case of emergency they press the alarm button. Then the care assistants attend the elderly’s call and talk to them. But care assistants cannot call to the elderly. If care assistants want to say something to the elderly, for example dinner is ready; they need to go to the elderly’s room.

The aim of the research was to explore care assistants’ use and experiences of existing information and communication technologies (ICTs). The care assistants’ experiences helped to shape the social interaction and identify various ways of social reality. They built their own meanings by which knowledge was constructed that can help with future development of ICTs. As Kelm (2011) and Ramanathan (2008) state that personal experience shapes the social interaction and people build their own meaning by interacting with each other. As a result knowledge is constructed within the social context or social practice. In the interviews participants shared their experience related to ICTs and pointed out some deficiencies in it. They explained that monitoring
technologies e.g. safety alarms and movement sensors, bed alarms and door alarms are given to elderly if they are above 75 years and demands that or if they are physically disabled or have dementia. These sensor alarms, like sensors in beds, chairs, foot mats or stairs, are only for unstable persons. Further, care assistants also talked about the risk of missing the step on the foot mat sensor that is near to the elderly’s bed. If elderly miss the foot mat sensor or leave the bed from the other side of the bed then care assistants do not know where the elder person is. Since the sensor mats are pressure triggered by stepping on or off the mat. The care assistant gives the suggestion that the door alarms should be used in all elderly’s homes who are taking the service of the safety alarm. In this way, care assistants can easily locate whenever elderly will have gone outside. Care assistants said that by using door alarms in elderly’s homes they also relieved as an alarm will show them if any elder person will go out of the room. Nevertheless, monitoring technologies are implemented in elderly’s homes by their choice of options. It is against the dignity of elderly to intrude on their privacy. The idea of implementing monitoring technologies in all elderly homes is only possible if the elderly prefer their safety on their privacy. My research findings are corresponding with Orpwood (2006). His arguments are important and also according to my research findings. He states pressure sensitive mats are placed on bed legs or sometimes on the floor next to the bed for support of elderly with dementia. These mats detect the weight change and give the information when the elderly get out of bed. However it is the experience that sometime elderly do not step on the mats and need to learn that where the mat is placed. Moreover, whenever elderly get up the room lights turn on for further support of the elderly. However it remains turned on for a long time and increases the possibility of alarming. Thus, to reduce this possibility elderly’s room light can be activated through the faders. Since light can be faded up automatically in a gentle manner.

During the interviews care assistants also expressed that there are a lot of false alarms because of sensitivity of the movement sensors. Since, sensors are as sensitive as care assistants get signals on their mobile phones even if elderly move her/his leg at night or if the wind blows. One of the care assistants shared the idea that a certain area should be secured by a laser which could be used to identify the previously mentioned false alarms. The care assistants will get the alarm signal only if elderly will cross a laser line or area in their apartment. Furthermore, during the discourse participants suggested that there should be a panic buttons everywhere in the building. The reason for this is that elderly sometimes become aggressive and care assistants could feel threatened. Care assistants should be able to press the panic button in case of emergency or if they feel fear so the other staffs can come for help.

Electronic health record systems are used for documentation purpose of the elderly’s health situation and social events. There are different programs and applications that are used for documentation. Jansson and Mörtberg (2011) arguments are important for more understanding about documentation system. They state that to improve the care services ICT system is used for documentation. This system stores the assigned work tasks of the care assistants for their daily routine activities. Care assistants can access their schedule and daily work tasks but cannot see the assignments of their colleagues. In the interviews care assistants pointed out that these documentation programs only use to store elderly’ information and routine situation but the care staff cannot use this program or application to communicate, about elderly condition, with colleagues. During the interview one care assistant raised the attention towards this deficiency and
demands that there should be a platform where care staff can communicate and discuss about the health and social activities of the elderly. Additionally, ICTs record systems are not applied to all kinds of housing apartments currently. Care assistants who belong to home-like institutions and most of the elderly’s homes use electronic health record system. However during the discourse care assistants who work in a particular area’s elderly’s homes told that there is no electronic record system. They just enter daily health and social activities of the elderly on paper-based registers. The findings related to participants’ demands are explained briefly in the table 7.2 below.

<table>
<thead>
<tr>
<th>Literature Review</th>
<th>Findings</th>
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<tbody>
<tr>
<td>1. The use of technology has great hope and expectation that the technology will create great services (Berg, Mörtberg and Jansson, 2005).</td>
<td>1. Care assistants were satisfied with the current technology.</td>
</tr>
<tr>
<td>2. Technology should improve (Jansson and Mörtberg, 2011).</td>
<td>2. The mobile phone connected to the safety alarm system is just a one way communication, it should be designed as a two way communication system.</td>
</tr>
<tr>
<td>3. The alarm system needs to improve the function (Joore, 2010).</td>
<td>3. The care assistant’s mobile phone should replace by the Smart Phone.</td>
</tr>
<tr>
<td>4. The mobile alarm system is a good replacement of the indoor alarm (Joore, 2010).</td>
<td>4. There is problem of hearing in telephone line of alarm system. There is also an imperfection that elderly’s safety alarm buttons become loose.</td>
</tr>
<tr>
<td>5. It is experienced that the elderly do not place foot on the pressure mats (Orpwood, 2006).</td>
<td>5. Movement sensors are too sensitive and produce a lot of false alarms.</td>
</tr>
<tr>
<td>6. ICT system is used to store assign work tasks (Jansson and Mörtberg, 2011).</td>
<td>6. Movement sensors activated by stepping on or off. If elderly miss the bedside mat (carpet) where the sensor is placed then alarm will not trigger and care assistants do not know where the elderly is.</td>
</tr>
<tr>
<td></td>
<td>7. A certain area in elderly homes should be secured by a laser line to decrease the false alarms.</td>
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<tr>
<td></td>
<td>8. The electronic health record system is used for documentation of elderly health and social activities but care staff cannot communicate with each other through it.</td>
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<tr>
<td></td>
<td>9. There should be a platform for care staff from which they can communicate with colleagues about the elderly activities.</td>
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<td></td>
<td>10. There is a need of panic buttons everywhere in the elderly.</td>
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</table>
The table 7.2 presents the summary of the outcomes of my findings related to care assistants’ demands about ICTs. Findings show that care assistants were satisfied with the technologies as much they have. They demand that the safety alarm system should be designed as two way communication system that can decrease the burden of care assistants. They demand that mobile phones should be replaced by Smart Phone. Moreover they pointed out towards the hearing problem in telephone line and also discuss the problem of loosening the safety alarm button that the elderly use to call the care assistants in the emergency situation. The outcomes show that the sensors are too sensitive and also it is possible that the elderly may miss the sensor mats (pads) and alarms do not trigger. The outcome of my research finding is also consistent with previous research. Care assistants give the suggestion that if a certain area of elderly home is secure with laser line then it can escape us from a lot of false signals. Moreover care assistants work burden can decrease. They also suggest to use door alarms in all elderly homes who take the service of safety alarms. Moreover care assistants also demand a panic button in all elderly housings for their own security. My research findings related to documentation system are corresponding with previous studies. However care assistants wish that there should be a platform for care assistants from where they can communicate with their colleagues and discuss the elderly daily care activities. The research findings about ICT demands are mostly related to the problems that care assistants had faced in current ICTs during their daily care activities. They also provided some suggestions for solving these problems for future development in ICTs of their area of work. The findings show the satisfaction in care assistants attitude rather than expectations about ICTs. However, care assistants have ICT related wishes, demands that are more about ICT problems, based on their use and experience of these technologies.

7.3 Ideas and Visions about Information and Communication Technologies

Care assistants used information and communication technologies in their care activities. Therefore every individual care assistant has her/his own experience, ideas, visions and thoughts about the ICTs. The understanding about these beliefs and ideas can be examined through social constructivism approach. As Howcroft, Mitev and Wilson (2005) state that there is the relationship between society and technology. Through social constructivism approach the impact of the technology can be observed and the relationship between the society and the technology can be explored.

During interviews care assistants said that there are rapid changes coming in ICTs and care assistants did not know about the advancements coming in the future technologies.
Though, they knew about the current information and communication technologies (ICTs) and how they work. Moreover, care assistants had positive attitude towards the technologies they are using. The participants expressed that technologies should be easy to use for all users. Since, care assistants work with the elderly that is tough since most elderly need their attention. Thus, care assistants cannot spend much time in training and understanding the technology. They get one day training and also get written instructions on paper. They can read these paper notes in case if anyone forgets the use of any ICT. These findings are corresponding with previous research as Jansson (2007) argues that care assistants are trained staff nurses and assistance of nurses. However, demands of further education and learning have been increasing in the working life of care assistants within municipalities. In addition, Jansson, Mörtberg and Berg (2007) describe the reason of silence of care assistants. They state that the silence of care assistants during the discussion of technology might be based on several reasons. It is possible that they do not have enough knowledge about technology to speak confidently. It is also possible that they are expressing their resistance or do not understand the question properly.

Participants of the research were highly satisfied with the distribution of technology between elderly and care assistants. During interviews they expressed it is a good idea that very fewer technologies are operated by the elderly themselves. Most of the information and communication technologies (ICTs) are used by care assistants for the support and the well-being of elderly. There was a prejudice in some care assistants that elderly people of 60 to 65 years are incapable to learn the usage of technologies. They give the reason for this is that at their advanced age elderly people cannot learn and remember the functionality of different complicated technologies easily. If training is given to elderly even then sometimes they forget the use of technology because of dementia or other factors of old age. Therefore, it is better that most of the technologies are used by care assistants. It is necessary to mention that the interviewed care assistant argued about some, but not all, elderly between 60-65 years, who avoid to learn new technologies or forget after learning. This is an unrealistic and adverse judgment about 65 year’s elderly of Sweden that may happen only a few. However, this particular description can be true about advanced age elderly, above 75 years, or have problem of dementia. The findings are also confirmed in Christensen and Grönvall (2011). They state that usually it is infeasible to empower the elderly themselves with technologies because of their frail condition. Instead, it is better to empower the care network surrounding the older persons for instance, communication through technology within the care network. In addition Koch (2006) arguments are also important and according to my findings. She argues that it is a common prejudice of most care professionals that older people cannot use technologies or are unwilling to use them. Moreover about 80% of the decision makers who take the decision about the home care believe that the acceptance of technologies among the elderly is very low.

Nevertheless, in interviews care assistants told that the safety alarm provides the fake alternative of safety. Since care assistant need 30 to 40 minutes to drive to the home of the elderly during this time anything can happen. However, the elderly feel safe and secure better using safety alarms. Nevertheless, my outcomes are not consistent with the literature, Melander-Wikman, Fältholm and Gard (2008) state that alarm systems are used for safety reasons and guarantee the privacy of elderly people. However, elderly’s mobility is actually limited by using the alarm system, because the alarm system have a limited range and therefore cannot be used outside. Elderly people feel
themselves trapped in their own homes. In addition, Finken and Mörtberg (2011) arguments are not accordance with my findings. They argue alarms and other technologies are used for elderly to make them feel safe and remain able to stay in their homes. The reason behind inconsistency in the findings and with previous study is that different social groups expect different things from technology. Since Bijker (1992) states that different social groups have different concerns and practices. Therefore, for understanding the impact of technology professional knowledge, daily practice and organization arrangements are required.

In addition, monitoring technology was also discussed in interviews. During the discourse most of the participants were against the use of number of alarm systems and web cameras in elderly’s homes. Using more alarms as movement sensors in elderly’s homes or the use of cameras in different locations to be able to watch different activities of elderly intrudes into the independence of older people. Moreover, the use of surveillance technologies should be limited. It should not interfere with the personal life of elderly. Participants expressed that web cameras and movement sensors can help the care staff and reduce the workload of care assistants. But it is impractical to implement the sensors and web cameras in all elderly’s homes to monitor them. Since frequent monitoring will cross the line of elderly’s dignity and intrude in their privacy. The findings are consistent with previous research. As Hofmann (2012) says the home is seen as a place of security and privacy. However, with the intervention of technologies residents may feel insecure and isolated. On one hand these technologies, i.e. communication technologies, increase the social interaction but on the other hand become the reason of interference with elderly privacy. Since, communication technologies, that support audio-visual contact, involve third party actors such as caregivers and access sensitive information of elderly. In addition, Menack and Cress (2012) state that there are a variety of information and communication technologies (ICTs) that are used to monitor elderly from far away such as web cameras. Care assistants can rely on these technologies and see the elderly from a long distance. Moreover, Essen (2008); Fleck and Straber (2010) describe surveillance- monitoring technology, e.g. web cameras and infrared sensors, are used to keep an eye on elderly and to monitor them from a distance. However there is the issue of privacy lost and interference. There is need to construct the surveillance technologies in the way that the surveilled elderly feel they are being cared.

In the municipality where my research was conducted movement sensors and web camera surveillance is used for monitoring and watching elderly. Most of the participants of my research expressed that the involvement of technologies makes the care work and communication with elderly more convenient. However, the use of surveillance technologies should be within the privacy line of elderly. They expressed negative feeling relate to these technologies. During interviews there was a contradiction in the point of view of the participants about the use of web cameras in elderly’s homes. Since the surveillance can create sometimes positive and sometimes negative affect. Some participants were in favour of using of web cameras in elderly’s homes and some participants were against it. The participants who were in favour of web camera argued that visiting elderly’s homes can disturb them. Web cameras can play a good role in this situation and escape the elderly from disturbance. Care assistants can keep an eye on the elderly by camera instead of checking on them personally. In this way surveillance ICTs, e.g. web cameras and movement sensors can be used to protect the privacy through avoiding extra visits at elderly’s homes. Contrarily, participants
who were against the web cameras in elderly’s homes argued that using web cameras in elderly’s homes is not a good idea, because it would be an interference in the personal life of the elderly. Care assistants instead should go and visit an elderly’s home personally because elderly also want to talk to somebody. Moreover, elderly need someone not just to do anything specifically but to let them feel they are supported and cared about. Since, most elderly feel lonely. Personal visits of elderly and spending some time with them can affect on their health positively. Care assistants described the phenomenon- use of ICT in social care, in different ways. Several care assistants had a number of meanings relate to ICTs used in their work practice. Social constructivism perspective helped to identify multiple meanings of ICTs in the social care work. Through social constructivism I looked at the complexity of these meanings. Creswell (2009) argues that through social constructivism a subjective understanding and multiple meaning of the same phenomenon or event are constructed. Through these multiple meaning a researcher look at the complexity of the views rather than narrowing these meanings in specific categories. When I compare my findings with previous studies, the findings were corresponding to the literature. Pols and Moser (2009) state technologies are perceived rather coldly, whereas feelings and human care is considered more comforting, because the feeling and contact that a human can give is better. Care technologies are considered to be cold and impersonal. An encouraging pair of hand on the elderly shoulder is missing. Since care technologies are introducing a way to deal with several people with less number of professionals. This can reduce the human contact. In addition, Mort, Milligan, Roberts and Moser (2008) arguments are also according to my study. They argue that in social care it is not possible to replace the care workers by technology. Since, human interaction is very necessary to decrease the loneliness of old people. Without the interaction of human, elderly can become isolated. Moreover, Coeckelbergh (2010) monitoring technologies are fake alternative of care because the care provided is without human contact and social interaction. These monitoring technologies watch the elderly from a distance but do not reduce their isolation and loneliness. My findings can be compared with Menack and Cress (2012), they say that the technology is not the replacement of care and attention of human. However, the technology can improve quality of life of care recipient as well as care assistants. Moreover, these technologies help in avoiding crises and also saving time and money. My findings are not consistent with Melander-Wikman, Fältholm & Gard (2008) but their arguments are important for more understanding. They argue that elderly, who have a positive attitude towards technology and have a fear of falling, they give more focus to safety over privacy. They think that being safe and secure is more important than the fact that they are being watched and someone intrudes on their privacy.

In addition, it is necessary to mention that some care assistants see the elderly as customers. Since, some, but not all, of the interviewed care assistants used the word “customers” for elder people. On one hand elderly people should not be dealt as customers. Since, if care assistants will be handled as customers then provided care cannot be real care. However, on the other hand it could be meant to show the professionality of the care assistant and her/his service oriented mind.

Thus, this research is a contribution to improve the representation of the care assistants’ work and to deliver deeper insights. Care assistants are connected to elderly by information and communication technologies (ICTs). Therefore their experience is important to understand the problems with the technologies that are used for the well-
being of elderly. These findings are confirmed in Jansson (2007), her arguments are important as she state that the knowledge of home care personnel and their skills and experiences are often ignored. Care assistants have a low status, therefore their ideas and views about a future development of technology underrepresented. The aim of the research was to explore the use and experiences of care assistants and identify problems and ideas that they noticed in ICTs during their daily care activities. Since, Bijker (1992) states that professional knowledge, daily practice and organization arrangements are factors that are significant in understanding and analysing the development of technology. Social constructivism approach helped me to examine the use and impact of ICTs in social care services. As Jackson, Poole and Kuhn (2002) state that the social constructivism approach helps to understand the use of ICT in the work environment as well as it provides help in designing and implementation of ICTs. This study is a step to collect the perceived problems that care assistants faced in ICTs during their routine work. Furthermore the innovative ideas for future development of ICTs are also identified. The research can provide a good analysis of ICTs in various elderly’s housings. It provides a good comparison of the degree of involvement of ICTs in home-like institutions and elderly’s homes. Results of participants’ visions and ideas about technology are summarized in table 7.3 below.

<table>
<thead>
<tr>
<th>Literature Review</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Care assistants were silent about discussion of technologies (Jansson, Mörtberg and Berg, 2007).</td>
<td>1. Care assistants knew about current ICTs but silent about changes in the technologies.</td>
</tr>
<tr>
<td>2. There is prejudice that the elderly are unwilling to learn about technology (Koch, 2006).</td>
<td>2. There is prejudice that the elderly are incapable to learn and forget the use about technologies.</td>
</tr>
<tr>
<td>3. Safety alarms are used to make elderly feel safe (Finken and Mörberg, 2011).</td>
<td>3. Safety alarms are fake technology.</td>
</tr>
<tr>
<td>4. Monitoring technology is the fake alternative of care (Coeckelbergh, 2010).</td>
<td>4. Use of number of alarm systems can interfere with elderly privacy.</td>
</tr>
<tr>
<td>5. Alarm system guarantees the safety and privacy of elderly (Melander-Wikman, Fältholm, Gard, 2008).</td>
<td>5. The elderly need personal attention that technology cannot give.</td>
</tr>
<tr>
<td>7. Surveillance technology should be constructed in the way to give the feeling that the elderly are being cared (Essen, 2008) and (Fleck and Straber, 2010).</td>
<td>7. The research improves the representation of care assistants’ work.</td>
</tr>
<tr>
<td>8. Care personnel experience is ignored (Jansson, 2007).</td>
<td></td>
</tr>
</tbody>
</table>

Table 7.3: A Summary of Care Assistants’ Visions about Information and Communication Technologies

The table 7.3 present the summary of my findings related to care assistants’ ideas and visions about ICTs in phenomenon of social care and services. Findings show that care assistants were discussing about the technology however they were silent about the
changes in the technologies. There was prejudice about the incapability of elderly to learn about technology. The findings are also confirmed by previous research. Participants see the safety alarm as unreal care that is not corresponding with literature. My findings show that number of alarm systems interferes with elderly privacy; it is not consistent with previous studies. My findings show the contradiction between the uses of monitoring technology. Most of the participants were against the use of web cameras consistent with previous research. Ideas and visions of care assistants are the findings of my research. Implementation of these findings and outcomes in future development of the ICTs probably can influence on care assistants condition and their care activities.
8. Conclusion

The purpose of my study was to understand the use and experiences of care assistants and the usage of current ICTs for the social care of elderly. Furthermore, demands, needs and ideas of the care assistants about the technologies in their routine activities have been identified.

According to the analysis and the discussion it is concluded that care assistants are satisfied with the ICTs that they are using presently. Most of the care assistants never experienced any problem in information and communication technologies (ICTs) that they use in their work. Nevertheless some of them identified technical problems that should be removed to make the system more efficient. The safety alarm system is used for elderly safety. There are some problems with the safety alarm system that needs attention. Firstly, there is the voice problem that care assistants confronted during elderly's calls. Sometimes they cannot hear the voice of the elderly clearly. It can be the technical problem of the telephone line or of the elderly’s microphone. Secondly, there is the problem of the loosening alarm buttons. It is not the fault of the technology that the alarm button becomes loose. It could be the fault of material that is used to produce the alarm button. It should be solved for elderly’s safety because it is the only source for elderly by which they can communicate with their care staff. Both problems are related to the elderly’s communication which is a sensitive matter. Elderly’s primary contact with care assistants are through an alarm. If elderly need any service in the case of emergency and the alarm button does not work then the elderly cannot communicate with the care assistants. Furthermore, it is also possible that the alarm button may be pressed mistakenly by the elder person. In that case care assistants cannot hear the voice of elderly clearly. Thus care assistants cannot ask the elderly what happened and they need to go to the elderly’s home even if it is not really necessary. This can increase the work burden on care assistants and can make their work more stressful.

There are some suggestions according to the outcomes of my research concerning the safety alarm system:

- Door alarms are implemented in elderly’s homes only if they need it and are unstable. The care assistants gave the idea that door alarm should be fixed in every elderly’s home who is taking the safety alarm service. There are two aspects of implementation of the door-alarm, first, this may decrease the work burden of the care assistants, since the alarm will trigger and indicates them whenever any elderly will go out of the house. Nevertheless, another aspect is that to fix the door-alarm in elderly’s homes interferes with elderly’s privacy that cannot be ignored. Therefore the idea is impracticable to fix the door-alarms in every elderly’s home.

- Safety alarm systems are only working with a one way communication in home-like institutions. Care assistants can talk to elderly on the mobile phone only if the elderly called by pressing the alarm button. Care assistants themselves cannot call the elderly e.g. by using the mobile phone. Every time when the alarm call comes from the elderly, the care assistants go there personally even if
care staff wants to ask about dinner from elderly. This increases the work burden on care assistants.

- There is a need for a panic button in every elderly’s housing. Since this will be good for the safety of the care assistants and other staff.

In addition, the mobile phones, that care assistants are using, are very old and cannot run the properties of latest IT applications. These mobile phones should be replaced by Smart Phones. Through these modern mobile phones the care assistants can use Google maps in case of emergency and they can find out who is in the closest elderly’s home. This will help in saving time. Moreover, outdoor mobile alarm systems should be introduced to increase the range of elderly’s security. Elderly can then also use the safety alarm button when they are outside their homes. By this elderly can feel more secure and care assistants’ work will become more efficient as well.

Movement sensors that are used for elderly monitoring are very sensitive. Depending on the sensitivity there are a lot of false alarms that increase the workload of care assistants. The alarm triggered even if the elderly move their legs at sleeping time. Care assistant needs to check every time when the alarm triggered. Therefore, it is needed to take into account the sensitivity of the movement sensors- bed-alarms and door-alarms. The idea of defining a laser line on a certain area of the elderly’s apartment can be considered to decrease the amount of false signals and to reduce the burden of the care assistants as well. However the laser line should be designed in the way that it does not limit the mobility of elder persons.

In the Växjö municipality a digital pen - the ICT memo recording system - is used to schedule the care assistants’ work as well as to record and transfer elderly’s daily activities. Through this system care assistants’ daily routine can be kept under surveillance and controlled. The digital pen is only used by mobile care assistants who visit elderly’s homes for offering care and services. However in the municipality digital pen is not equally implemented in all elderly’s homes. There is a need to implement the system in all elderly’s homes correspondingly. This digital pen is known as mobi pen in the municipality. The municipality has plans to replace the mobi pen by “mobi phone”, an application for Smartphones. It is considered that by implementing the digital pen information transfer might be easier. However it might be inconvenient for care assistants to write on the mobile display screen in place of paper. Then a mobile phone with a larger mobile display screen will also be needed.

The documentation system for social care activities of the elderly is not equally implemented in the municipality where my research was conducted. In most of the elderly housings, care assistants are using electronic health record systems for the documentation. However, some elderly’s housings are still using paper-based registers. There is a lack of security with stationery system because data is stored in filing cabinets and can be freely available to anyone. Since care assistants told that there is no restriction on the access of elderly’s information in these paper-based registers. Therefore, any unconcerned care assistant can see all information related to any elderly. Thus, care assistants demand that firstly, the electronic health record system should be equally applied to all elderly’s homes. There is a need that the documentation system should be electronic and not in the access of irrelevant persons. Since the National Board of Health and Welfare in Sweden mandated to implement a generic system, i.e
the same documentation system should be used in county council and municipalities (Socialstyrelsen, 2011). Thus there it is needed to follow the mandate and implement an electronic documentation system in all elderly housings correspondingly. Secondly, care assistants also stated that the ICTs report systems are only used to record and document the health and social activities of the elderly. However, care assistants cannot communicate with other staff members through it. As a result, without communication care assistants always assume that all tasks have performed that were supposed to be performed. It is a good idea if staff can communicate using an IT application. Then they can also discuss the elderly’s activities with each other, and activities which did not work or not being performed.

In the municipality web cameras are used for surveillance and monitoring the elderly who are unstable or need it. Participants contradicted themselves in their point of view about the usage of web cameras in elderly homes. Most of the participants were against the use of web cameras because of interference with elderly’s privacy. It is concluded that web cameras should only be implemented in elderly’s homes if they demand based on their choice of options. It is correct that through implementation of monitoring technologies the efficiency of care work can enhance and the elderly will also feel more secure and safe. Yet, personal privacy is an ethical issue that needs to be considered. Moreover web cameras’ safety can be compromised on the elderly privacy. Therefore, it is necessary to construct the information and communication technologies (ICTs) in the way that the elderly feel that they are being cared. Thus, care assistants’ use and experience of ICTs can bring forward the ICTs needs and demands in terms of elderly well-being.

There is a summary of suggestions based on the conclusion:

- Telephone line problems need to be considered because there is no other way for elderly to communicate with care assistants. Therefore, it is needed to install ICTs correctly.

- Care staff and elderly are only connected through safety alarm button. It is needed to check the reason why the alarm buttons loose very often.

- Care assistants’ mobile phones should be replaced by Smartphones that can help the care assistants to find out the closest elderly’s home in case of more than one elderly alarm calls at the same time by using the Google maps application or similar webpages.

- Care assistants do not have knowledge about the upcoming future ICTs. There is a need to involve them in the development of upcoming technologies. Training programs can help to enhance the interest of care assistants about ICTs.

- There is need to update the manual documentation with an electronic health record system for support of management activities. Moreover, the manual paper-based systems are less secure because unconcern care assistants can see the information relevant to any elderly.
• There is need to implement the electronic health record system for documentation of all elderly housings correspondingly.

• There is a need of a system that enables the communication between care assistants and their colleagues to discuss the care activities of elderly in daily routine.

• It is impracticable to built-in door-alarms on every elderly’s door who is taking the safety alarm services. This may intrude with elderly privacy.

• Defining a laser line in elderly’s housings can help to decrease false alarm signals and control the sensitivity of movement sensors. But it is necessary to consider that the design of laser lines should not limit the elderly’s movement.

• Implementation of web cameras in elderly’s homes is unethical and an interruption on elderly privacy.

• Contacts with a human should not be replaced with technology. The elderly should be given personal attention and an encouraging pair of hand on their shoulder to reduce loneliness and isolation as well as to the involvement of technology.

• There is need to construct the monitoring technologies in a way that the elderly feel that they are being cared rather than surveilled and being watched.

• It is necessary that the municipality starts some workshops and courses for care assistants, in which it is taught to care assistants that the elderly are not their customers but are persons who need their attention and care.

At the end, it is concluded that my research outcomes show that some of the research findings are corresponding to the previous studies but some are not consistent with the literature. When compared with the previous studies my outcomes show that care assistants have fewer expectations and are satisfied with the current ICTs. However my results also show the need of the equal implementation of ICT such as a common documentation system. There are some findings that are not consistent with previous studies such as ICT demands, ideas and visions. These findings are contribution in the ICT research.

Thus care assistants play an important role for well-being and independent living of elderly using ICTs. However, I want to add my comments that it is a very positive thing in Sweden that the elderly are not totally dependent on technologies. Nevertheless, social care and services are provided through care assistants with involvement of several ICTs. Because sometimes elderly need someone to be there, not to fix anything or do anything particularly. But just to let them feel they are supported and cared about.

8.1 Research Contribution

This study has addressed the use and the experiences of care assistants about information and communication technologies (ICTs) used in their daily activities. The
research is a contribution to understand the care assistants’ daily activities and the role of the technologies in their work. Furthermore, the study explores the care assistants’ demands and ideas about future ICTs.

- The research will give a good knowledge about the everyday activities of care assistants. Thus, the research will help to decrease the ignorance of the low status work of care assistants.

- The research was done in care organization in Växjö municipality. The study is conducted to collect the experience and skills of care assistants that are usually ignored during the development of ICTs. The research has shed light on the current ICTs problems.

- This study explored the care assistants’ use and experiences about the ICTs that will help in overcoming the future challenges in the development of these technologies.

- The research explores and compares the care and services in the two kinds of elderly’s housings- home-like institution and elderly’s homes, in the municipality.

8.2 Future Research

The results of my research work can be either used in the development of future information and communication technologies (ICTs), or used as follow up study of ICTs used in social care and services. There are different aspects related to social care and technologies that can be studied in the future. Based on current research suggestions about future research direction can be:

- The point of view of the elderly about ICTs can also be added.

- Elderly’s ideas and needs about the mobile alarm system could be researched. For instance, do elderly want to use alarm systems outside their homes?

- How and what improvements do care assistants want in the electronic health record system for documentation and how many of them want that the system to be mobile?

- Why are the care organizations in Sweden not connected to each other? What benefit could the organizations get by communicating with each other?
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Appendixes

Informed Consent Form for Master Thesis

Study Title / Topic
Demands and effects of information and communication technologies on care workers of elderly.

Researcher
Hina Mariam, Masters Program In Information Systems, Linnaeus University

Purpose of the Research
Propose of the research is to explore the information and communication technologies (ICTs) that care assistants used in their work practice for care of elderly. The main scope of the research is to explore care assistants’ use and experiences of ICTs in their work. The focus will be on the demands, ideas and vision of care assistants about future ICTs.

Description of Research Project
I will conduct interviews with care assistants who perform services at elderly’s homes in order to collect data about their experiences of existing information and communication technologies and their wishes and demands about these technologies. What kinds of ICTs are currently used to assist care workers in social care and services offered to elderly in their homes? How do current technologies effects care workers daily activities? What kind of visions, ideas and demands do care workers express about future information and communication technologies? This research will help in getting knowledge that should be considered for development of future information and communication technologies.

Benefit of Research and Benefits to You
As a researcher, I will have a deeper understanding about information and communication technologies that are recently used. Care workers’ future demands and wishes about information and communication technologies will also be explored. You as a care worker may have an impact on the development of future information and communication technologies through your contribution to my research project. This research will also give you the possibility to think about existing information and communication technologies and to express your requirements for future information and communication technologies.

Risk and Discomfort
I do not foresee any discomfort from your participation in research. For example: Sharing your personal information to third parties. If the interviewee has requested anonymity any material that may identify the interviewee or her/his affiliations in the thesis, then the researcher may quit or paragraph material that obtained through the interviews in the thesis. Any given name of participants will be replaced by fictitious ones that will not bear any resemblance to the real names. Only gender and age of the interviewees will be listed.
Appendix A

Participant’s Rights about Interview
The interviewee can reserve her/his rights to edit or withdraw the interview. The interview is volunteer base and an interviewee / participant can leave the interview any time if s/he wants without giving any explanation. Moreover interviewees can also ask to delete date that researcher collected whenever they want.

Access to Interview Material
The recorded material and original transcripts will be limited to the researcher who is conducting interviews, supervisor of the thesis and examiner of the research. In any case, the recorded material, transcripts and other material that will gather in this research and that may identify the participant will not be given to any outsiders or any agency.

Question about Research
You can ask any general questions about research or your role in research. Please feel free to contact Hina Mariam, MIS student, by email: (hj222bj@student.lnu.se)

Confidentiality
I understand the above explanation and agree with the statements above.

Yes ☐                    No ☐

I understand that my participation in this research is volunteer based and I can withdraw from the research any time if I want without giving any explanation.

Yes ☐                    No ☐

I understand that I can ask the researcher to remove my data any time I want without any explanation.

Yes ☐                    No ☐

By signing this document I consent to participate in the research study and I allow you to use this data and information in your master thesis.

Yes ☐                    No ☐

I agree with audio recording of data

Yes ☐                    No ☐

By signing this document I consent to participate in the research about the demands and the ideas of care workers about information and communication technologies. Data/information that I share with you that can use in your master thesis.

I want to keep my name anonymous ☐
Appendix A

Date of interview: ____________ Place: ____________

Participant's Name: _______________________________________

Participant's Signature: _____________________________________

Researcher Name: _________________________________________

Signature: _______________________________________________
Appendix B

**Interview Guide**

For primary data collection I will use semi structured and informal interviews. I prepare an interview guide to maintain the high degree of flexibility. The use of interviewers guide indicates the structure of the interview. First of all reason and influence of the research will be described to care workers. The interview will be started with some warming up questions about interviewees/participants' background and their daily work routine. After that I will start my actual interview related to my research questions.

1. Would you please describe your background? Your name, age, education, your designation, experience etc.?

2. Where do you do your work/job?

3. When did you start your daily job?

4. What kind of services you give to elderly in their homes?

5. 5a. Would you please describe your work, please walk me through a day at work- previous day? When did you start in the work day? What happened then? And when did you leave?

5b. How do you give daily feedback to your officers at the end of the day about your daily job activities? At the end of the day do you register the care and services you offered to the senior citizen?

5c. Do you use any technology in elderly homes such as safety alarms etc.?

6. Can you describe how your work is organized? How many colleagues/managers you have? And how many elderly you serve daily?

7. Do you have meetings with your colleagues regarding work?

8. Where you meet daily before starting job for getting schedules and attendance?

9. What kind of schedule you have about your daily job? How it works?

   a. Manual  
   b. Technology

10. Who assigns you work? And how?
11. Please describe your coordination with your managers, colleagues and elderly? How you connect with them?

12. Do you use any technology during your job? Names?

   a.                               b.                                   c.                               d.

13. How you use the technologies in job?

14. Is there any special education, skill or training required to work as a care assistant?

15. Is there any special training required before using ICTs?

16. Is there any other technologies that your colleagues use?

17. Do you feel any problem or difficulty in the technologies during use or in sudden condition?

18. Do you feel any of these information and communication technologies should not be used for elderly?

19. Do you want any change in information and communication technologies?

20. Do you have any wish or idea about future information and communication technologies?

21. Can you please draw scenario how elderly and you connect to each other daily?
Explanations about Care Staff

There are several kinds of staff available for elderly help. It is categorized on the basic need of the elderly (Brochure Växjö commune, 2012). Staff is hired with right skills those always put care workers needs at the center (Omsorgsnämnden, 2012).

Care Assistants
Care assistants are staff that help and support the elderly in service activities such as walking, cleaning, shopping, laundry etc. they are known as undersköterska.

Occupational Therapist
In case of visual or hearing impairment person can get support of visual or hearing instructor. The occupational therapist is known as arbetsterapeut in Swedish.

Personal Assistant
Personal assistant provides assistance in the case of very severe disabilities. For those who need a lot of support to meet basic need of their life. Personal assistant help in basic need such as hygiene, eating, drinking, dressing and undressing. Therefor knowledge of the person’s disability is required for personal assistant’s job.

Personal Agent
In case of mental disability personal agent help to get care and support according to person needs.
Municipality Brochure and Organizational Policy of Social and Care Services In Sweden

Screen shots of brochure of Växjo municipality about social services

Ledigavälinning

Ledigavälinning innebär att en person följer med dig så att du kan delta i aktiviteter. Ledigavälinning kan rekommenderas för att du ska kunna besöka vänderi, delta i fritid--, kultur- och näringslivet, föreningar med mer. Vid du ska göra bestämmelser du gör att den du intresseras.

Du kan få ledigavälinningar regelbundet eller vid en enastående tillfälle. Det är kommersiellt för aktiviteter i mellanrum men kan också vara tillfälliga resa.

Tillfälliga pleringar

Tillfällig pleringar kan göras om du tillfälligt inte kan få dessa behov av med och hjälp tillgängliga i beslut. Mötet
ningen är att du ska intresseras dem.

Tillfällig plering kan till exempel bli använda:
• om du störkas i hemmet av en närstående som kan behöva enkännlighet.
• efter en sjukdomstidsre 
• som bostadskom ihävliga i beslut eller några funktions-

Materiellstöd


Du som har fyra 75 år och har möjlighet att besätta materiellstöd
nors med att göra en utredning behörighetsrättning. Före mer information kontakta kontakten på telefon 0470-434 92.
Appendix D

Screen shots of budget and screen shorts of social services (Omsorgsnämnden) in municipality of Växjö.
9.12 Daglig verksamhet enligt LSS

9.13 Kommunal rånsäker- och sjukvård

9.14 Kostverksamhet

Ny teknik newspaper
Appendix E

Copy of Front Pages of Browsed Websites

www.vaxjo.se

Elder Care

For those who are older and need service, care and treatment must be long-term care of good quality. You should be able to feel secure that care is when you need it.

The efforts of the elderly is to facilitate your daily life if you are due to age or illness need support to get by on your own. The main principle is for you to give self-help.

To find help
An assistance officer investigates and makes decisions on various

www.SKLA.se

SALAR represents the governmental, professional and employer related interests of Sweden’s municipalities, county councils and regions.

Municipalities, county councils and regions

Swedish is divided into 290 municipalities and 29 county councils which include the regions of Götaland, Halland, Västra Götaland and Västmanland.

There is no hierarchical relation between municipalities, county councils and regions, since all have their own self-governing local authorities with responsibility for different activities. The only exception is Gotland, an island in the Baltic Sea, where the municipality also has the responsibilities and tasks normally associated with a county council.

The Parliament, Riksdagen, is the supreme political decision-making body in Sweden.

Address to the municipalities (to the Swedish website)

Local government in Sweden

Local government has a long tradition in Sweden. The country’s municipalities, county councils and regions are responsible for providing a significant proportion of all public services. They have a considerable degree of autonomy and have independent powers of taxation. Local self-government and the right to levy taxes are stipulated in the Instrument of Government, one of the four pillars of the Swedish Constitution.

The Constitution

Art. 1. Swedish democracy is founded on the free formation of opinion and on universal and equal suffrage. It shall be realised through a representative and parliamentary policy and through local self-government.
Appendix E

www.manskligarattigheter.gov.se

The Swedish Government

The Government runs the country and the authorities

The government's main tasks are to make basic decisions that are not the

responsibility of the Riksdag and to make laws that are subject to

immediate effect. The government has four main responsibilities:

- draft government bills (proposals) for the Riksdag
- implement the decisions of the Government
- decide which rules (legislation) Sweden must follow
- control the money that is allocated to the government in its budget

The government also appoints cabinet ministers who are responsible

for the various functions of government. The ministers are assisted by

the Secretary General of the government.

Once the Riksdag has passed new laws, it is the Government's job to implement it.
The government's other tasks include guidelines addressing the authorities about their
primary duties. Such regulations include determining which schools and study programs qualify for a study allowance or instructing new authorities in what their
primary duties are.

The Government Offices and the central authorities help the Government perform its

work.

The Prime Minister forms a government

The ministry reports the Prime Minister (head of government) who in his/her turn

reports to the Riksdag. The Prime Minister coordinates the government's work and

seeks the ultimate responsibility for

government policy. Many support structures and departments are also under their
department, e.g., the

Ministry of Finance and the Ministry of Foreign Affairs. Some departments have several

Ministers of State in each office. The Prime Minister for Sweden, in addition to

being the Prime Minister, also acts as Minister for Health and Social Affairs.

Development cooperation both handle their official business at the Ministry of Foreign

Affairs.

Government is accountable to the Riksdag and needs the Riksdag's support in order to

perform its work.

Many departments under the Prime Minister and cabinet ministers at the

government's official website

The Government Offices (Regeringskansliet) perform the Government's work:

www.sweden.gov.se

Elderly care in Sweden

Social services in each municipality have the main responsibility for providing care

for the elderly. This is their duty under the Social Services Act. Municipalities are

entitled to design health and social care services that are adapted to local conditions.

This means that the support offered to elderly people may vary.

The Social Services Act states that elderly people must be able to live

and lead independent lives in safe conditions and have an active and

meaningful existence in the company of others. Municipalities are

required to establish special forms of housing for service and care of

elderly people in need of special support.

Care managers assess need for help and support

Municipalities are entitled to design health and social care services that

are adapted to local conditions. This means that the support offered to

elderly people may vary.

109
Various Kinds of Elderly Housings

Housings are categories according to the degree of offered care. There are two kinds of housings in the municipality, home-like institution and elderly’s homes.

1. Home-like Institutions

In home-like institutions care staff is in place around the clock. These special housings are for elderly who need to stay closer to the care staff around the clock (Brochure Växjö kommun, 2012). Moreover, in these housing care’s work is not mobile because care assistants work in-house.

2. Elderly’s Homes

Elderly’s homes are without assistance and round the clock care and attention for independent living of elderly. However elderly can apply for additional social care and services that are offered by the municipality. Elderly homes are divided into various kinds of housings such as traditional apartments, houses and senior housings. In these housing mobile care assistants provide social care and services.

2.1 Ordinary Housings and Houses

Ordinary housings (hemlinjen in Swedish) are for the elderly who can live in their own home and do not need longer care and supervision. However they can apply for social care and services that are offered by the municipality. Those who want to move in these elderly housings should be older than 65 years. But there are some services that elderly can access at 75 years. For instance, alarm services (Brochure Växjö kommun, 2012). In these houses mobile care assistants provide social care and services.

2.2 Senior Housings

In senior housings (senior boende in Swedish) several rental apartments are situated in the same building. These housings are for elderly who are over 75 years and can live independent without round the clock care. However elderly can apply for social care and services offer by municipality (Henning, Åhnby and Österström, 2009, Växjö Kommun, 2012). In these housings care work is not mobile since care assistants’ work in-house.