Exploring Equality of Use and Access to Public E-services for People with Disability: A Study of Disability, Public e-services and IT Policies

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I dedicate this study to all the people with disability all around the world, whose enthusiasms and efforts for getting over the obstacles and inequalities always inspire me.
Abstract

Discussion of the equal use and access to public e-services for people with disability does not present a coherent picture of Information Technology (IT) policies, public e-services and disability. Current studies usually take care of one or two of these subjects together, for example use and accessibility issues of public e-services from the viewpoints of users with disability, or IT policies and guidelines regarding use and access to public e-services for all people, or limitations of technology in supporting people with disability to equally use and access public e-services. In this study, in order to explore the equality of use and access to public e-services for people with disability, I will apply a framework proposed by Orlikowski (1992). On this account, I will explore the equal use and access to public e-services from three aspects of experiences and expectations of people with disability, public e-services and disability features available on them, and IT policies in combination.
Executive Summary

This thesis is an exploration of equality of use and access to e-services in public sector for citizens with disability. The study is not a literature-based research but instead putting together data collected from citizens, IT policies and public e-services.

The context of the research is Sweden. The researcher chooses to investigate public e-services at regional and local level and IT policies at national, regional and local level. Research methods include interviews with citizens with disability, studying national, regional, and local IT policies, and also investigating selected public e-services against web accessibility issues.

Orlikowski’s duality of technology – structuration model of technology - in form of triangle of human agents, technology, and institutional properties is applied to findings in order to analyze empirical materials.

In discussing the results of analysis, duality of influence between citizens with disability and public e-services, besides influence of IT policies on citizens with disability, and finally influence of interaction of people with disability with public e-services on institutional properties will be argues with regard to equality of use and access to public e-services.

Due to varying limitations and delimitations, the results of the study are restricted to selected research context and settings. In order to gain a more comprehensive understanding of relationships among IT policies, citizens and public e-services, more extensive studies are required.
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1. Introduction

Publicizing “information society for all” (COM/1999/687, European Commission) in 2000, led members of European Union (EU) to structure outlooks of their Information Technology (IT) policies. This structure was based on equality in using and accessing information and services available in public sector for all citizens by the means of an ICT tool; public e-services. In many European countries, endeavours for transforming processes and procedures of public sector began in advance of this legal code, however, “information society for all” established a focal point for future ICT plans through which governments could take their next steps more purposive and consequently all citizens could benefit from evolution of ICT in society. Almost identical awareness was concerned in the outlook of ICT society in Sweden.

Awareness of providing all citizens with equal use and access to information was approved in 2000 by government and parliament of Sweden as the bill “An Information Society for All” (Prop./Bill 1999/2000:86). This bill targets to build Information Technology (IT) infrastructure for ICT society of Sweden in which all individual citizens (and businesses) can equally have access to information and use it. Influenced by this law different IT policies are framed through which varying aspects of developing public e-services are prospected, for example accessibility, usability, benefiting all citizens, IT standards, and so on. Based on these aspects, my aim is to investigate the equal use and access to public e-services for citizens with disability.

1.1. Problem Area

Approving the bill “an information society for all” (Prop./Bill 1999/2000:86) has encouraged many scholars to explore and examine the bill in practice and theory. Accordingly, different researchers have tackled the bill through varying channels. One of the arguments that researchers focus on has been the use and accessibility of online information, services and ICT applications for citizens with disability.

In the report, “Towards a Swedish Information Society for All” (2000), the IT bill, information society for all, is explored through an IT perspective. Part of this report has discussed that implementing the information society for all should be adjusted with the particular needs of citizens, for example needs of citizens with disability (need is the word used in this paper). The report also explains about an IT program that the government of Sweden has assigned to the Swedish Handicap Institute in 1996. The IT program contains four modules (ibid, p. 18):

“An information campaign - Fritt Fram; initiatives to increase user competence; the development and implementation of IT-products and services designed for disabled; a survey of disabled persons’ use of IT”.
The purpose behind these modules has been developing an IT infrastructure with regard to the expectations and demands of people with disability. In this paper, the accessibility to the IT applications, information and services in general is pictured as an influential factor in implementing the information society for all.

In another study, Olsson, Sandström and Dahlgren have argued (2003, p. 349) “although access to new ICTs in Sweden is relatively high in international comparison, within the country there are significant gaps between different groups of citizens”. In this regard, they have asked (ibid, p. 349) “who has access to the technology? Are there significant differences between groups of citizens?” These scholars have relied on this idea that however the equality in accessing information is proposed in the IT policies of Sweden, it is not sufficient to focus merely on the policies in order to implement and evaluate information society for all citizens. Therefore, instead of merely relaying on the IT policies, they have run an exploring study by which real obstacles in accessing to information and services via internet can be investigated. Olsson, Sandström and Dahlgren (2003) have investigated the bill, information society for all, based on the obstacles that can prevent citizens from using and accessing online applications. Besides economic and users’ skills, information technology in general and computers and internet in particular are highlighted as the obstacles that the government of Sweden face in implementing the information society for all. In the research, they have concentrated on the technology-oriented solutions for providing the equal accessibility to information and services and generally practising the information society for all.

Nilsson (2005) in his research also studied the bill, information society for all, by exploring the access to the IT applications from the users’ perspective. In his study, he has categorized problems that people may have in accessing to IT applications to five different groups (ibid, p. 74): “Technical and physical possibility to use, will to use, allowed to use, knowledge to use and economical prerequisites, familiar to use”. This study mainly focuses on users and does not examine the technology or IT policies. However the main idea of the study constructs on the bill, information society for all, the study is mainly exploring the role of users in accessing information and IT applications – not the technologies or policies.

Endeavours for delivering public services via the internet encouraged the government and public administrations of Sweden to modify and develop their IT policies (Ilshammar, Bjurström and Grönlund, 2005; eGovernment Factsheet - Sweden – History, 2006). These attempts have resulted in approving versions of IT policies such as e-government action plan 2008 (or action plan for e-government) and eDelegation 2009 in order to increase the efficiency, effectiveness and public value of this phenomenon – public e-services. The versions of IT policies consist of varying principles and strategies to develop public e-services for the Sweden society. Along with the national IT policies, each of the local and regional authorities put into practice their own versions of IT policies/guidelines within the framework of the national IT policies in order to implement information society for all via developing public e-services for all. (eGovernment Factsheet - Sweden – History, 2006)
Attempts for developing public e-services for citizens of Sweden have not hidden from the eyes of researchers and ergo public e-services and – specifically national - IT policies (action plan for e-government 2008 and eDelegation 2009) have been explored through the varying lenses.

In a comparison study by Löfstedt (2007), the design (development) of public e-services in different municipalities of Sweden has been investigated. He has studied the subject of public e-services from the viewpoints of public administrations (municipalities). The result of the study has shown that municipalities’ goals in developing e-services are citizen-oriented. One of these goals is accessibility which has got a high (not the highest) priority for almost all municipalities at the time of developing e-services – economic goals take the first place in this comparison. The results of this research have also determined that most of the implemented e-services cannot benefit both municipalities and citizens, so there is need for developing e-services that can uphold the preliminary goals of municipalities in developing e-services, for example accessibility for besides economically benefiting all stakeholders involve in the e-services.

Lind, Östberg and Johannisson (2009) have conducted a study about the shortfalls of e-government action plan I (2008) and II (2009). They have discussed that an important lack in the e-government action plans is inability of them to determine resources, processes and procedures on which public administrations at different levels can rely on in order to develop e-services. This is while the action plans should be the source of decisions and actions for the public administrations at different levels for developing e-services. They have seen this shortfall as one of the reasons for falling down in the EU ranking of e-services.

Grönlund (2009) tackled the action plan for e-government in Sweden by criticizing the proposed infrastructure in the action plan 2008. He discussed that the action plan for e-government 2008 does not open discussion about how to serve citizens via internet rather it is most about which technology should be employed to develop e-services: “on technology rather than on services; production-centred rather than needs-based ... closed political systems rather than open infrastructure” (ibid, p.61).

In an analysis by Melin (2009), the action plan for e-government is criticized. He has categorized the action plan for e-government into the three main categories. One of them is “Process Orientation” (ibid, p.112) in which he partly has focused on “what about customer/client values and focus?” (ibid, p. 117). On this account, he has highlighted “different users or user groups in terms of stakeholders (discussed e.g. by [Scholl, 2001]) are not mentioned in the action plan” (ibid, p. 118).

The action plans for e-government (2008 and 2009) have been investigated by Wallström, Engström, Salehi-Sangari, and Styvén (2009). They have discussed about one of the starting points in the action plans: citizens’ needs. They argued that, citizens’ needs proposed to be the starting point but the result of developing e-services change it to be the final point (ibid, p. 124) “however, in the schematic presentation of the four action areas, administration’s
contact with citizens and businesses are presented as an outcome (result) rather than as the starting point”.

Landgren (2012) has explained that citizens should be able to access and use information and services by the means of e-services. In this discussion two points are highlighted. First, accessing to the e-services can help both the government of Sweden and citizens being in a dual communication and being informed about each other’s status. Second, citizens should easily use e-services in order to be able to benefit from the available information and services. Landgren’s work upholds this idea that the public administrations of Sweden and IT policies can support citizens with disability in equally using and accessing public e-services. He has also suggested participation of citizens in developing e-services for providing better and more factual accessibility to e-services.

In the above studies, the bill, information society for all, has been given a specific attention – implicitly or explicitly. Almost in all of these studies, the accessibility to the online information and services for all citizens has constructed part or all of them. To explore the accessibility for all, researchers have tackled the approved IT policies (e.g., Östberg and Johannisson, 2009; Grönlund, 2009) and/or existing public e-services - as technology - (e.g., Olsson, Sandström and Dahlgren, 2003). In some studies, scholars have looked into the accessibility matter for all from the viewpoints of the citizens (e.g., Nilsson, 2005; Melin, 2009). Nevertheless these studies present helpful pictures of the life story and status quo of the equality in using and accessing public e-services for all, they lack a coherent picture of IT policies, public e-services and citizens together. It might be asked whether it is required to put these three together or what the advantage is of exploring them jointly. I claim yes, it is important to put these three along with each other and investigate the equality of use and access to public e-services for all by analyzing the information collected from IT policies, public e-services and citizens concurrent and in combination. However, the actual answer is expected to be given by conducting this study. On this account, I have chosen to address the equality of use and access to public e-services with regard to the expectations and demands of citizens with disability. In order to explore the equality of use and access to public e-services for citizens with disability, I am going to (1) study what IT policies at the national, regional and local level promise to provide to advocate the equality of use and access to public e-services for citizens with disability; (2) study what actually is developed and promoted as public e-services with regard to the use and accessibility issues of public e-services for citizens with disability; (3) study what citizens with disability may experience and expect while they use and access public e-services.

In order to explore these three together, I will analyze the disability, IT policies and public e-services by applying a united framework proposed by Orlikowski (1992) which expands on the relationships of institutional properties, technology and humans. Thus, I will study the equality of use and access to public e-services from each one of these three dimensions in relation to the other two.
Based on the above, I conduct this research to explore the following research questions:

- How can experiences and expectations of people with disability influence equality of use and access to public e-services for them?
- How can public e-services serve expectations and demands of people with disability in equally using and accessing public e-services?
- How can IT policies incorporate experiences and expectations of people with disability for implementing equality of use and access to public e-services?
- How can use and accessibility issues of public e-services through the lens of experiences and expectations of people with disability influence equality of use and access to public e-services which is proposed in IT policies?

1.2. Contribution of the Study
I believe this study contributes to the current studies in public e-services domain in information system in particular and the IT bill, information society for all, in general. This study tackles “an information society for all” (Prop./Bill 1999/2000:86) by exploring the equality of use and access to public e-services from the perspective of IT policies, public e-services and disability and then investigating how these perspectives influence each other. In other words, I explore how IT policies, public e-services and people with disability can practise the equality of use and access to public e-services for people with disability. Doing so is a novel attempt since the other studies mainly investigate one or two perspectives which make the outcomes one-sided.

To investigate the equality of use and access to public e-services for people with disability, I apply Orlikowski’s framework (1992). This brings a contribution to the available studies that employ Orlikowski’s framework (1992) to explore the subject matters in Information System (IS) and Information Technology (IT) areas. This research then evidences the practicability and applicability of this theory to the IS and IT field. Also, employing this framework contributes to the discussions of limitations and strengths of the Orlikowski’s framework in its application to the IS/IT field.

1.3. Scope and Limitations
In this study, I discuss the equal use and accessibility to public e-services for people with vision impairments, hearing impairments, development or functional impairments, and moving impairments. Also, for this research, I investigate public e-services, vaxjo.se and ltkronoberg.se that are respectively launched by Växjö Municipality and Kronoberg County Council. The first one delivers varying services to citizens of Växjö city and the second one serves inhabitants of Kronoberg County with healthcare, medical facilities and so on. I choose to investigate these public e-services due to the information and services they offer to the citizens. Therefore, this study is limited to vaxjo.se and ltkronoberg.se and other public e-services which are developed by other public administrations are not included.

Moreover, language is a limitation that specifically affects the data collection procedure. The national, regional, and local IT policies are in Swedish and usually their English versions are
a summary of the whole content. Therefore, in order to fully study the IT policies, translation from Swedish to English is required. To do that, I used Google translate webpage and also my supervisor who knows both Swedish and English language supported me. Same barrier is applicable to the interviews. The interviewees with disability and interviewer (I) have got two different languages (Swedish and English). So, in order to translate the interviews, another person helped. This influences mutual understanding between the interviewees and interviewer. The whole translation process affects reliability and validity of collected data. Handling of validity and reliability issues are discussed later in sections 5.2.3 Reliability of Data and Results and 5.2.4 Validity of Data and Results, of the chapter 5, Research Methodology. Besides, as a third person has been needed to translate interviews, I should ask for interviewees’ permission for both attendance of that person and translation of their answers. To do that, in advance of the interview sessions, I informed the interviewees and asked for their permission to do so. More information is available in the section 5.4 Ethical Issues of This Study, of the chapter 5, Research Methodology.

1.4. Structure of Research

This research is organized to be 9 chapters. There are also two other parts available at the end of the study as References and Appendices. Chapter 1, Introduction, is the current chapter. Chapter 2, Research Settings, explains the context of this research. Chapter 3, Information Society for All: Public E-services in Sweden, contains information gained from studying varying literature in the field. Chapter 4, Theoretical Framework, illustrates the philosophical theories for IS research and the one applied to this study. Chapter 5, Research Methodology, is a description of the research approach and research methods including data collection and analysis methods. Chapter 6, Empirical Material, presents the empirical data collected from varying resources. Chapter 7, Data Analysis, focuses on analyzing the empirical materials based on the Orlikowski’s structuration model of technology. Chapter 8, Discussion, argues the final outcomes of the analysis and Chapter 9, Conclusion and Contribution, presents conclusions and opinions about the results of the study, also brings up suggestions for the future studies.
2. Research Settings

2.1. Context of Research
In this chapter, I present the context of the research. As I organized this study to be conducted in Sweden, therefore, public e-services, interviews with citizens with disability and civil servants, and IT policies are of this context.

Citizens with disability who lived in Växjö city - at the time of conducting this research - participated in the interview sessions. Their involvement in the interview sessions was optional. Throughout the interview sessions, they openly discussed the interview questions and expressed their experiences and/or expectations about the use and accessibility of the public e-services (vaxjo.se and ltkronoberg.se websites). The detailed information about how I contacted with citizens with disability, how the interviews were conducted and etc is provided in chapter 5, Research Methodology.

Vaxjo.se and ltkronoberg.se are public e-services which are chosen to be investigated in this study. The first one delivers online services to the inhabitants of Växjö city (local). Therefore, vaxjo.se is introduced as the public e-service at the local level. Ltkronoberg.se serves the citizens of Kronoberg County (region). So it is known as the public e-service at the regional level. These public e-services provide the information and services for routines and daily life of people; therefore, citizens interact with them very often. So I found them appropriate selections for discussing the equality of use and access for citizens with disability. Explanation about how I collected information from these public e-services is provided in chapter 5, Research Methodology.

Another source of information is interviews with civil servants at Växjö Municipality and Kronoberg County Council. The interviewees of Växjö Municipality worked in the communication department and the interviewees of Kronoberg County Council worked in the IT department - at the time of conducting this research. In the interview sessions, we discussed the equality of use and access to the public e-services and IT policies and guidelines. Information about how I contacted with the civil servants, how interviews were conducted and etc is provided in chapter 5, Research Methodology.

IT policies at the national, regional and local levels are also part of the context of this research. I went through the varying IT policies in order to find out what strategies are proposed in the policies for the equality of use and access to public e-services. Explanation about how I collected information from these IT policies is provided in chapter 5, Research Methodology.

2.1.2. Public Administrations - Civil Servants
Two public administrations at the regional and local levels are taken into discussion for this study. In this section, their policies, public e-services, tasks, responsibilities, and structures
are depicted in order to provide the readers with a general picture of these public administrations.

Explicating varying services these public administrations offer to the citizens can contribute to my rationality for selecting them for this study. As I mentioned earlier, both Växjö Municipality and Kronoberg County Council offer services that serve part of the everyday life of the citizens. So, those who live in Växjö city and Kronoberg County are usually in contact with them and use these services. For example the inhabitants of Växjö city often involve with activities such as school registration, public transportations, build and buildings permission and etc that are handled by Växjö Municipality. Kronoberg County Council as another selected public administration mainly focuses on delivering health care services to the citizens of Kronoberg County. According to these rationalities, I decided to choose vaxjo.se and ltkronoberg.se and their respective public administrations for this study.

Information about the structure of Växjö Municipality and Kronoberg County Council clarifies that their decision making is independent from central government of Sweden. That is, these public administrations can approve policies based on the local or regional needs. Therefore, even though decision making can be independent in these entities, the approved policies and decisions cannot be out of the national bills and strategies (read sections 2.1.2.1 and 2.1.2.2 for complete information). This then supports my future analysis of the IT policies at the national, regional and local levels.

2.1.2.1. Växjö Municipality
Växjö Municipality – in Swedish Växjö Kommunen - is one of 290 municipalities in Sweden. Like the other municipalities, Växjö Municipality “leads and coordinates municipal activities, developments and economic status”\(^1\) of Växjö city. Växjö municipality serves the inhabitants of Växjö with the services and information about preschool, school, and special school, permissions and license, social services, library, energy and environment, emergency management, public transportations (see Fig. 1). In vaxjo.se (Växjö Municipality website), it is declared “among the most important tasks are preschools and schools, social services and elderly care”\(^2\).

Växjö municipality is governed by the highest body of municipality which is the city council (see Fig. 1). The city council is elected by Växjö citizens every four years. Växjö Municipality is governed independently by the elected local politicians. In other words, Växjö Municipality is self-governed, and regulate the local decisions (limitedly) such as local tax tariffs, subsidies, how to use tax and so on. However, the local regulations and decisions are framed within the national laws. That is, the politicians of Växjö Municipality should make decisions by respecting the policies and bills which are approved by the parliament and the government of Sweden. These activities and tasks are all controlled by specific inspection groups. Above explanation is brief information about Växjö Municipality. Figure 1 is the

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1 (http://vaxjo.se/Kommunen/Organisation-och-politik/) [accessed on: January 2011]
2 (http://vaxjo.se/Kommunen/Sa-fungerar-kommunen/). [accessed on: January 2011]
organization chart of Växjö Municipality (available at vaxjo.se) which shows a more comprehensive picture of it. In figure 1, I highlighted (in green) the communication department. This is the department I conducted the interview with its informants about the research questions and aims of the study.

The website, vaxjo.se is a means for providing the citizens with information about the municipality’s services, tasks and activities, besides, supporting the citizens in communicating their ideas, expectations and demands. Vaxjo.se contains varying links that connect its users to what they look for. Additionally, information is organized based on the subject and their relatedness under the departments: Children & Education (Barn & Utbildning), Building & Housing (Bygga & Boende), Environmental & Transportation (Miljö & Trafik), Support & Care (Stöd & Omsorg), Work & Business (Arbete & Företag), Experience & Do (Uppleva & Göra), Municipality (Kommunen). Also, several disability features such as Very Legible (Lättläst), Sign Language (Teckenspråk), and Listen (Lyssna) are located on vaxjo.se in order to facilitate the users with disability in using this e-service. The structure and features of vaxjo.se is available in Appendix C.

Vaxjo.se follows the standards of ‘Guidelines for vaxjo.se and underlying webs (Riktlinjer för vaxjo.se och underliggande webbar)’. This document which is developed by people in communication department (see Fig. 1 - highlighted by green), determines the IT policy of Växjö Municipality for developing vaxjo.se for all in line with the national web standards. It indicates which department or group is responsible for what activity about vaxjo.se, for example who writes about the permissions and licenses, which group develops the user interface, and which group decide about assigning the resources for modifying e-service and so on. Besides, the organization of information, accessibility issues, disability features and similar considerations are standardized in this document.
City Council (61)
Växjö Municipality's “parliament" The nomination committee (15)

The municipal accountants (11)

Värend Rescue Association (78.3% *)

Växjö Municipality Company Ltd (VKAB)

Smaland Airport Ltd (42%)

Växjö Theatre AB

Culture Park Småland AB (41%)

AB Region Theater Blekinge-Kronoberg (22%)

Arena City of Växjö AB

High school board (15)

High school Management

Technical Committee (15)

Technical management

The Municipal (15)
Växjö Municipality "Government"

Municipal Working Committee (7)
Municipal organization and Personnel Committee (5)
Emergency management board (7)
Municipal District Council of Lammhult (9)

Election Committee (5)

Trustees (5)

Building Committee (15)

Recreation (9) and Culture Committee (9)

Body of work and welfare (15)

Environment and Health Committee (11)

School and child care committee (15)

Turnover orgs Board (15)

Municipal administration
Municipal

- Finance Office
- IT Unit
- Communications
- Municipal Offices
- Trade and Industry Office
- Personnel Office
- Planning Office
- Procurement Unit

City Planning National Land Agency

Culture and Leisure

Work and welfare

Environmental Health offices

School and child care department

Care department

FIGURE 1. VÄXJÖ MUNICIPALITY - ORGANIZATION CHART

3 (available at: http://vaxjo.se/upload/www.vaxjo.se/Kommunledningsf%C3%B6rvaltningen/Kommunkansli/Organisation_skisser_v%C3%A4xj%C3%B6_kommun.pdf) [accessed on: January 2011]
2.1.2.2. Kronoberg County Council

About twenty county councils (Landstinget) are available in Sweden. They are mainly responsible for the health care issues. However, their public services include the health care services and studies for people with disabilities, regional transportation, enterprise and business investments, and cultural developments. Kronoberg County Council consists of nine centers named as Emergency Center, Children's and Women's, Surgery Center, Medical Center, Medical Service Center, Primary health care and rehabilitation center, Psychiatric Center, Service Center, Dental Care Center. Decisions are taken by the management team consist of the county director, center managers and medical advisors - members can be increased if needed. Kronoberg County Council obeys the national laws of Sweden, however, it has the authority to decide about and administer their activities and tasks independently. Figure 2, political organization chart, along with figure 3, center organization chart (available on ltkronoberg.se) shows a comprehensive picture of Kronoberg County Council.

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**Figure 2. Kronoberg County Council – Political Organization Chart**

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4 (The Swedish Association of Local Authorities and Regions – activities: http://english.skl.se/municipalities_county_councils_and_regions/activities_1) [accessed on: January 2011]
County councils can be accessed via the different ways such as phone, fax, email, and personal visiting. One way that county councils introduce themselves and also their services is through their e-services. Kronoberg County Council (Landstinget Kronoberg) which is available on the web address: http://www.ltkronoberg.se/ is selected for this study. This e-services support its users (inhabitants of Kronoberg area) with the varying services. Ltkronoberg.se consists of the varying information and services, for example an online-service for collecting medical test result. The related information available on Ltkronoberg.se is classified under the headings: Health and social work (Hälsa och vård), Dental care (Tandvård), Careers (Jobba hos oss), Research and education (Forskning och utbildning), and about the county (om Landstinget). These categorizations are accessible on the menu bar of the website. Besides, on the Ltkronoberg.se, it is claimed that the universal guidelines of web design is followed for developing this e-service. Accordingly, it is promised to provide the equal use and access to Ltkronoberg.se for all citizens. In this regard, the disability features

5 (available at: http://ltkronoberg.se/Om-landstinget/Organisation-/) [accessed on: January 2011]
that support this promise are located on ltkronoberg.se: Customize (Anpassa), Very Legible (Lättläst), Sign Language (Tecken), Listen (Lyssna). Available information on ltkronoberg.se demonstrate the varying features that support citizens with disability to use and access ltkronoberg.se. It includes information about adjustment of the texts (colour, size...), listening features, sign language, searching and navigation features and etc. The structure and features of ltkronoberg.se is available in Appendix C.

2.2.2. Policies at the National, Regional and Local Level

Part of this study is about exploring the equality of use and access to public e-services in the IT policies at the national, regional and local level. As these policies determine what plans and strategies are prospected at each level in order to manage the use and accessibility of public e-services with regard to the demands and expectations of people with disability. On this account, I investigate the following documents:

a. Document at the local level: ‘Guidelines for vaxjo.se and underlying webs (Riktlinjer för vaxjo.se och underliggande webbar)’. This document contains the set of internal/local standards that people at the communication department (Kommunikationsenheten) create and apply in order to launch vaxjo.se with regard to the use and accessibility issues that people with disability might face. Additionally, Växjö Municipality webpage, the public e-service at the local level contains the guidelines and standards about the use and accessibility of ltkronoberg.se under the name “About this site”6 available on vaxjo.se (for detailed information about Växjö Municipality please see section 2.1.2.1 Växjö Municipality of the current chapter, and to learn about vaxjo.se see Appendix C).

b. Document at the regional level: a set of guidelines and standards about the use and accessibility of ltkronoberg.se with regard to what people with disability demand is published on ltkronoberg.se under the name “About this site”7 (for detailed information about Kronoberg County Council see section 2.1.2.2 Kronoberg County Council of current chapter, and to learn about ltkronoberg.se see Appendix C).

c. Documents at the national level: The national documents are issued by the public administrations and the government entities of Sweden in order to outline the general directions and principles for developing public e-services for all. These outlines actually look for standardizing and managing the equality of use and access to public e-services. For this study, e-government action plan 2008, eDelegation 2009, and Verva guidelines 2006 are investigated.

As it is clarified in eGovernment Factsheet - Sweden – History (2006 – 2010), e-government action plan 2008 is:

6 http://vaxjo.se/Kommunen/Om-webbplatsen/ [accessed on: January 2011]
7 http://ltkronoberg.se/Om-landstinget/Arbomr/Information-och-kommunikation/Webben/Om-webbplatsen/ [accessed on: January 2011]
“The document highlights the prioritised policy areas until 2010, indicates
the responsible Government departments and defines the necessary
coordination with municipalities and regions (county councils).”

eDelegation 2009 which is the complimentary version to e-government action plan 2008, is
defined as the collection of strategy and policies that are:

“aiming to enlarge the prospects for developing more user-friendly
interfaces for eServices to citizens and businesses, especially for those
services that integrate the processes of several public agencies”.
(eGovernment Factsheet - Sweden – History, 2006 – 2010)

Along with these two, the national web development guidelines (2006 – translate to English
in 2008) by Verva is applied to public e-services - “The Swedish Administrative
Development Agency (Verva - no longer in operation) is established in January 2006 as one
of the Government's central advisory agencies. Verva's remit is to coordinate the
development of Central Government in Sweden, while driving and promoting the country's
eGovernment development” (eGovernment Factsheet - Sweden – History, 2006 – 2010). This
document contains the guidelines about varying web development matters such as web
accessibility; website standards, web content and services, and assistive technologies for web
browsing.
3. Information Society for All: Public E-services in Sweden

Through to the end of this chapter I will provide the readers with the history and progression of Sweden in progressing the IT policies and launching public e-services as the ICT means by which all citizens in Sweden could be able to equally use and access information and services in public sector. In this chapter I choose to provide the readers with the background information about and the status quo of Information society for all and the equality of use and access to public e-services in Sweden. However, this study is not a literature-based research; doing so can shape the readers’ mind about the research aim and how it can contribute to the current literatures. It is worth to mention that in order to find related literature for this study a list of keywords such as public e-services in Sweden and etc are used. Full list of them is available in Appendix D.

The story of public e-services started from 1993 when USA introduced web-services as the ICT means by which public administrations and governments became able to deliver services in public sector to citizens. Since then public e-services became one of highly regarded study areas among the practitioners and scholars all around the world (e.g., UN, 2010; Wimmer, Codagnone and Janssen, 2008). The emergence of public e-services automatically twisted with the influence of varying concerns and strategies into them. One of these subject matters is usability and accessibility issues of public e-services for people with disability or in other word, the equality of use and access to public e-services for all citizens including people with disability (e.g., Huang, 2003; Jaeger, 2006). This movement influenced different governments and civil servants and drew their attention to this reality that people with disability should receive equal benefits from public e-services as everyone else in a society. And it was the time when many countries started to think of the new promotions. As such the European Union introduced eEurope Initiative in which highlights “information society for all” (COM/1999/687, European Commission) as the outlook of European Union’s plan for the aim of providing public e-services for all citizens in European countries. The preliminary goals of eEurope Initiative (2000) are

“to bring every citizen, home and school, every business and every administration into the digital age and online; to create a digitally literate Europe, supported by an entrepreneurial culture ready to finance and develop new ideas; to ensure that the whole process is socially inclusive, builds consumer trust and strengthens social cohesion” (eEuropa, 2005).

This has been an initial move toward providing the equal accessibility to information and services for citizens through public e-services in order to equally benefit all people. One of the countries that contribute to this vision is Sweden.

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Sweden since 1970s has been involved with the implication of information and communication technology (ICT) to processes and procedures in public sector. Before inception of the third millennium, application of IT/ICT to public section was not as wide as today. Since 70s, the government and public administrations of Sweden have merely used IT/ICT for the internal communication and information exchange (eGovernment Factsheet - Sweden – History, 2006, updated 2011). However, by approving “Central Government Administration in the Citizen's Service” (Regeringens proposition 1997/98:136) in 1998, the government of Sweden initiated moving toward more citizen-oriented e-services by which citizens of Sweden can benefit from transformation of public services. Centralization of the citizens’ need continued till early 2000 when the government of Sweden presented a new vision; “Information society for all” (Prop./Bill 1999/2000:86). Approving this bill by the parliament of Sweden resulted in the application of ICT to public sector “in order to stimulate growth, employment, regional development, democracy, fair treatment, quality of life, equality and efficient Public Administration” (eGovernment Factsheet - Sweden – E-government in Sweden, p. 9-10). This vision includes all citizens of Sweden regardless of ability or disability, age, gender, and so on that may marginalize people and their needs. However, this right was earlier embedded in the ideology of rights of citizens of Sweden; ‘Folkhemmet’. Folkhemmet (Hansson, 1935 stated in Elovaara and Mörtberg, 2007) discussed establishing the welfare system by which all citizens of Sweden can benefit from the social services. Later, this was exercised in varying policies. The Swedish Disability Policy is an example of policies which were developed to practice folkhemmet - specifically for people with disability: “People with disabilities have the same rights as everyone else” (Facts about Sweden - Swedish disability policy, 2010, p.1).

With regard to the above bills and visions, the progression of IT policies and public e-services can be better understood. According to the eGovernment Factsheet - Sweden – History (2006, updated 2011), in 2000, an initial action plan which is called “a public administration in the services of democracy” was developed by the government of Sweden. This version of action plan encouraged the idea of 24/7 agency as “the provision of services through the Internet round the clock, seven days a week, irrespective of the division of responsibilities between Government agencies or other public organisations” (eGovernment Factsheets, 2012, p. 9). Since then, public administrations and all involved entities in the evolvement of IT policies and public e-services have tried to improve and optimize their decisions and actions in order to better serve the society of Sweden. In this regard, in January 2006, the Swedish Administrative Development Agency (Verva)⁹ was initiated to operate. It was in charge of developing the national web guidelines and standards for handling the use and accessibility issues of e-services in public sector. Through years, varying versions of IT policies (e.g., Bill Prop. 2004/05:175) and updates in 24/7 agencies were presented in order to serve the society of Sweden with public services. In 2008, the Minister for Local Government and Financial Markets presented; the action plan for e-government (or e-government action plan). This policy has been targeted to overcome foregoing deficiency in

⁹ Not operating any more. Government of Sweden decided to close it in 2008. However, public administrations still apply Verva Guidelines to public e-services.
taking citizens as central element in developing public e-services. In alignment with the initial aim of information society for all, the action plan for e-government 2008 constituted aiming to “simplifying access to information” and “accessibility of information” (eGovernment Factsheet - Sweden – History, 2006, updated 2011). The Verva guidelines 2006 also were promoted in this action plan as the national guidelines for handling the use and accessibility of public e-services. Also, in order to uphold Verva in providing better accessibility to public e-services for citizens with disability, the Swedish Agency for Disability Policy Coordination (Handisam) was assigned to collaborate with the Verva. In contribution to and advancement of this policy, eGovernment Delegation (eDelegation) was presented in 2009. The user-oriented public e-services is emphasized in eDelegation 2009 by highlighting that first, public e-services should be developed in a continues form due to the changes in expectations and needs of citizens, and second, simplifying the use of public e-services by providing citizens with ‘my pages’ that supports privacy and independency of individuals while they are working with e-services. (eGovernment Factsheet - Sweden – History, 2006, updated 2011)

Varying studies have been conducted to investigate the actual impression of equal use and access to public e-services for people with disability in existing public e-services in Sweden. Studies which explored Swedish e-government policies (e.g., e-government action plan 2008, eDelegation 2009 and so on), implicitly or explicitly were constructed based on the Swedish government Bill (1999/2000:86) “an Information Society for All”.

Discussions of the use and accessibility of public e-services in some studies conducted through the channel of users’ demands and expectations. In a study by Lind, Östberg and Johannisson (2009), they focused on the aim of action plan for e-government 2008 for providing equal access. They discussed that however in published reports (e.g., UN, 2008 in ibid) Sweden situated among top ranked countries for the state of its public e-services, what still missed in IT policies is advocating the accessibility to relevant information – together with other elements - with regard to end-users’ expectations (needs). Through the updated versions of IT policies, it has been tries to manage the equal accessibility by encouraging the government agencies to take a “user-centric perspective” (ibid, p. 47), nevertheless the agencies assumed that they already have this perspective in delivering their services. Lind, Östberg and Johannisson (2009) then included that government agencies are actually usage-oriented rather than user-oriented. By taking a marketing perspective in their study, Wallström, Engström, Salehi-Sangari and Ek Styven (2009), argued “the need of the user should always be an important starting-point in the efforts made by administrations to develop eServices” (ibid, p. 123). They showed that in actual development of public e-services – with regard to the IT policies and guidelines, what has happened is that public e-services are implemented to be accessible based on what the government agencies know about the accessibility – and not based on what actually users experience and expect. This consequently targeted few numbers of users. This is while what required is developing accessible public e-services with regard to “needs, attitudes and behavior” (ibid, p. 126) of

users. Based on a statistical report publicized by the United Nations in 2008, OECD in 2009 reported that “overall, Sweden exhibits ... over 50% of citizens regularly access information on government services via the internet” (ibid, p. 2). OECD report (2009) was constructed based on e-government readiness index (UN, 2008, p.10) which basically focused on to what extent a country is ready to achieve goals and missions of its e-services in public sector. In the report, it was outlined that conducting the evaluation aimed to advocate citizens in using e-services in public sector, whereas investigation had a technology-oriented approach to e-services in public sector rather than a user-oriented approach. In a more recent publicized survey by UN (2010) - among varying examinations, “the national websites were tested for a minimal level of web content accessibility as described in the Web Content Accessibility Guidelines of the World Wide Web Consortium” (UN, 2010, p. 110) ... “The research team followed a citizen-centric approach to assessment of online services, among other things by putting themselves in the place of the average user“(UN, 2010, p. 110). Therefore, this examination seems as a more appropriate one for understanding the state of accessibility of public e-services. However, in this study, the researchers put themselves in the place of users and examine websites against the use and accessibility issues. Therefore, still what they experience about the use and accessibility of e-services is different from what people with disability experience. It is worth to mention that explicit information about the use and accessibility issues specifically for people with disability have not found in any of the above reports.
4. Theoretical Framework

In this section, firstly I describe the arguments about different philosophical world-views used in IS studies. After that, I present the structuration theory, its extensions, and its application to IS. And then on these accounts, I discuss how structuration theory can satisfy aims and questions of current research.

4.1. Philosophical World-Views for IS Research

Carrying out IS research by the means of an appropriate philosophical world-view (perspective) have always been the subject of discussion among IS scholars. This matter actually has twisted with the careless use of terms; information system (IS), system, information technology (IT), and computer. (Lee, 2004)

Proposing information system as a means for collecting required information to conduct business tasks and processes in order to achieve organizational goals makes IS a desired field for social sciences (Lee, 2004). In natural sciences approving or disapproving a scientific theory is based on generated law from the behaviour of collected data without applying researcher’s experiences, justifications, or expectations, whereas, social science is not about approving or disapproving (Jackson, 2000). It explains, argues, and criticizes behaviours, structures, events and anything related to the humans and societies (Kuper and Kuper, 1985). This explanation opens up the subject of selecting appropriate philosophical perspective for a research. This is arguable by referring to the absence of human beings and their influences, in positivism approach which is the best and most used means for natural studies (Berger and Luckmann, 1967 stated in Lee, 2004). Accordingly, many researchers such as Schön (1983) and Popper (1965) (both stated in Lee, 2004) argued that positivism (and logical positivism) cannot be an appropriate perspective for IS studies. Anyhow positivism has been applied to varying studies specifically when quantitative approach furnishes research questions (Lee, 2004). General argument by them indicates that theories/hypotheses need to be (re)examined in laboratories under the particular controlled condition. These examinations are repeatable and repetitions should demonstrate a logical regularity. Therefore, generating general laws (theories) from/for them is feasible. But, studies of social science are not easy to examine in laboratories. Even if it was possible, the controlled conditions are not constant in each try. Therefore, repetitions cannot prove or disprove a theory/hypothesis. Along with that, Schön (1983 stated in Lee 2004) discussed that studies in social science involve exploration of phenomenon which is created through social interactions of human beings who give meaning to those interactions (subjective meanings).

Researchers such as Lee (2004) argued that the interactions of human beings with entities such as organizations and technology make information system fits within the social studies. Human beings through their interactions with other entities can create and recreate aims, functions, norms and standards that facilitate or constrain humans or those entities involve with them. On this account, a philosophical world-view such as positivism that implicate on the objective knowledge and theory is not sufficient for IS research. Motivated by varying
discussions about interpretivism as a perspective in social sciences, Walshaw (1995) argued emergent and growth of interpretivism in IS research. He discussed social constructions to impressions, descriptions and analyses of human beings about those constructions. In another work about applying social theories to IS, Mingers and Willcocks (2004) disputed varying strands of interpretivism that IS scholars dressed their studies with. However, like any other subject matter in social sciences (e.g., discussion by Bostrom and Heinen 1977, and Emery and Trist, 1960 about systems theory in general and socio-technical systems in particular, both stated in Lee, 2004), information system can be influenced by norms, standards and regulations, power, and any (un)predicted alterations. Such influences result in application of the existing social perspectives to IS research with regard to what meant to be achieved by accomplishing the study.

Anthony Giddens’ structuration theory is a widely used theory in IS research (Jones, Orlikowski and Munir, 2004). However, non-applicability of the structuration theory to IS studies has been criticized by different scholars, for example by Gregson, 1989, Walshaw, 1993, Orlikowski, 1992 and DeSanctis and Poole, 1994. As the consequence of the critiques, Giddens’ theory has been changed. Through the following section a more detailed prescription of Giddens’ structuration theory and its extensions are provided. Afterwards, I discuss how this theory is advocated IS research. And finally, in the last section, I motivate my use of Orlikowski’s structuration model of technology for this study.

4.2. Structuration Theory
One attempt to introduce an appropriate theoretical frameworks for IS research moves back to Anthony Giddens’ Structuration Theory. Besides his other works, he institutionalized structuration theory (1976-1984). In this theory, the focus is not merely on the individuals who live in a society, nor on the structures and regulations of a society but on a balanced inclusion of both these thinkings. This theory supports the duality of structures. To understand the duality of structures, a clarification of the main concepts in structuration theory is required. The main concepts in this theory are rules and resources that construct a social system. This is what Giddens refers to as structures. He explained that rules are those criteria that individuals follow. He also clarified that resources are meant to be created through human agents’ actions.

Giddens explained that structures – rules and resources - put actions into a recursive manner through which those actions are created and recreated. In return, recreation of the actions results in recreation of the structures as well. Giddens (1984) introduce these creations and recreations as duality of structures. Giddens (1984) declared three distinct dimensions for structure: Signification, Legitimation, and Domination (see Fig. 4). In other words, these dimensions of structure help to understand the duality of structure. Signification implies on the language for communication and interpretation between actors while carrying out their actions. Legitimation aims to form norms and morality. Domination gives rise to power by the means of resources. These three dimensions work jointly. That is, the signification of a specific concept originates in its legitimation and by its creation and recreation, influences norms and values and also controls power types in creation and recreation of signification. It
is important to notice that the dimensions of structure of a specific concept periodically interact with the human actions (communication, power and sanctions – see Fig. 4) to support the existence of that concept. However, the dimensions of structure are subject of change through interacting with human actions. This interaction is happening through the bed of modalities. As it is shown in figure 4, modalities include interpretive schemes, facilities and norms. For example, the municipalities in Sweden have got rights to decide about their local laws independent of central government (domination). However, through conducting elections each four years (the modality: facility), new members join municipalities who may change the decisions and propose new local decisions/laws. Along with that, municipalities may communicate with and serve citizens via traditional modes of communicate e.g. phone or meetings (legitimation). But because of new technologies, they may introduce e-services (modality: norm) in order to open new communication and serving channel. Moreover, municipalities may used to collect feedback from citizens in form of questioners (signification) but through new methods in communication between politicians and citizens, municipalities may ask people to attend workshops and design (modality: interpretive schemes) their solutions for improvements in municipalities’ works.

System is another concept in Giddens’ structuration theory which refers to the social practices that are born through recreations of actions. Besides structure and system, structuration is another concept. It indicates under what conditions those structures and systems are created and recreated. (Giddens, 1984)

In Figure 4, the interactions of human agents and structures are pictured (containing three stated dimensions). This means, activities of human agents develop relationships. These relationships then are interpreted through varying signification schemes. Besides, these relationships can grow different power schemes. From another angle, human agents’ actions are producing and reproducing resources. Accordingly, humans’ actions and interactions are
creating structures and creation of structures are actually affecting human actions and restructuring them.

But what can be achieved by employing the duality of structure for studying a subject matter? Motivated by Giddens (1984), structuration theory supports dynamic behaviour of elements involve in carrying out an action in a social context. Structuration theory can through creation and recreation of structures propose change in existing state of affairs. Sewell (1992) also discussed that change is the outcome where structuration theory is applied in social context. He (1992, pp. 16-19) argued that change results from

“the multiplicity of structures; the transposability of rules; the unpredictability of resource accumulation; the polysemy of resources; the intersection of structures.”

Change can emerge from the multiplicity of structures because structuration theory asserts that individual agents have access to distinct resources and contrasting rules (diverse structures). The possibility to apply (re)created structures into discrete social matters brings out the idea of transposability of rules (ibid). This means, a combination of distinct rules, resources and actions are applicable to an emerged social issue. All these varied and practicable resources, by the influence of different factors, can become unpredictable. This can result in changing the applicability or categorization or use of those resources. Meanwhile, the intersection of structures is one reason why resources can be understood differently. That is, in institutionalization of resources, identical advantages and disadvantages can be achieved. These similarities still are discussable from the viewpoint of those agents who take actions and (re)create those resources. Based on these claims, it is noticeable that change is achievable by applying the structuration theory into a socially constructed matter. (Sewell, 1992)

4.2.1. Structuration Theory and IS

Despite the application of structuration theory to varying social studies, there are arguments of weaknesses and shortcomings in this theory (see e.g. Orlikowski, 1992 and DeSanctis and Poole, 1994). One of the main critiques against structuration theory is its inability to considering Information Technology as an influential factor for changing societies. DeSanctis and Poole (1994) discussed that it is beneficial to see technology as both structures and result of actions. That is, technology can be part of the social structures since it discerns as a resource created by the humans’ actions. Also, technology provides the opportunity for new social actions. But in Giddens’ structuration theory, this conception is not facilitated. DeSanctis and Poole (1994, p. 126) argued that

“Social structures provided by an advanced information technology can be described in two ways: structural features of the technology and the spirit of this feature set”.
They try to bridge the aspects of technology with the main concepts and structures of the Giddens’ structuration theory.

In another attempt, Orlikowski (1992) argued constrains of Giddens’ structuration theory in application of technology into this theory. She challenged this shortfall by introducing *structuration model of technology* which gives rise to the concept: *duality of technology*. Adhering to the Giddens’ structuration theory, in her extension, Orlikowski accentuated the interaction with technology, by discussing the ability of technology to structure and be structured by humans’ actions. This construction and reconstruction is continual and recursive. Orlikowski (1992, p.398) argued

“Technology is both shaped by and shapes human action (the duality of technology); and that the interaction between people and technology is ongoing and dynamic (the interpretive flexibility of technology)”

She showed that technology is a means for humans to conduct their actions and in reverse, those actions can result in changes in the use of or development of technology. Accordingly, technology in a dual interaction with human agents produces structures (see arrows a, b in Fig. 5 and table 1). That is, technology is the outcome of the human’s actions and in reverse, the developed technology assists humans in conducting their actions (see arrows a, b in Fig. 5 and table 1). Additionally, the interactions between technology and humans are also affected by the institutional properties such as financial resources, human efforts and etc (see arrow c in Fig. 5 and table 1). Besides, technology can influence the institutional properties of an organization which result in changes in the organizational structure – rules and resources (see arrow d in Fig. 5 and table 1).

![Figure 5. Structuration model of technology (Orlikowski, 1992, p. 410)](image-url)
<table>
<thead>
<tr>
<th>Arrow</th>
<th>Type of Influence</th>
<th>Nature of Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Technology as a Product of Human Action</td>
<td>Technology is an outcome of such human action as design and development, appropriation, and modification</td>
</tr>
<tr>
<td>b</td>
<td>Technology as a Medium of Human Action</td>
<td>Technology facilitates and constrains human action through provision of interpretive schemes, facilitaties and norms</td>
</tr>
<tr>
<td>c</td>
<td>Institutional Conditions of Interaction with Technology</td>
<td>Institutional properties influence humans in their interaction with technology, e.g. intentions, design standards, professional norms, state of the art in materials and knowledge, and available resources (time, mony, skills)</td>
</tr>
<tr>
<td>d</td>
<td>Institutional Consequences of Interaction with Technology</td>
<td>Interaction with technology influences institutional properties of an organization, through reinforcing or transforming the structures of signification, domination and legitimation</td>
</tr>
</tbody>
</table>

**TABLE 1. EXPLANATION OF STRUCTURATION MODEL OF TECHNOLOGY (ORLIKOWSKI, 1992, P. 410)**

4.2.2.1. Application of Structuration Theory to This Research

Previously, I explained about the appropriateness of Giddens’ structuration theory in general and Orlikowski’s structuration model of technology in particular for IS research. In this section, I motivate why Orlikowski’s structuration model of technology is a preferred theory framework for my study than Giddens’ structuration theory. But, before that, I need to clarify that throughout this study, when I state the term ‘constructor(s)’ in my script, I refer to each of human agents, technology, and institutional properties – this term is offered by me and is not available in the original theory or Orlikowski’s version. It does not bring any contribution to this study or theory and is merely an abbreviation for human agents, technology, and institutional properties.

Orlikowski’s structuration model of technology provides this study more complementary than its origin, Giddens’ structuration theory. Orlikowski argued that the duality of structure is not open for application of technology to social context. That is, the duality of structure does not show how human actions can re-create technology and how technology can facilitate and constrains human actions.

Current discussion of information society for all in general and the equal use and access to public e-services in particular is investigated based on the relationships illustrated in figure 5 and table 1. Therefore, according to the structuration model of technology of Orlikowski, I can discuss the technology aspect, human aspect and policy aspect of the equality of use and access to public e-services and consequently explore how these three may interact to work out the equal use and access to public e-services for people with disability.
5. Research Methodology

In this chapter, I present my research approach for this study, the data collection methods, and the analysis of the empirical materials. Moreover, ethical issues, validity, reliability and generalization of the outcomes are discussed.

5.1. Research Approach

Apart from the theoretical framework, research approach and research methods should be decided in advance of starting the research. (Creswell, 2009)

Scholars (e.g., Miles, Huberman, 1994; Walsham, 1995; Neuman, 2003; Creswell, 2009) introduce varying alternative approaches for studies, for example qualitative approach. According to Denzin and Lincoln (2005), the qualitative approach helps to conduct social sciences since it supports humans’ interactions with other entities. The qualitative approach provides also the possibility of justifying humans’ interactions and their outcomes in an exploratory form (Avison and Myers, 2002). This research aims to explore the equality of use and access to public e-services for people with disability with regard to their experiences and expectations. This study focuses on the how of equality of the use and access to public e-services from a different perspective. It does not follow a numeric approach rather an explorative approach toward the research aims and questions. This is in alignment with what the qualitative approach offers. Therefore, the qualitative approach can more suitably facilitate this research with investigating the equality of use and access to public e-services with regard to the expectations and experiences of people with disability about the use and access of public e-services.

5.2. Research Method

Along with a suitable research approach, a research should be planned for the appropriate data collection and analysis methods (Creswell, 2009).

5.2.1. Data Collection

For conducting this research, the discrete materials are used: semi-structured interviews with the citizens and civil servants, investigating the national, regional and local IT policies and web standards (Reading documents), and investigating public e-services and the disability features available on them at the regional and local level (technologies). Additionally, reliability and availability are two important matters that influence the outcomes of study. Therefore, it is needed to discuss how they are handled for this study.

All empirical materials were recorded by the proper means and then were transcribed in the form of tables (see Appendix E). The tables were constructed based on main keywords and phrases of this study such as use and accessibility of public e-services in Sweden with regard to experiences and expectations of citizens with disability (see Appendix D for keywords and phrase). This helped to ease the analysis of the findings since the collected data was grouped and codified based on the specific keywords and phrase. Therefore, determining similarities
and differences in the empirical findings became easier. Afterwards, the structuration model of technology is applied to categorize the empirical findings (see Chapter 7) for investigating the research questions.

5.2.1.1. Interviews with Citizens with Disability and Civil Servants
Semi-structured interview is employed as the data collection method for this research. Citizens with disability and two groups of civil servants participated in the interviews. Generally, three types of semi-structured interviews were arranged for this study: person-to-person interviews, email interview, and group interview. Interview questions are pre-organized and open-ended. This helped the researcher to openly discuss interviewees’ opinions and ask them to elaborate their answer.

Participation in the interviews for both citizens with disability and informants of public administrations is voluntary. That is, the interviewees could reject to attend the interviews. Also, if they accepted to be interviewed, this would not put any obligation on them for the future engagement. This means, they could reject to answer any of the questions or ask to withdraw all or part of their answers any time before the official submission of the research. Interviewees were given information about this research and were free to ask for any further explanation. Their rights were also elucidated for them by the means of information consent (see Appendix A) that should be read and signed by them before commencing the interview session (further information about Ethical Issues is available in section 5.4).

I recorded each interview session by my mobile phone – audio record. Also, during each session, I took notes of what interviewees discussed. Interviewees were informed about recording the session by both mobile phone and writing notes through an information consent and also, verbally before inception of the interview sessions (see section 5.4 for Ethical Issues and Appendix A for Information Consent).

5.2.1.1.1. Interview with Citizens with Disability
The interviews were conducted between March and April 2011. As it is mentioned earlier in the section 1.3 Scope and Limitations, through the interviews, we discussed the equal use and accessibility to public e-services for people with vision impairments, hearing impairments, development or functional impairments, and moving impairments. Fourteen person-to-person and one email interview were conducted. Both types follow a similar theme (see appendix B for Interview Theme). It is worth to point out that the given answers in email-interview were not as discussable as person-to-person interviews because of the distance-based nature of the email-interview. Therefore, however, the interviewees were informed that questions are open for discussion, or extra information can be shared, the collected answers could not be elaborated as the person-to-person interviews. As interviewees did not speak English and I as researcher did not talk Swedish, the translation of their answers was required. This procedure had been done by the help of a third person who attended the interview sessions. Translation then brought up the discussion of reliability and availability of the information. I discussed about reliability and validity in sections 5.2.3 and 5.2.4. In

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addition, the attendance of a third person in the interview sessions was an ethical issue that the interviewees needed to be informed of and agreed upon that (see section 5.4).

The process of finding people with disability is supported by Handikapprörelsens Idé- & KunskapsCentrum Kronoberg. Handikapprörelsens Idé- & KunskapsCentrum Kronoberg is an institute in Kronoberg area in charge of providing the features and facilities, information, and help and support for people with disabilities in Kronoberg area (http://www.handikappkunskap.se/). The institute helped the research in contacting citizens with disabilities – in Kronoberg area. Based on the information about the research that the researcher presented to the responsible people in that institute, they explained the project to the citizens with disability and asked for the possibility and their interest of joining the interviews. Fifteen citizens with disability became volunteer to participate the interviews. They had different age, gender, education and so on – this research was isolated from including these factors. At the time of conducting this research, the interviewees lived and worked in Kronoberg area, yet, their origins might be from other regions of Sweden or even other countries.

During the interview session, the interviewees discussed about the state of using internet in general and selected public e-services in particular. Then, the questions were narrowed down toward the use and accessibility of public e-services that interviewees experienced at the time of working with suggested public e-services. Besides sharing their experiences, I asked them to talk about their expectations and demands about those issues of e-services. (See the Interview Theme in Appendix B)

5.2.1.1.2. Interview with Civil Servants

Two group-interviews were performed with civil servants of Kronoberg County Council and Växjö Municipality. The interviews were conducted in April 2011. Each group consisted of two persons. The interviewees from Växjö Municipality worked in the communication department and the interviewees from Kronoberg County Council worked in the IT department. The interview sessions with these people were in English so language was not a hinder for the reliability and validity of the research.

In both groups, the interviews have opened with briefly narrating the history of civil servant, its missions and responsibilities. The interview questions then focused on public e-services that each of the Växjö Municipality and Kronoberg County Council launched and the rationalities behind developing them. The interview questions then continued toward the contacts and relationships between the citizens with disability and civil servant, the strategies civil servant had for providing the equal use and access to public e-services for citizen with disability and the ways citizens with disability can share their experiences and expectations about the use and access issues of public e-services. And finally, the interview questions were about the collaboration of civil servants with their IT consultants and also the disability communities that can aid them about the use and access issues of public e-service, structure of their IT policies and the internal IT guidelines for managing the use and access issues of public e-service. (See Interview Theme in Appendix B)
5.2.1.2. IT Policies at National, Regional and Local Levels
To realize how the equality of use and access to public e-services is prospected in the IT policies, I investigated three groups of IT policies. First two are the web guidelines that each of Växjö Municipality (local level) and Kronoberg County Council (regional level) developed and applied. These documents are independent of the national IT policies; however, they still are framed within the national framework. Third, national IT policies which are approved based on the national ICT strategy and IT infrastructure of Sweden. E-government action plan 2008, eDelegation 2009, and Verva guidelines 2006 are of those national IT policies that I analyzed in this study. Previously in the section 2.2.2, I introduced each of these national, regional and local IT policies. The documents are in Swedish. Therefore, I needed to translate them in advance of employing them. To do that, I used Google Translate and also my supervisor edited my translations. The translation process then brought up the discussion of reliability and availability. I got into them in the sections 5.2.3 and 5.2.4.

In order to always having access to the related details and facts in IT policies and guidelines, I took note of them with specifying their references and the date of access. Beside, for those standards available on public e-services (webpage), I took print screens and snapshots with specifying the related URL, page title, and the access date.

5.2.1.3. Public E-services at Regional and Local Level and Disability Features Available on Them
Växjö.se and ltkronoberg.se are the selected public e-services at the local and regional levels. I studied varying services available on these two websites including the disability features. The available e-services can be merely in the form of information or interactive services such as ‘my health care contacts’ in ltkronoberg.se. Additionally, the disability features available on each of vaxjo.se and ltkronoberg.se such as sign language, audio features, customization and legibility were studied. This was done in the following way: I chose the feature and tried to use and access information and services available on these two websites. Then I compared the use and accessibility of these public e-services with and without the disability features. To record my findings from browsing vaxjo.se and ltkronoberg.se, I took print screens and wrote notes. These public e-services are in Swedish. An English version of them is also available but not as similar as their Swedish version. Therefore, translation was done by the means of Google toolbar. Translation then brought up discussion of reliability and availability. I explained about them in the sections 5.2.3 and 5.2.4.

5.2.2. Data Analysis
The empirical findings need to be analyzed and interpreted in order to work out the research questions. Therefore, the next step after collecting the required data is analyzing the empirical materials. Creswell (2009) explained that this is not required to wait for the analysis until the data collection is finalized. The analysis can be performed in parallel with the data collection process, since, this can impact on the forthcoming materials which are intended to be collected.
The data analysis was conducted in two stages. First, I applied the Creswell’s model (2009, p. 185) for analyzing the qualitative data (see Fig. 6). This model consists of the six separated steps that accomplishing each one, will help to get closer to the preliminary aims of a research. However, for this study all steps had not been employed, it was tried to adhere to the main idea of the model in organizing and categorizing the findings, extracting general sense out of them, and then doing a comparison. Second stage was application of the Orlikowski’s structuration model of technology (1992) to the empirical findings that were categorized and labelled during the first stage (see chapter 7).

I started my analysis with coding of the data while I was transcribing the empirical materials in the form of tables. I frame the tables based on the keywords and phrases of this study (see Appendix D). Thereafter, I re-read the coding to capture the general sense from them. By doing so, I could detect the main constructors which may constructs the structuration model of technology; citizens with disability as the human agents; public e-services and disability features available on them as the technology; the national, regional and local IT policies as the institutional properties.

The categorization of collected information and determining the main constructors created the opportunity for comparing the empirical findings. Through this comparison, again I complied with the main keywords and phrases in order to find out the similarities and differences in what people with disability and civil servants said, public e-services, and what proposed in the national, regional and local policies. These similarities and differences were then imported to the Orlikowski’s structuration model of technology to determine the relationships and interactions of the constructors on each other (see chapter 7) in order to work out the research questions of this study.
5.2.3. Reliability of Data and Results
According to the Yin’s suggestion (2003 cited in Creswell, 2009) about the reliability of data, the findings of this research were documented. The documentation included transcribing the findings (e.g., interviews, policies, and selected e-services) as much as possible. Doing so supported the researcher with the possibility of re-checking the findings and keeping them under control and check for the mistakes or conflicts.

5.2.4. Validity of Data and Results
As I explained previously, translation (from Swedish to English) of the empirical materials have influenced validity of the findings. Therefore, it was important to take actions that could validate the collected data and results as much as possible. On this account, I handled validity of the research based on some of the Creswell’s (2009) suggestions such as giving proper
information to the participants, determining the issues that can influence the study, and another person who involve with the study read and review the collected data and results. Below, I explain each of these in relation to this study.

The interviewees with disability were given information about the aim of the research, how it may help them about the use and accessibility of public e-services and so on. Also, the result could be shared with them if they asked for that (with regard to ethical issues). By giving this information, the interviewees were expected to share the accurate information about the issues they faced at the time of working with e-services. The civil servants as another group of interviewees were provided with information about the research aim and steps. It was also explained to them how the results can explore the current state of their e-services. Also, the result could be shared with them if they asked for that - with regard to the ethical issues. By giving this information, the interviewees were expected to share the accurate information about the procedure, problems and difficulties for developing and modifying their e-services and affiliated IT policies.

The next strategy for validating the collected data and results is determining the issues that may put the research into challenges. Language was one of them. Since the interviewees’ main language was Swedish and the researcher’s language was English, the communication and translation process was the subject of validity issue. I asked a third person to attend the interview session and translate the answers that interviewees gave. In order to re-assure about accuracy of the translation and also my understanding about their answers, I repeated what they said and the translator re-translated my understanding of their answers for them. However, this might not be the best way for validating data; it could improve the validity and accuracy. And due to the researcher’s limitation in Swedish language this could be seen as an expected issue in advance of starting the research. Attendance of a third person in the interview sessions was the subject of ethical issue that was handled by informing the interviewees about that and collecting their permission in advance of starting the interview session. Another issue was personal consideration which influences the accuracy and validity of information that was given by the civil servants. Since due to some worries such as carrier situation, they might not feel secure about sharing all the problems and difficulties they involved with about their public e-services and the IT policies (i.e. decisions, laws and so on).

Additionally, my supervisor commented on varying parts of the research. She has been involved in formulating the research from the preliminary steps, so her comments supported me in realizing if the research questions, aims, data collection procedure, analysis of findings, and discussions were valid and accurate.

5.2.5. Generalization

Creswell (2009) argued that qualitative studies are not aimed to be generalized. He (ibid, p.193) explained:

“In fact, the value of qualitative research lies in the particular description and themes developed in context of a specific site. Particularity rather than
generalizability (Greene and Caracelli, 1997) is the hallmark of qualitative research”.

Referring to the above citation, the findings of this study were particularized rather than generalized. Citizens with disability in Växjö city, and public e-services and the IT policies at national, regional and local levels were selected for this study. They were involved with exploring the equality of use and access to public e-services. This kept the study in specific context. Hence the final outcomes and discussions were particular to that context and those who had been involved in the study and therefore could not be considered as general results.

5.3. Role and Responsibility of Researcher

As Creswell (2009) discussed, in qualitative studies, researchers cannot be a non-existence. A researcher can be solely an observer when s/he is only observing what others in a specific context are doing without any interfere or judgement. However, later in the data analysis and discussion phase, the researcher becomes an interpreter to elucidate and describe her/his understanding as the outcomes of the whole research. This idea is applied to this study.

During the interview sessions, I as researcher of this study did not influence, interfere or judge interviewees’ ideas, explanations, demands and expectations. That is, the interviewees were independent in discussing their ideas, justifying questions, and suggesting their expectations and demands. However, the analysis of data was influenced by my understanding and reasoning through the application of the theoretical framework. Also the final results and discussions were rooted in my perception and reasoning in connection to the theoretical framework and analysis.

Additionally, I as the researcher should be aware of my responsibilities during the different phases of the research. That is, I should be cautious about the ethical issues and the involved persons’ rights at the time of collecting data, analysis of findings and inferring and presenting the results (Creswell, 2009). This concern was handled by prospecting the feasible ethical issues and informing people who involved the study by the means of information consent (see information consent in Appendix A).

5.4. Ethical Issues of This Study

Ethical issues have been always part of the academic research considerations and researchers have argued its role and importance all through conducting studies (e.g., Orb and Eisenhauer and Wynaden, 2000; Hart, 2005; Creswell, 2009). Researchers should be aware of their responsibilities during the different phases of a research. That is, they should be cautious about the ethical issues and involved people’s rights all through the research.

In advance of starting the research, a research proposal was also submitted (March 2011) to Etikkommittén Sydost for further investigations about the ethical issues that this study might have with regard to the rights of citizens with disability. This proposal contained brief information about the research, its aims and questions, research methods and also ethical considerations. In late March 2011, the permission for conducting this research was obtained
from them. Also, information consent was formulated in order to remind the participants of the study about their rights. The information consent (see Appendix A) which demonstrated rights of involved people in the research, anonymity of identity of interviewees, possibility of cancelling their involvement and withdrawing their answers, introducing researcher and her supervisor, research aims, research questions, contribution of the research, research methods, policy for sharing of the results, language of the research, translation strategy, and similar information is used to deal with the ethical issues of the research.

One of the main considerations was the identity of the interviewees (both citizens with disability and civil servants). As it was explained in the information consent, identity of the interviewees is anonymous. This means, they were not asked to tell their name, age, gender or similar information. And in case of citizens with disability, they were not asked to talk or explain about their disability. However, if they introduced themselves, I omitted their identity from the collected data. Yet, the interviewees were asked to give general information about their backgrounds in order to make the interview sessions friendlier so people could comfortably talk what they intended to.

Apart from the citizens with disability and civil servants, the person who helped in translating the interviews with people with disability was asked to sign the information consent. Anonymity was also applied to this person. Besides, this person could attend interview session (for translation aim) if interviewees with disability accepted upon that.

Furthermore, main language of the interviewees was Swedish, whereas, language of the researcher and research was English. So translating from Swedish to English and vice versa was a sensitive and important action. Each interviewee could ask for accessing to (only) his or her translated answers anytime. This was expected that by doing so, interviewees’ rights in assuring about the information they gave were managed. Along with that, the interviewees could ask to read the analysis of their information, and the final outcomes. By doing so, reliability and validity of the research could be managed better since the interviewees were able to discuss if what the researcher wrote, analyzed and concluded was related to what they thought and said.
6. Empirical Material

The purpose of this research is studying the equality of use and access to public e-services by exploring the IT policies, investigating public e-services and disability features available on them, and interviewing with citizens with disability.

Until the end of this chapter, use and access of public e-services are presented through the hatch of four resources; the first set of data is the national, regional and local IT policies and web standards regarding the equal use and access to public e-services for people with disability. The second set of data is a demonstration of several public e-services at the regional and local level and disability features available on them. The third set is the interviews with citizens with disability - who are potential or active users of public e-services – about their experiences and/or expectations regarding the use and accessibility of public e-services. And lastly, interviews with civil servants of Växjö Municipality and Kronoberg County Council about their public e-services, IT policies, future plans and so on with respect to the equal use and access to public e-services for citizens with disability.

As previously it is mentioned, all materials (including IT policies, public e-services and interviews with citizens with disability) are in Swedish. Therefore, the quotations which are cited through to the end of this chapter are the translations and not the original ones.

6.1. Use and Accessibility: IT Policies at National, Regional and Local Level

In this section, I present empirical findings about the equal use and accessibility of public e-services for people with disability which are prospected in the national, regional and local IT policies and web standards. I start this section with presenting the collected data from the national IT policies and then move to the regional and local IT policies.

Several versions of IT policies are formulated by the government of Sweden that promote the evolvement of information society for all in Sweden. In this study eGovernment action plan 2008, Delegation for e-government (eDelegation) 2009 and Verva Guidelines 2006 were investigated.

In 2008, the e-government action plan was approved by the government of Sweden (Reg. No Fi2008/491). E-government Action plan 2008:

“aims to improve the coordination of the strategic e-government work in the Government Offices” (Handlingsplan för eFörvaltning, 2008, p. 4).

The e-Government action plan 2008 is structured on the goal:

“as easy as possible for as many as possible” (ibid., p. 3).

Along with that, this goal is prospected to facilitate citizens to (ibid, p. 5):
“Exercise their rights and obligations and access to government service”.

To practise accessibility of information, in the priority four of this policy, the government agencies are assigned to communicate with citizens (ibid., p. 16):

“Administration contacts with citizens ... Milestone: citizens ... can easily ... access to the administration’s overall services and information”

To equip accessibility of information through e-government services, the priority two concentrates on IT standardization. This standardization encompasses:

“Concepts, data structures, interfaces for electronic services and electronic communication, etc” (ibid., p. 6).

Although in this priority, no crystal clear referral to citizens with disability is highlighted, furnishing part of IT standardization with international web accessibility standards can exercise in prevalence of the citizens with disability. This is observable in the section priority issues (ibid., p. 17) where the application of Verva\textsuperscript{11} web guidelines to public e-services and collaboration between Verva and Disability Policy Coordination (Myndigheten för handikappolitisk samordning) are mapped out.

Besides the IT standardization, the e-government action plan 2008 obliges the government agencies to consider citizens’ expectations and demands by highlighting:

“user’s need should always be an important starting point in administration’s efforts to develop e-services” (ibid., p.16)
and “the user needs to be in focus” (ibid., p. 16).

To drive the missions and visions of developing public e-services in Sweden, in 2002, Verva - Swedish Administrative Development Agency publicized the first version of web development standard in adjustment with Web Content Accessibility Guidelines 1.0 (WCAG 1.0) – developed by the Web Accessibility Initiative (WAI), employed by all the European Union Member States. Modifications are applied to improve the standardization of use, accessibility, contents of webpages, privacy, security and similar concerns (since 2002 till 2008).

As it is explicated in the Swedish National Guidelines for Public Sector Websites (Vägledningen 24-timmarswebben) (Verva, 2008, p. 11):

“The Guidelines are maintained by Verva, as part of its goal to ensure that all communications between citizens and public administrations

\textsuperscript{11} Due to government decision, since 2008 Verva is no longer in operation. But Swedish National Guidelines for Public Sector Websites (Vägledningen 24-timmarswebben) is still in use.
(Government authorities, municipalities and county councils) are perceived as simple, efficient and suitable for their purpose. The purpose of the Guidelines is to support the procurement, development, and maintenance of a website by a public administration so that it offers equal opportunity usage for all citizens”.

The Verva guidelines supported the aim of developing available, accessible and usable public e-services for all citizens based on the international standards (e.g., WCAG). The Verva guidelines also exercised vision of the Swedish Government for “making all public administration websites accessible to its citizens by 2010, in line with Europe’s i2010 initiative” (Verva, 2008, p.13). On these accounts, Verva guidelines ought to structure the IT standards and policies meeting expectations of citizens with disability as equal as other citizens’. (Verva, 2008)

Chapter 2 of Verva guidelines is devoted to the criteria and guidelines for developing user-centred systems. It focuses on collecting, analyzing, and reviewing users’ expectations and demands. More topics about user-centred systems are discussed all through this document. “Offer the same service to everyone; User confidence in public service websites; usability and accessibility standards for web development; Assistive technologies for using websites” are of topics explicated in Verva guidelines (2008, p. 10-11). This document also contains link to the Swedish Handicap Institute in order to provide the readers with complete information about how users with disability can/suppose to use public e-services (Document is called Surfa utan hinder12).

For progressing the IT strategies and policies, the government of Sweden instituted the Delegation Committee (Fi 2009:01). This committee took Verva’s responsibility in coordinating the evolvement of public e-services and IT standardization. Respectively, eDelegation 2009 (e-government Delegation 2009) was then published to both accomplishing shortcomings of the e-government action plan 2008 and outlining novel decisions and criteria for development of public e-services till 2014. (Tor 2010:32)

“Citizens can exercise their rights and fulfil their obligations and take advantage of government services in a simple manner” and “More accessible public information ... makes life easier for citizens ...” (Delegation för e-förvaltning, 2009, p. 6).

Similar as the e-government action plan 2008, there is no evidence of explicit expression about the citizens with disability in eDelegation 2009. In the section, starting points, (ibid., p. 6) the terms “citizens’ rights and obligations and citizens’ needs; accessible public information; accessibility and usability of e-government services” are highlighted to cover the aims “citizens’ benefits; advantages citizens can take from e-government; simplifying

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12 available in Swedish at www.hi.se/surfautanhinder [currently not available]
communication and contact among government and citizens; and making life easier for citizens”.

The Verva guidelines are one of the main key components of eDelegation 2009. This is outlined as “The delegation is to take stock and to develop, the previous Verva guides and reports on the field” (Delegation för e-förvaltning, 2009, p. 10). Therefore, the Swedish National Guidelines for Public Sector Websites (Verva, 2006) still buttresses the development of public e-services based on the existing IT standards.

Investigating the national IT policies is one part of document reading process in this study. In order to realize how public administrations follow the national IT policies and find out which strategies they take for the aim of managing the equality of use and access to public e-services, I explored the web guidelines and IT policies of Växjö Municipality and Kronoberg County Council.

Guidelines for vaxjo.se and underlying web (Riktlinjer för vaxjo.se och underliggande webbar) is an internal web guideline of Växjö Municipality. It contains the standards that people at the communication department (Kommunikationsenheten) create and exert for developing accessible vaxjo.se. It encompasses the guidelines about organization of the content, user interface, disability features, and so on. Besides the communication department, editors of the other departments should obey it if they intended to publish on the vaxjo.se. This document specifies the web guidelines for vaxjo.se. Public e-services launched by the other municipalities can develop and apply their own IT policies. Even so this guideline is framed based on W3C:s, World Wide Web Consortium13 or as the interviewees of Växjö Municipality stated “We obey national e-government standards and guidelines” (stated by one of them and confirmed by the other one).

Also, a general document available on ltkronoberg.se - website of Kronoberg County Council - About this site14, demonstrates varying features that are supposed to support the citizens with disability to equally use and access ltkronoberg.se. It includes information about the web standards with regard to use and accessibility issues for people with disability such as adjustment of the texts (colour, size...), listening features, sign language, searching and navigation features and etc. Alike argument is stated by the interviewees of Kronoberg County Council “In our work with the site, we follow the international guidelines for accessibility” (stated by one of them and confirmed by the other one).

6.2. Use and Accessibility: Public E-services and Disability Features
To gain better understanding of how public e-services are accessible, I surf each of the vaxjo.se and ltkronoberg.se websites. Browsing each of them demonstrated that several features are set to enable citizens with disability accessing to and using information and

13 W3C is an international community that develop web standard. One of these standards is WCAG which focus on developing accessible web pages for people with disability.
14 http://ltkronoberg.se/Om-landstinget/Arbomr/Information-och-kommunikation/Webben/Om-webbplatsen/ [accessed on: January 2011]
services available on them. The disability features such as customization (anpassa), legible (lättläst), sign language (tecknspråk), and listening (lyssna) (for supplementary information about these webpages and disability features on them, see Appendix C). I browsed public e-services by the means of these features, in order to better understand how these features can support a person with disability in using and accessing e-services. This experiment showed that in none of these e-services, the disability features do not assist a user with disability in searching for information in specific format for example in audio format. Also, it showed in all e-services, people with disability access to less information or e-services than others have access to, for example employing legible (lättläst) feature does not provide the people with disability about how to use e-services interactively and it mainly gives general information about responsibilities and services the agency offer, or in another example customizing font size and line space in these e-services is limited to the options given on the websites (public e-services). Using the disability features available on these public e-services showed that they are limited in providing the equal use and access for people with disability. Since my understanding of how a person with disability use and access these public e-services is literal, I put these matters into discussion with citizens with disability.

6.3. Use and Accessibility: Interview with Citizens

For the aim of investigating the equality of use and access to public e-services for citizens with disability, I interviewed the citizens with disability who might or might not use public e-services. These interviews were conducted to understand varying matters such as what public e-services they use, how they access to those e-services and how those e-services are accessible to them, how they inform the civil servants about their expectations and experiences about the use and accessibility of public e-services, what features located on these e-services to support people with disability to use and access to public e-services, how people with disability use those features.

Through general dialogues with citizens, I realized the fact that all fifteen interviewees use internet. However, as interviewees explained, the degree of using internet and its usage differs person to person. For example, one interviewee liked to surf the websites for searching, online shopping, and reading news and so on but another one used it just for listening to music or watch movies. Anyhow, a general consideration brings out that the informants possess the knowledge of internet and how to use the internet.

Interviewees then talked over using each of vaxjo.se and ltkronoberg.se. Nine out of fifteen interviewees used these public e-services revealed that this is a common way of collecting their intended information. Their explanations showed that most of the interviewed citizens aspire to use (proposed) public e-services for collecting information. As they said:

via vaxjo.se, they search for “contact information of an individual or a community”, or “links to other webpages such as library”.
via ltkronoberg.se, the interviewed say they often look for “updated information about diseases and treatments” and “new assistive technologies for person with disabilities”.

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Two of the interviewees never or occasionally used public e-services. They motivated their answers by:

“preferring other ways of communication with civil servants” such as
“calling” instead of using e-service, and
“never felt the need to use them”, and
“not having enough knowledge”,

However, they stated they are “interested in learning how to use e-services without help”. Two others merely (without any further justification) expressed “uninterested” or “not interested” in using those e-services. In ltkronoberg.se case, one person reasoned her answer by saying because of a “political reason” she had not used ltkronoberg.se.

Five out of fifteen (or five out of nine who use public e-services) used these public e-services interactively such as finding and registering in school via vaxjo.se or scheduling a medical appointment via ltkronoberg.se and etc. Motivations behind not using public e-services for interactive actions were:

“feeling unsecure”, and “preferring other ways of communication”
and some of them stated “inability to complete steps without help”.

In their interviews about using public e-services as a communication means, most of the interviewed citizens expressed:

“Preferring other communication means such as calling, visiting, sending
papers/mail, emailing, sending SMS”,

They reasoned their choice by:

“not having access to internet all the time”,
“calling and filling paper forms are traditional method”,
“it is faster to call or visit”,
“it is good to hear someone’ voice”,
“it is good to have everything written in emails. It can be saved”,
“it feels good to have face to face conversation”,
“as long as paper-based method is available, not choosing other ways. It is
easier”,

Or some of the interviewees said that their selection depend on the situation such as “if I am in hurry or not”. Some chose to use public e-services since:

“it is easier”, and/or
“it is better to have everything in written format since always can be
referred to”, and/or
“reading information somewhere is easier than hearing from other people”

Anyhow, almost all informants pointed out that they will choose to use public e-services as their first communication priority if:

“can be sure if what they do is right for example log in, filling out and submitting form and etc”, and/or
“know how to do different things on e-services”, and/or
“have technology help them doing actions without help of others”

To realize what citizens with disability think about use and accessibility of these public e-services, they were asked to express their experiences about using and accessing vaxjo.se and ltkronoberg.se. As citizens explained they mostly face problem in:

“searching (specifically in disability format such as searching for information in sign language)”, and/or
“understanding the content of e-services in terms of written language”, and/or
“irrelevant information”, and/or
“obsolete information”, and/or
“finding links and contact information, online help”, and/or
and “navigating inside a page or between pages”.

Besides, the interviewed citizens who use the assistive technology for accessing public e-services explained that they have problem in:

“Accessing to information in image or pdf formats since their technology cannot read them”.

Those interviewees, who needed help of other people specifically for private actions such as registering personal information, stated that they have no problem in giving their personal information to other people. However, almost all interviewees were concerned about accuracy, privacy and security of their activities through public e-services specifically when it comes to interactive actions such as sending personal information and similar ones. They stated:

“I am not sure if what I am doing is right”, and/or
“I am afraid if I enter wrong information”, and/or
“I don’t know how to work with that, I never did that”, and/or
“I don’t have confidence to do that by myself”, and/or
“I don’t think they are secure”, and/or
“I cannot trust the assistive technology I am using”, and/or
“I prefer to not write my personal information on web because I don’t know who will read them”
The interviewees were asked to talk over their experience about using and accessing public e-services by the means of the disability features available on them. All the interviewees explained that they never used disability features available on public e-services. However, six out of fifteen interviewees stated that they were aware of those features but they never used them. The rest nine said that they never checked for such features and they were not aware if such features are available or not. Some of these nine with hearing impairment stated that they are able to read texts, so information in sign language is not needed. Some of interviewees with vision impairment expressed that they used external assistive technologies. Citizens were also asked how they use the online help available on public e-services, but almost all of them stated that they did not know if it is available or not and they have not used it. To reason that, interviewees expressed:

“because I have a good man\textsuperscript{15}, and/or
“because of using external assistive technology to browse and use e-services”, or “I don’t know why”

The informants are then asked to elaborate their answers about using assistive technology and/or good man. Six out of fifteen interviewees used external assistive technologies such as screen reader, Braille printer (blindsksrift), voice commander, and magnifying program for working with the internet in general and also public e-services of this study. Nine rests do not use any assistive technologies. Further investigation shows that out of these nine people who do not employ any assistive technology; two of them never use public e-services at all, four of them use them merely for collecting information, two of them interactively use those public e-services with the help of others, and one of these nine uses them in interactive form without any help (the reasons for using/not using/not interactively using of public e-services stated in two paragraphs above).

Besides assistive technologies, the interviewees were asked if they use (selected) public e-services independently or whether they need help of other people. Six interviewees out of fifteen used e-services independently and without any help. Three people mostly used it independently but for some specific actions (e.g., submitting forms) they told they need other people’s help because they are not sure if what they are doing is right or not. And six of all needed help of other people for using those e-services. These six and those three reasoned their statement by stating:

“I am afraid if I enter wrong information”, and/or
“I don’t know how to work with that, I never did that”, and/or
“I don’t have confidence to do that by myself”, and/or
“I don’t think they are secure”, and/or
“I cannot trust the assistive technology I am using”

\textsuperscript{15} A good man is a person who help person with disability in varying activities they should do.
The interviewed citizens were also asked to describe how they share their experiences and expectations with each of Växjö Municipality and Kronoberg County Council which offer public e-services. Very few people discussed this concern by describing:

“Filling questioners”

In extending their discussion, citizens pointed out:

“More feedback should be collected from people with disability”, and/or they believe people with disability “can participate in developing and evaluating e-services” or “can help in developing and evaluating e-services”

From a general viewpoint, the interviewees with disability were asked to describe what they experience while they try to use and access each of vaxjo.se and ltkronoberg.se and also what they expect about the use and accessibility of public e-services in terms of changes in the technology of public e-services, IT policies and civil servants.

Seven interviewees believed that the contents of public e-services in terms of understandability of language should be improved. Besides, five people explain that the amount of information can be reduced for example by removing the irrelevant information – they explained that irrelevant information is what they do not need to have. One person suggested that information should be in simple texts rather than pdf files or pictures. Another person also recommended that more information can be given in sign language. Additionally, people discussed about the security concerns they have. They stated that they need to be assuring about the accuracy, privacy and security of what they enter in the forms, for example when they fill in a form by registering personal information. Moreover, people believed that the structure of public e-services and the way information is organized can be improved. The improvement in user interface is also affirmed by two interviewees. The search function is another point that interviewees introduced. Citizens believed search function should be improved so they can search based on specific file format, for example audio file. Besides, they stated that the search function does not usually give them the proper result so they need to look for what they want for long hours.

Along with these expectations about public e-services, most of the interviewees pointed out those who decide and develop these public e-services can collect more feedback from people with disability to understand their expectations and even citizens with disability can participate in developing and evaluating public e-services.

6.4. Use and Accessibility: Interview with Civil servants

In order to discuss about the regional and local IT policies and also the equality of use and access to public e-services, the informants of Växjö Municipality and Kronoberg County Council were invited to participate in the interviews.
The interviewees of both Växjö Municipality and Kronoberg County Council stated their aim of developing e-services as:

“better serve citizens” and “create new communication between citizens and politicians”

As the interviewees of Växjö Municipality explained the aim of creating new communication among the citizens and politicians is not satisfied. They described that due to not receiving the proper answer after sharing their question or suggestion, citizens gradually give up doing so. The interviewees of Kronoberg County Council in answering if their aim of developing ltkronoberg.se is fulfilled declared:

“10000 users (members) is a respectable symptom of using ltkronoberg.se.”

However, the question was if these users are merely registering for curiosity or they actually use available services on ltkronoberg.se (and consequently 1177.se is not part of this study so I have just provided the introductory information in Appendix C, the section 2.1 E-services on ltkronoberg.se). They stated that they “can answer by statistical analysis”. But I should mention that I had not received any document in this regard, although I asked for it.

The interviewees of each of Växjö Municipality and Kronoberg County Council argued that they intend to meet expectations and demands of citizens with disability about their public e-services as equal as other citizens. To do that, they collected inputs by distributing questioners among people with disability and conducting surveys (in national/regional/local level). Besides these methods that both Växjö Municipality and Kronoberg County Council performed to collect intended information, each of them undertook methods specific to them. Accordingly, the interviewees of Växjö municipality explained:

“We collect information from reception in municipality building. This information is frequent queries that citizens ask from them.” also
“gather questions that citizens ask via telephone”

They clarified that in order to gain their intended information out of the collected data:

“Google Analytics is used for statistical analysis for example number of visits of specific webpage. So they can find varying subjective information and search for reasons, for example why one page does not have many visitors or one has got.”

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16 http://www.1177.se/Kronoberg/?ar=True [accessed on: March 2011] (1177.se is given in Appendix C, the 2.1 E-Services on ltkronoberg.se)
Additionally, the interviewees of Kronoberg county council described:

“Expectations and demands in different focus groups are discussed, for example a group of citizens with different kinds of disabilities. Then, we employ Google Analytics to analyze collected replications.”

They clarified:

“This is not merely done for replications in local level but also for statistics collected in national level.”

One considerable point that both Växjö Municipality and Kronoberg County Council have highlighted is the lack of direct contacts with citizens with disabilities. They explained that it needs a lot of resources including time, money, and efforts. Instead, they try to trust in knowledge and experience of the developers or consultants that cooperating with them in developing e-services. Nonetheless, usually they run use and accessibility test by them and/or a third party which is not involved in the development process of e-service. However, as the national IT policies presents, a continual communication with citizens for discussing the impact of public e-services on their life and a user-oriented perspective in developing public e-services should be regulated by the government agencies in order to comply with citizens’ expectations and demands.

Both Växjö Municipality and Kronoberg County Council work together with the consultancy companies with focus on the use and accessibility. The informants of Kronoberg County Council explained Logica and Funkanu are two companies that support them in overcoming the use and accessibility issues of their e-services. Logica is the company that develop ltkronoberg.se and Funkanu is the company executing the use and accessibility test to evaluating ltkronoberg.se. Besides, people in Kronoberg County Council try to keep themselves update by reading the newsletters about the novel technologies and tools in web use and web accessibility areas. The informants of Växjö Municipality worked together with SIP Company which offers solutions and applications for people with disability. Besides, SIP holds courses for the interviewees about web use and web accessibility issues. The interviewees also have had discussion sessions with the informants of Handikapprörelsen i Kronoberg about these issues. They have also consulted with web developing companies which have web accessibility professionals. A third company – different from the company has developed vaxjo.se and people in Växjö Municipality – test vaxjo.se against web use and web accessibility issues.

In addition to these explanations the interviewees of Växjö Municipality and Kronoberg County Council stated that the disability communities are incorporating with civil servants to demonstrate expectations and demands of the citizens with disability about the use and accessibility of public e-services. These interviewees, from the other viewpoint, had this assumption that the disability community inform their members about the assistive technologies that people with disability can employ for using internet in general and public e-
services in particular. They also presumed that the disability community train and inform citizens with disability about how to use public e-services. Additionally, interviewees described that they are in continual collaboration with the consultant companies that are experts in usability and accessibility areas. As civil servants declared, this assured them that standards are applied to their e-services.

Both Växjö Municipality and Kronoberg County Council were enquired about their future plans for managing the equality of use and access to public e-services for citizens with disability. The informants of Växjö Municipality explained that they plan to buy a new search engine. They told that this new search engine – not the search engine at the time of conducting this research - has a technology that even if people write their questions wrongly; it brings varying answers based on the correct options. They also arranged for launching a new version of vaxjo.se in April-June 2011. They also intended to test the new version of this website against the use and accessibility issues. In this new version, they also try to use more understandable language so it can help all people including people with disability in following varying reports, articles, news, and so on. The informants of Kronoberg County Council explained that they start to plan for launching new version of ltkronoberg.se. They also intended to continue their cooperation with Funkanu Company for further considerations about the use and accessibility of ltkronoberg.se for people with disability.
7. Data Analysis

In previous chapter, I have presented the empirical findings. In this chapter, I investigate and analyze those empirical findings by the means of structuration model of technology. First I re-show a holistic picture based on the structuration model of technology or the duality of technology. Thereafter, the main constructors of my study are identified and then the interaction between humans and technology.

7.1. A Holistic Picture of Framework

Before I move to the main body of the analysis, I provide a short description of Orlikowski’s structuration model of technology. Orlikowski (1992, p.398) explains:

“Technology is both shaped by and shapes human action (the duality of technology); and that the interaction between people and technology is ongoing and dynamic (the interpretive flexibility of technology”).

The above statement is understood as, in a dual interaction, technology and human agents produce and reproduce structures (see arrows a, b in Fig. 7 and Table 2). In other words, technology is the outcomes of human actions (see arrows a in Fig. 8 and Table 2) that take place in use and/or design of technology. In reverse, technology assists, facilitates or constrains human agents in conducting their actions (see arrows b in Fig. 7 and Table 2). Additionally, interaction of technology and human agents is influenced by institutional properties such as IT standards (in this study e.g. eDelegation 2009) (see arrow c in Fig. 7 and Table 2). Besides, technology can influence on institutional properties of an organization which result in changes in organizational structure (see arrow d in Fig. 7 and Table 2).
TABLE 2. EXPLANATION OF STRUCTURATION MODEL OF TECHNOLOGY – DUALITY OF TECHNOLOGY (ORLIKOWSKI, 1992, P. 410)

7.2. Detection of Constructors

The concept constructors have been introduced in this study to identify constructors of the presumed triangle (see Fig. 7) for this study, the empirical findings were categorized based on the keywords of this study including: use and access issues of public e-services, regional and local public e-services; national, regional and local IT policies, experiences and expectations of citizens with disability, civil servants, see also Appendix D. After that, I re-read materials to gain a general sense of what they are.

Results of resolutions and decisions about IT policies of Sweden by communities or agencies at national level are known as to be IT policies at national level or national IT policies. Examples are e-government action plan 2008, eDelegation 2009, and Verva guidelines. These are structured in order to meet the aim of the Swedish government in equally delivering services to all citizens via internet so called e-services. Accordingly, IT policies can be ICT standards which determine IT infrastructures, resources, and guidelines for developing an information society. Involved governmental departments and other communities in approving policies are then identified as decision-makers.

Additionally, IT strategy which are decided and governed by local authorities independent of national strategy is comprehend as to be IT policies at regional and local level. In other words, due to the self-govern essence of local authorities, they can modify and adapt national policies or create new version with regard to their conditions and situations. For example in launching accessible public e-services, each of vaxjo.se and ltkronoberg.se follow their own strategies. However, from another viewpoint they obey national policy that affirms public e-services should be accessible to all citizens equally. These authorities formulate and develop their IT policies and public e-services. IT policies can be IT standards, guidelines, norms, values, strategies, structures, and expertise for developing public e-services. Additionally, as civil servants stated in their interviews they cooperate with usability and accessibility consultants and/or disability community to gain better result of their attempts for designing
and developing public e-services for all. Overall, decisions about and implementation of standards, norms, resources, and strategies and so on are taken by public administrations – as civil servants - and their IT consultants.

Apart from IT policies, public e-services are assumed to be as ICT means for improving communication between government and citizens and simplifying citizens’ life – however public e-services is more a solution rather than a technology. Examples of that are vaxjo.se developed by Växjö Municipality and ltkronoberg.se by Kronoberg County Council. In addition, according to us(ability) and accessibility standards structured in IT policies and web standards, varying disability features should be set on public e-services. Disability features available on public e-services are supposed to support people with disability in using and accessing e-services. Therefore, disability features available on each of vaxjo.se and ltkronoberg.se are known as to be the means or technologies for helping people using and accessing public e-services. Assistive technology for people with disability are also another group of ICT/IT tools that interviewees with disability introduced as technology which assist them in working with internet (and public e-services), for example magnifying tools, Braille display and etc. These tools are also used by numbers of people with disability I interviewed. They asserted that such technology enable them to use public e-services and access to information published on them.

People with disability are another source of information who discussed equality of use and access to public e-services with regard to their experiences and expectations. Government agencies and public administrations of Sweden – as civil servants - are responsible to serve them with all services and supports as equal as other people in society. People with disability who participated in this study were either potential or active users of public e-services.

Based on above analysis and with reference to Orlikowski’s structuration model of technology – duality of technology, each of constructors of this study is identified as below:

a. Institutional Properties: national, regional, and local IT policies, strategies, decisions, norms, communication patterns and designs which are approved by government agencies[public administrations] - civil servants, their IT consultants, and other involved government entities are grouped under institutional properties.

b. Technology: Information and Communication Technology, existing public e-services and disability features available on them, and assistive technology.

c. Human Agents: People with disability involved in this study (Citizens of Sweden).

Following is the figure that shows these constructors (see Fig. 8). Nevertheless, the how of relationships among them are presumption and need to be analysed base on the categorized empirical material and Orlikowski’s theory.
Identification of constructors was the first phase of my analysis of the empirical material. The next phase is to identify the relationships between humans, technologies, and institutional properties or the identified constructors.

7.2. Duality of Technology – Relationships among Constructors

Figure 8 is a demonstration of the main identified constructors and their presumed relationships. Here, four main relationships (arrows) are explored and explained according to the second phase of the analysis.

A) ICT, Public e-services and their disability features, and assistive technology as product of actions of people with disability - arrow a (see Fig. 8)

Orlikowski (1992, p. 410) describes arrow a as:

“Technology is an outcome of such human action as design, development, appropriation, and modification”.

Additionally, she explains this relationship can happen in two different modes depending on type of people’s interaction with technology

”the interpretative flexibility operates in two modes of interaction... design mode.... use mode” (ibid).
Understanding analysis mode is necessary in order to determine for what mode the analysis should be conducted. To make these modes clear, Orlikowski (1992, p. 410) explained:

“In the design mode, human agents build into technology certain interpretive schemes (rules reflecting knowledge of the work being automated), certain facilities (resources to accomplish that work), and certain norms (rules that define the organizationally sanctioned way of executing that work).“ ..... “In the use mode, human agents appropriate technology by assigning shared meanings to it which influences their appropriation of the interpretive schemes, facilities, and norms designed into the technology, thus allowing those elements to influence their task execution.”

In this study, both modes are taken. I argue the use mode due to my aim to explore equality of use and access to public e-services with regard to what people with disability experience and/or expect as they may or may not use these e-services. Therefore, since the focus is on use and access to public e-services, the use mode of public e-services by humans is brought out. Also I will show people with disability can be influential in re-design of public e-services based on experiences and expectations that interviewees with disability explained earlier.

Here through arrow a, I discuss how interactions of people with disability with public e-services and disability features available on them – as ICT tools - can create and recreate equal use and accessibility.

The empirical findings show that almost all interviewees with disability collected information from vaxjo.se and ltkronoberg.se. Some of them also used e-services for emailing their enquiries. However, many of them did not use these public e-services for interactive actions such as school registration. None of people with disability used disability features available on vaxjo.se and ltkronoberg.se websites. Some of interviewees stated that they used assistive technology such as magnifying tools in order to use and access public e-services. However, they stated that assistive technology they use cannot support them for all actions, for example Braille display cannot read pdf files therefore person who use it, cannot read and realize information available in pdf file.

Analysis of findings demonstrates people with disability do not take any interactive actions while they use either of vaxjo.se or ltkronoberg.se. This influence the results of analysis because what people share as their experience and/or expectation are more about actions such as reading information, finding and searching for specific information and so on. However, there are very few people who have experience of working with public e-services in interactive form; they have not mentioned any specific issue they may face while they interact with e-services. Therefore, as interaction of people with disability with public e-services is limited, it is not easy to determine how use and accessibility issues influence their interaction with public e-services.
Experience of people with disability from using and accessing vaxjo.se and ltkronoberg.se determine that, they usually face issues with numerous amounts of information, irrelevancy of information, non-understandability of language, receiving irrelevant result from search function, availability of some information in improper file formats such as pdf and impossibility of searching for information in specific disability formats. Interviewees also explained assistive technologies they sometimes employ for surfing public e-services are limited, for example Braille displayer cannot read image files. This caused people with disability to not have access to all available information on public e-services.

Along with these issues, those who not use public e-services for interactive actions, justified themselves by uncertainty about security, privacy, accuracy of information they register into online forms and not having knowledge of doing so or simply not being interested - usually because of their disability. Accordingly interviewees with disability expected to see changes in UI, language and content – in terms of words and grammar structure, amount of information, search functions including search in specific information format (e.g., audio file) and decreasing file types such as pdf or image. They also expected to be given enough information about how security and privacy is handled in these public e-services and more general, how they can use public e-services in interactive form. Many of interviewees explained that it is good if public administrations – as civil servants - collect more information from people with disability about use and accessibility issues they face. They also desired to be part of design, development and evaluation of public e-services.

In spite of limitation of interviewees’ interactions with public e-services, experience and expectation of people with disability affirm that they do not have equal access to information and services available on public e-services and therefore they cannot equally use and benefit from public e-services. Giving information in form of pdf file or image file and also not providing search functions which fits with what people with disability need are of examples of inequality in use and access. Analysis of empirical data shows that expectations and experiences of people with disability have potentiality to be applied in investigating and re-creating equal use and access. Figure 10 demonstrates that use of public e-services and disability features available on them by people with disability has the potential to create and recreate equal use and access. I argue that by referring to citizens’ experience of collecting information, reading news and similar activities they told. However because people with disability use public e-services limitedly, their feedback about use and accessibility of public e-services cannot be very influential in re-design of public e-services and consequently modification of equality of use and access to public e-services. Therefore, the influence of citizens with disability on public e-services is not happening. This is also true about assistive technology. Since, some of informants with disability use and access public e-services by the means of assistive technologies, what they experience at the time of using these technologies can help in re-design of them. Figure 9 demonstrates this relationship (arrow a). Dash line indicates limitation of this interaction.
FIGURE 9. PUBLIC E-SERVICES, DISABILITY FEATURES, AND ASSISTIVE TECHNOLOGY AS PRODUCT OF INTERACTION OF PEOPLE WITH DISABILITY WITH PUBLIC E-SERVICES

B) Public e-services and their disability features, and assistive technology as medium of actions of people with disability – arrow b (see Fig. 8)

Orlikowski (1992, p. 410) describes arrow b as:

“Technology facilitates and constrains human action through provision of interpretive schemes, facilities, and norms”.

To discuss this arrow, I analyze how public e-services, disability features available on them and assistive technologies - as ICT tools – facilitate or constrain expectations of people with disability about equality of use and access to public e-services.

Each of vaxjo.se and ltkronoberg.se websites offers varying services in form of information and interactive forms and applications. For example, vaxjo.se deliver varying cultural, political, entertainment, school registration, and social services and so on to inhabitants of Växjö that are known as to be responsibilities of Växjö Municipality (read chapter 2 section 2.1.2.1 for information about Växjö Municipality). Ltkronoberg.se delivers health care services to citizens in Kronoberg region that is core responsibility of Kronoberg County Council (read section 2.1.2.2 for information about Kronoberg County Council). It also offers other services such as regional transportation, enterprise and business investments, and cultural developments which are part of its outer tasks.

Accordingly, citizens with disability are supposed to use these public e-services as a novel medium for doing their routines or particular actions – along with traditional methods such as visiting or calling. As interviews with citizens with disability declared public e-services mainly and widely employ for collecting information or sometimes emailing enquiries. According to them, they mostly experienced issues in searching information in specific formats such as audio files, accessing information in pdf or image format, language and content, irrelevancy and huge amount of information. Also, as very few interviewees asserted using these public e-services for interactive actions, those who not interactively used public e-services provided varying reasons behind their claim; not interested, not knowing how to work with them and being unsure about security, accuracy and privacy of what they are doing – usually because of their disability. These experiences show that current use and
accessibility to e-services that people with disability face, constrain them in having equal use and access to public e-services. Even though people with disability use public e-services for collecting information, when they cannot read all announced news or information or when they cannot search for proper type of archived information, this does not completely support the idea of supporting (facilitating) people with disability in equality of use and access to public e-services.

Another service presented to citizens is disability features available on public e-services. According to IT standards such as Verva guideline 2006, it is expected that these features can serve expectations of people with disability in having equal use and access to public e-services. But as interviewed citizens explained none of them use these features. This means disability features not work as aimed. In other words, as interviewed citizens do not employ those features for using and accessing public e-services, it is not possible to determine whether these features support people with disability to equality use and access public e-services or not. Therefore, the relationship of disability features as technology with citizens with disability as human agents does not exist. Anyhow, to examine how information and services are accessible, I tried to use vaxjo.se and ltkronoberg.se by the means of disability features available on them. However, what I experience by doing so is not similar to what people with disability experience if they do so. Anyhow, I realized that first, usually disability features does not translate all available information and services to disability language and second, setting of disability features is mostly limited to specific options, therefore, if a person need specific type of settings, out of those pre-defined options, possibility is not provided. The analysis shows that disability features available on public e-services are very limited and in complete in supporting equal use and access for people with disability. Therefore, even if a person with disability tries to use these features, that person cannot use and access to public e-services as equal as other people. This then pictures disability features available on public e-services as imperfect medium for people with disability to use.

Interviews with citizens with disability illustrated that for some cases, assistive technology is the medium for using and accessing public e-services. This furnishes assistive technology with being a medium for citizens with disability to use public e-services. As interviewed citizens declared assistive technologies are sometimes not able to support them in reaching what they are looking for, for example Braille display cannot read pdf and images. Hence the technology constrains their actions. Consequently, this influences the relationship of assistive technology and people with disability. That is, assistive technology can partly facilitates citizens with disability in interacting with public e-services.

An overall result gained from the analysis of vaxjo.se and ltkronoberg.se (as public e-services), available disability features and assistive technologies illustrates that interviewees with disability do not have equal access to e-services. In other words, use and accessibility of public e-services and available disability features result in constrains in equally using and accessing public e-services. Consequently, facing these issues can push citizens with disability to choose other mediums for doing their routines or particular actions. Even though
as interviews with citizens with disability determined, experiencing different use and accessibility issues do not bind them in using public e-services. In other words, still public e-services play the role of communication medium which can facilitate people with disability to do their intended actions. This can supports existence of relationship from public e-services to people with disability, even though the influence is not happening as it is expected.

Figure 10 depicts existence of relationship from public e-services to people with disability (arrow b). It shows although public e-services are still not the broad means for communication and interaction for people with disability, they have the potentiality of being so, since interviewees express their desire in doing so. This desire causes them to be cautious about issues happen to them while using and accessing with public e-services. Yet, public e-services due to existing use and accessibility issues and also limited interactions people with disability have with them do not widely influence or enter to daily life of people with disability. Dashed arrow b determines public e-services and available disability features are not equal means for people with disability to use and access public services and information via internet.

**FIGURE 10. PUBLIC E-SERVICES, DISABILITY FEATURES, AND ASSISTIVE TECHNOLOGY AS MEDIUM OF ACTIONS OF PEOPLE WITH DISABILITY**

C) Institutional properties influence on actions of people with disability – arrow c (see Fig. 8)

Orlikowski (1992, p. 410) describes arrow c as:

“Institutional properties influence humans in their interaction with technology, e.g. intentions, design standards, professional norms, state of the art in materials and knowledge, and available resources (time, money, skills)”.

To investigate arrow c, I located national, regional, and local IT policies, strategies, decisions, norms, communication patterns and designs under institutional properties. All of them are approved and implemented by government agencies and public administrations - civil servants, their IT consultants and other involved entities. This helps me to analyse how
strategies, standards, values and norms, and communication patterns can influence people with disability in using and accessing public e-services.

IT policies at all three levels are supposed to uphold implementation of government’s goal in provide equal use and access to public services via internet and simplifying people’s life. The analysis of the interviews with civil servants demonstrated this aim is not met since requests and questions which are sent by (all) citizens via these public e-services are overlooked by politicians and this causes citizens to distance from public e-services and choose other means of communication.

Additionally, IT policies at national, regional and local level contain norms (communal ways of thinking and acting, e.g. equality) and rules through which public e-services are designed to be a means for improving communication between civil servants and all citizens. National, regional and local IT policies outline varying communication patterns for contacting citizens to explore the impacts of development of public e-services on them. These patterns suppose to back people with disability in sharing their experiences and expectations. As interviewed citizens with disability declared, being involve in or participate in design of public e-services can in a better way be designed according to our requirements. But interviews with civil servants showed they usually do not broadly, periodically and systematically collect feedbacks from people with disability by which they can statistically examine equal use and access to public e-services and/or explore and discuss experiences and expectations. Therefore civil servants needs to provide suitable communication patterns by which people with disability and civil servants can closely communicate and collaborate in order to understand each others’ languages, limitations, expectations and so on. But this does not exist for now. In addition, public administrations and disability communities should be in frequent communication in order to gain a common understanding of use and accessibility issues that people with disability may face while they use public e-services. Additionally, public e-services in terms of IT technology and standards are influenced by ICT experts’ knowledge and skills. As civil servants explained in interviews, in order to design accessible public e-services, they asked different IT consultants to preliminary advice them about use and accessibility issues, examine their e-services against those issues and giving feedbacks. Collaboration between civil servants, ICT experts and disability communities can be developed through appropriate communication patterns which are outlined based on factors such as required time duration, speciality of consultants, and so on. Yet, such communication patterns are limitedly available for now. For example civil servants do not have very clear and active communication with disability communities – as they explain in interviews; however these communities are representatives of people with disability and can contribute with their viewpoints and expectations.

Along with stated norms, communication patterns and strategies, developing standards and guidelines that administer equality of use and access to public e-services are of institutional properties. National IT policy (i.e. e-government action plan 2008, eDelegation 2009, and Verva guideline) outlines IT standardization in order to provide adequate infrastructure for equal use and access to public e-services – there are other concerns included in IT
standardization such as security which are not subject of this study. Adhering to web accessibility standards equally delineates in local and regional public e-services guidelines. Analysis of both interviews with civil servants and regional and local IT policies confirms this statement. Developing IT standards in general and web accessibility standards in specific can reinforce equality of use and accessibility to public e-services as strategy; however it is an initial step of implementing this strategy. Therefore, IT standardization is one proper step toward providing equal use and access to public e-services.

Nevertheless, these properties are outlined to advocate citizens with disability’ expectations, actual implementation of them is the final outcome that people really uses. Despite this fact, limitations make this job difficult. As civil servants point out, collecting expectations and demands of people with disability (even in forms of feedbacks) needs allocation of time, money and human resource. And as civil servants determine allocation of these resources should actually be approved by decision-makers to take the shape of norms. Therefore, the whole process is not as direct as it is prospected in IT policies. These limitations and difficulties therefore, influence on both amount and quality of collected information about experience and expectations of people with disability, and possibility of application and implementation of them.

Analysis of influence of institutional properties on human agents provides four main outcomes. First, existence of strategies, standards, norms and rules, and communication patters in IT policies, promotes rights of people with disability in equally use and access public e-services but this is not necessarily considered in the design of services. Second, improper communication with people with disability in order to examine their experiences and expectations about use and access issues of public e-services makes the access to offered e-service unequal. Third, as the civil servant do not ask people with disability about their demands then their experiences and expectations do not have any impact on the institutional properties. Forth, lack of communication among in-charge or involved agencies and communities results in not knowing each others’ status quo in implementing equality of use and access to public e-services. This then creates a recursive influence at institutional properties level. On these accounts, figure 11 is depicted which demonstrates the influence of IT policies on expectations and demands of people with disability about use and accessibility of public e-services. Dash line indicates institutional properties cannot still provide adequate base for properly meet expectations and demands of people with disability regarding their use and access issues of public e-services.
D) Influence of use and accessibility of public e-services on institutional properties – arrow d (see Fig. 8)

Orlikowski (1992, p. 410) describe arrow d as:

“Interaction with technology influences institutional properties of an organization, through reinforcing or transforming the structures of signification, domination and legitimation.”

Investigating arrow d is meaningful if it is discussed through interaction of people with technology. In other words, in order to determine the influence of technology on policies, decisions and designs – as institutional properties, it is required that people start to use technology and share their feedbacks and experiences about that technology. The empirical material shows that the citizens do not use e-service. This makes the analysis very difficult or even impossible. Therefore, till the end of this section, I will explore how use and access of public e-services, disability features available on them and assistive technologies through the lens of experiences and expectations of people with disability may influence IT policies, decisions and designs.

Analysis of national, regional and local IT policies and guidelines along with interviews with civil servants shows public e-services are technologies by which all citizens are supposed to access to information equally, communicate with local authorities and equally benefit from them. However, analysis of empirical materials indicates that these aims are not implemented as they are prospected. I argue that by referring to first use and accessibility issues that interviewees with disability faced and second limited use of public e-services by people with disability. According to informants with disability, there are varying use and accessibility issues that they deal with while using public e-services. Unavailability of disability formats
for search function, availability of inaccessible file formats such as pdf, language and content problems and so on are of use and accessibility issues that people with disability experienced. In addition, analysis of disability features available on public e-services and assistive technology demonstrates that such technologies do not support people with disability in using and accessing public e-services. For example, in ltkronoberg.se, if a person choose ‘lyssna (listening)’ button (disability feature), that person should install an application in advance of using this feature. This can cause problem for a person with disability who wants to use this feature because she/he may not be able to install the application by her/himself. Similar limitations are discussable about assistive technology for example a Braille displayer cannot read a pdf or image file. Such limitations lead people with disability not being able to interactively and equally use and access public e-services. Interviewees with disability also expressed their expectations about use and accessibility of public e-services which can support them in better and more using public e-services. Changes in content, search function, file formats, appropriately informing them about security and privacy of information they registering to online forms and training them about how to use and interact with public e-services – which are of their expectations – can encourage them to interact with and use public e-services more than they do currently. They also mentioned that they are interested to be involved in design, development and evaluation of public e-services. This shows that citizens can be motivated in varying methods in order to use public e-services more interactively. Civil servants should be aware of this and ask people with disability to participate in exercising equal use and accessibility for them.

An overall understanding shows public e-services – vaxjo.se and ltkronoberg.se – are not designed and developed to equally serve all citizens with e-services. Use and accessibility issues and shortfalls in training and informing people with disability about public e-services and how they can interact with them build a gap between people with disability and interactive use of public e-services. That is, existing limitations and use and accessibility issues of public e-services, available disability features, and assistive technology that people with disability experience and also the way people with disability use public e-services does not reinforce and does not exercise equality of use and access to public e-services as are prospected in the IT policy. All these then lead to limited implementation of policy (and bill), information society for all.

On above account, I picture figure 12. It shows that interaction of people with disability with public e-services supposes to reinforce equality of use and access to public e-services for all citizens. Yet, based on issues interviewees with disability discussed, this is not happening and further improvements and changes are needed. Dashed arrow in the figure 12 indicates public e-services cannot fully reinforce implementation of IT policies which aims to create an information society for all.
FIGURE 12. INFLUENCE OF USE AND ACCESSIBILITY OF PUBLIC E-SERVICES ON INSTITUTIONAL PROPERTIES

**Technology:**
Existing public e-services, disability features on public e-services, information and communication technology, assistive technology

**Institutional Properties:**
National, regional, and local IT policies, strategies, decisions, norms, communication patterns and designs which are done by government agencies [public administrations] - civil servants, their IT consultants, disability community and other involved entities
8. Discussion

This study aims to investigate the equality of use and access to public e-services with regard to the experiences and expectations of people with disability. I applied Orlikowski’s duality of technology to analyse the empirical materials. In this chapter, I will discuss the results of my analysis.

The purpose of this study is to investigate the equal use and access to public e-services, which is part of an underlying infrastructure for creating an information society for all (Prop./Bill 1999/2000:86). Therefore, the following research questions were addressed:

- How can experiences and expectations of people with disability influence equality of use and access to public e-services for them?
- How can public e-services serve expectations and demands of people with disability in equally using and accessing public e-services?
- How can IT policies incorporate experiences and expectations of people with disability for implementing equality of use and access to public e-services?
- How can use and accessibility issues of public e-services through the lens of experiences and expectations of people with disability influence equality of use and access to public e-services which is proposed in IT policies?

In the analysis chapter, I started with identifying the institutional properties, human agents and technology based on the definitions and specifications of constructors of the structuration model of technology given by Orlikowski (1992). And therefore, I came up with the preliminary result which is presented in figure 13. People with disability are grouped as human agents, public e-services, disability features available on them and assistive technology are categorized as technology, and finally national, regional and local IT policies, strategies, decisions, norms, communication patterns and designs which are approved by public administrations, their IT consultants and other involved entities are known as to be the institutional properties (see Fig. 13). Nevertheless, during the analysis procedure, the state of the relationships among constructors was still questioning and needed to be analysed based on the categorized empirical materials and Orlikowski’s model.
The results of analyzing the empirical findings show that the relationships between the constructors of this study do not support the equality of use and access to public e-services for citizens with disability (see Fig. 14). Figure 14 pictures the relationship of citizens with disability, public e-services and IT policies. It exhibits that the relationships among these three constructors does not encourage the actual implementation of equality of use and access to public e-services and consequently limited the development of the bill, information society for all.

As it is drawn in figure 14, arrows a and b which suppose to create a dual relationship between citizens with disability and public e-services are dashed. This means citizens with disability do not influence on the re-creation of use and accessibility of public e-services based on their experiences and expectations. This is while informants with disability are a good source of discussing use and accessibility issues of existing public e-services. This limited relation is presented as arrow a in figure 14. Arrow b in figure 14 demonstrates that public e-services are a restricted means for people with disability to equally use and access their required information and services. Arrow c shows that the approved IT policies and guidelines can limitedly support the rights of citizens with disability in equally using and accessing public e-services. In other words, although equally using and accessing public e-services is proposed in different IT policies of Sweden, it is not actually implemented. Arrow d which is the last arrow shown in figure 14 pictures that the existing use and accessibility
issues of public e-services have limited practicability and implementation of the IT policies and guidelines.

In addition to these four arrows, a recursive relation exists at the institutional properties level. That means IT policies and public administrations at different levels and responsibility types should be in contact with each other in order to understand each others’ status quo, capabilities and plans for the aim of implementing equal access to public e-services for people with disability and enacting the bill, information society for all.

The result of analyzing each of the arrows depicted in figure 14 is given through to the end of this chapter.

**FIGURE 14. INTEGRATE PICTURE OF DUALITY OF TECHNOLOGY - CITIZENS WITH DISABILITY, PUBLIC E-SERVICES, IT POLICIES**

I) Result of Analyzing the Arrows a and b: dual influence of people with disability and technology

In explicating arrows a and b (see Fig. 14) in the structuration model of technology, Orlikowski (1992, p. 410) claims “Technology as a Product of Human Action” (see arrow a in Fig. 14) and “Technology as a Medium of Human Action” (see arrow b in Fig. 14). Here, I discuss the outcomes of the dual influence of people with disability as human agents and public e-services, disability features available on them and assistive technology as technology in order to investigate the equality of use and access to public e-services. By doing so, I focus on two of my research questions:
- How can experiences and expectations of people with disability influence equality of use and access to public e-services for them?
- How can public e-services serve expectations and demands of people with disability in equally using and accessing public e-services?

The result of the analysis shows that the duality of influence between the citizens with disability and public e-services and disability features available on them, and assistive technology has not happened. That is, public e-services are not the equal means for people with disability to use and access, and in reverser, public e-services are not modified based on the experiences and expectations of people with disability. Varying researchers have discussed these matters also. Landgren (2012) suggested that citizens can participate in the design process of public e-services in order to cooperate in developing public e-services which are accessible to them. In another study by Wallström, Engström, Salehi-Sangari and Ek Styven, (2009) citizens’ need have been introduced as an influential factor for developing public e-services which are accessible to all.

In addition to the above discussions and studies, this limitation in the duality of influence between citizens and technology (or duality of technology) is in contrast with what proposed in the IT policies of Sweden, for example action plan for e-government 2008, eDelegation 2009 and Verva guideline or in the local and regional IT guidelines, for example Guidelines for vaxjo.se and underlying webs. In all these IT policies, it is highlighted that public e-services are ICT means by which all people can have easier life and also all should have access to the information and services in public sector (action plan for e-government, 2008; eDelegation, 2009; Verva guideline, 2006). Also, in order to better serve the citizens, their needs should be the preliminary step in developing public e-services (action plan for e-government, 2008; eDelegation, 2009).

However the analysis illustrates two contradictory outcomes: first, public e-services are not equally accessible for people with disability. And second, the use and accessibility of public e-services are not modified based on the experiences and expectations of people with disability.

Overall, I argue the result of my analysis by putting forward several subjects of thinking. First, the result of analysis shows that public administrations and their IT consultants are very guideline-oriented. Yet, many ICT scholars have suggested methods by which citizens can be part of the whole process of designing and evaluating public e-services, for example participatory (e.g., suggested by Elovaara and Mortberg, 2007) or citizen-oriented design (e.g., suggested by Wallström, Engström, Salehi-Sangari and Ek Styven, 2009). Of course IT guidelines and standards are good source of web accessibility standards but they are not representative of what people with disability experience and expect. Therefore, for providing people with disability with equal use and access to public e-services, it is important to actively involve people with disability in designing, using, and evaluating public e-services in order to put to practice their expectations and experiences about use and access to information and services in public sector. Second, public administrations, their IT consultants
and disability communities can increase their relationship and being more actively in contact in order to better understand what people with disability experience and expect about use and accessibility of public e-services. This is previously done by the government of Sweden, when they assigned an IT program to the Swedish Handicap Institute in 1996 (stated in the report ‘Towards a Swedish Information Society for All’, 2000).

In addition, people with disability also can try to interactively use public e-services. This is the third subject. If citizens with disability interactively use public e-services then their feedback can more comprehensively present their concerns about the issues of privacy, security and accuracy of their information. According to the analysis of what many of informants with disability stated, they do not interactively use public e-services because they do not know how to do that or they are afraid of wrongly enter their information or they are worried about the security and privacy of their information. This is while they are interested in learning how to interactively use this technology but they do not know how they can learn it. This matter is also discussed by Nilsson (2005). He explained (ibid, p. 74) that users should be understood by developers of public e-services: “technical and physical possibility to use, will to use, allowed to use, knowledge to use and economical prerequisites, familiar to use”. On this account, it can be asked who or which entity can help citizens learn how to use public e-services or learn about privacy and security of their actions. Is it the responsibility of disability communities or public administrations? Or is it a joint responsibility?

II) Result of Analyzing the Arrow c: influence of institutional properties on people with disability

In elucidating arrow c (see Fig. 14) in the duality of technology, Orlikowski (1992, p. 410) asserts “Institutional Conditions of Interaction with Technology” (see arrow c in Fig. 14). Here, I debate the influence of the institutional properties on the human agents which are people with disability. The result of my analysis is related to another research question of this study which is:

- How can IT policies incorporate experiences and expectations of people with disability for implementing equality of use and access to public e-services?

The outcome of the analysis shows that the relationship (arrow c) among grouped items as the institutional properties and the citizens with disability as human agents does not support the equality of use and access to public e-services.

Existence of strategies, standards, norms and rules, and communication patterns in IT policies (e.g., action plan for e-government, 2008; eDelegation, 2009; Verva guidelines, 2006) besides IT policies at the local and regional level (e.g., Guidelines for vaxjo.se and underlying webs), promotes the rights of citizens with disability in equally using and accessing public e-services but it does not necessarily implement their rights. Design issues of public e-services which make them inaccessible for all, inefficient and insufficient communication with citizens with disability regarding their experiences and expectations about the use and accessibility of public e-services and not efficiently discussed about the allocation of resources for collecting experiences and expectations of people with disability.
are of the shortcomings that diminish practicability of the actual implementation of equal use and access to public e-services which is prospected in IT policies.

These determined imperfections have been also discussed by other researchers. Lind, Östberg and Johannisson (2009) explained that both of the e-government action plans I (2008) and II (2009) have missed explaining about the allocation of resources, processes and procedures on which public administrations at different levels can rely on in order to develop the public e-services for all. This is in line with the result of current analysis which shows IT policies suffer from ‘not efficiently discussed about the allocation of resources for collecting the experiences and expectations of people with disability’.

Regarding the issues of lack of or insufficient communication with citizens with disability, Wallström, Engström, Salehi-Sangari, and Styvén (2009) also stated (ibid, p. 124) “however, in the schematic presentation of the four action areas, administration’s contact with citizens and businesses are presented as an outcome (result) rather than as the starting point”. Therefore, this might be the time that policy makers and public administration should ask themselves how the same issue is still existed.

Design of the public e-services is another point of discussion. In this regard, researchers discussed different approaches that give the power to the citizens’ voice, for example Elovaara and Mortberg, 2007 argued the participatory design which focus on the participation of citizens in designing e-services. Landgren (2012) also suggested that the participation of citizens in developing the process can result in more accessible e-services. As the analysis of the empirical findings shows, people with disability face varying use and accessibility issues while they use public e-services. As the design of public e-services is part of the institutional properties that influence the equality of use and access to public e-services, it is necessary for public administrations to actively test and evaluate their designs.

This leads the researcher (I) to ask if the web accessibility guidelines are enough for designing and developing public e-services or public administrations need extra information such as experiences and expectations of citizens with disability, or if the cooperation of public administrations and IT consultants is based on a mutual understanding of each others’ capacities, missions and visions, or if the public administrations have lack of knowledge about experiences and expectations of people with disability about the use and accessibility issues of public e-services, or if the allocation of resources for collecting expectations and experiences of people with disability about the use and accessibility of public e-services is more costly than loosing people with disability as their potential users and distancing from the initial aim of creating an information society for all.

III) Result of Analyzing the Arrow d: influence of technology on institutional properties

In explaining the arrow d (see Fig. 14) in the structuration model of technology, Orlikowski (1992, p. 410) explains “Institutional Consequences of Interaction with Technology” (see arrow d in Fig. 14). Here, I argue the influence of public e-services, disability features
available on them and assistive technology as technology in the national, regional, and local IT policies, strategies, decisions, norms, communication patterns and designs which are approved by the public administrations - civil servants, their IT consultants, disability community and other involved entities as institutional properties. This discussion is related to the last research question of this study which is:

- How can use and accessibility issues of public e-services through the lens of experiences and expectations of people with disability influence equality of use and access to public e-services which is proposed in IT policies?

The result of analysis determines that the influence of public e-services on IT policies does not support the implementation of the equality of use and access to public e-services. In different IT policies (e.g., action plan for e-government, 2008; eDelegation, 2009; Verva guideline, 2006) it is promoted that all citizens should access to public e-services and benefit from them equally. If it happens then the bill, an information society for all will be reinforced. Löfstedt (2007) asserted this idea when in his discussion about developing public e-services, he explained that accessibility of public e-services for all can be beneficial for both the citizens and public administrations. Also, Landgren (2012) affirmed that accessible public e-services can implement the aim of the public administrations in creating a two way communication means between them and citizens.

However, the result of analysis shows that people with disability face varying use and accessibility issues while they use public e-services. These issues then limit people with disability in equally using and accessing information and services available on public e-services. In other words, existing use and accessibility of public e-services do not reinforce the equality of use and access to public e-services for people with disability which is proposed in the IT policies (e.g., action plan for e-government, 2008; eDelegation, 2009). This then leads to the limited implementation of the bill, information society for all which in long term influences the plans and outlooks of the government of Sweden and public administrations in building an information society for all people to gain the equal benefit from the offered public e-services.
9. Conclusion and Contribution

This study aimed to explore the equal use and access to public e-services for people with disability through investigating what people with disability experience and expect, how public e-services are designed, and what proposed in IT policies. To meet this aim, this study conducted to answer the following research questions:

- How can experiences and expectations of people with disability influence equality of use and access to public e-services for them?
- How can public e-services serve expectations and demands of people with disability in equally using and accessing public e-services?
- How can IT policies incorporate experiences and expectations of people with disability for implementing equality of use and access to public e-services?
- How can use and accessibility issues of public e-services through the lens of experiences and expectations of people with disability influence equality of use and access to public e-services which is proposed in IT policies?

The focus of this study has been on citizens with disability, public e-services and the disability features available on them, and IT policies and civil servants. My analysis of the collected data was conducted with the use of Orlikowski’s structuration model of technology, the duality of technology, as theory framework was applied to them. First, I identified the involved constructors based on the definitions and specifications of each of institutional properties, human agents and technology in Orlikowski’s structuration model of technology – duality of technology. Thereafter, through the rest of my analysis, I investigated the relationships between the identified constructors. By doing so, I expected to answer the initial research questions. Later in the discussion section, the outcome of the analysis led me to argue the duality of influence between people with disability and public e-services, the influence of the IT policies on citizens with disability with regard to the equal use and access to public e-services, and the influence of the interactions of people with disability with public e-services on implementing the equality of use and access to public e-services as prospected in IT policies.

The results of my study show that public e-services are still not a wide ICT means for people with disability to equally use and access. Due to the current use and accessibility issues that people with disability explained, public e-services are not their first choice when they interact with the local and regional authorities or conducting their daily actions. This then causes public e-services to not play their presumed role in being a medium of interactions for people with disability. Additionally, as the result of the analysis showed, public administrations do not actively collect experiences and expectations of people with disability regarding the use and accessibility issues of public e-services. Or even though citizens with disability pointed out that they are interested to participate in designing, interactively using and evaluating public e-services, civil servants do not give rise to the opportunities in which citizens can participate in design, interactively use and evaluating public e-services. Therefore, public e-
services cannot be modified or re-designed based on the actual experiences and expectations of people with disability. On these accounts, the shortcomings in the duality of influence between citizens with disability from one side and public e-services as technology from the other side cannot support implementation of the equality of use and access to public e-services.

Regarding the results gained from conducting this study, there are varying methods by which the relationships among IT policies, public e-services, and citizens with disability can be improved. First, public administrations should motivate people with disability in participating in design, use and evaluation of public e-services. The results of the analysis showed that people with disability are interested in being involved in designing, using and evaluating public e-services but this is not occurring actually. This then influences negatively on both the interaction of people with disability and public e-services and also the re-design of public e-services by civil servants in order to improve the use and accessibility of them. Second, the Government of Sweden and those who involve with structuring the national IT policies should provide clear strategies that highlight the allocation of resources by public administrations in order to create opportunities for people with disability to more regularly share their experiences and expectations about the use and accessibility of public e-services. Third, responsibilities of the disability communities and public administrations and their IT consultants should be explained. For now, civil servants presume that it is disability communities’ responsibilities to inform people with disability about how public e-services work and how they can work with public e-services. But people with disability do not get any information from the disability communities or the civil servants. This is problematic. So it should be stated clearly who is in charge of supporting people with disability while they use public e-services and how other entities should uphold the in-charge entity. Fourth, the government of Sweden and decision makers can re-think whether public e-services have this capacity to be equally accessible for all or not. If it is a yes then find a way to spread it among the people with disability and if no, then how they can replace public e-services with the technologies that provide the equal use and access to public information and services and consequently equally benefit citizens with disability.

Answering the research questions of this study brought contribution to the current studies about the equal use and access to public e-services for people with disability. In addition, the results of the study contribute to the current discussions about the bill (Prop./Bill 1999/2000:86), the information society for all. This study also presents a novel view to the subject of equality of use and access to public e-services by investigating experiences and expectations of people with disability, IT policies and public e-services all together under a united framework.

9.1. Contribution to the Theory
To conduct this study, I employ Orlikowski’s structuration model of technology. This theoretical framework overcomes the limitation of its origin in discussing the duality of technology along with the duality of structure. As I explained earlier, this theory discusses the influence of technology, human agents and institutional properties while ICT/IT is
applied into a context. By doing so, I investigate relationship of people with disability as human agents, ICT policies as institutional properties and public e-services and disability features available on them as technology in practicing the equality of use and access to public e-services for people with disability.

I think application of Orlikowski’s structuration model of technology to this study, is a contribution to the current studies which affirm capacity of this theory to be applied to ICT/IT field. I have not organized this study to criticize application of Orlikowski’s structuration model of technology, still during application of the theory to my findings; I faced varying limitations in exploring return influence of the human agents on institutional properties and institutional properties on technology. I think this study needed to show those influences as well because I aimed to provide a united picture of dual influence of these constructors on each other. Based on my current limited work, I proposed a change in the model as is shown in figure 15 which is an undeveloped idea and needs to be examined and criticized. In figure 15, each of institutional properties, human agents and technology are given the name constructors and each of them has got a dual relationship with the other two and this is the reason the name of the model is duality of constructors. As it is shown in figure 15, arrows a and b present the duality of technology, arrows c and d display the duality of structure between institutional properties and human agents, and arrows e and f describes the duality of structure between institutional properties and technology. Arrows a and b explain technology as a product of human actions and technology as a medium of human actions. That is, technology can support humans in doing their actions and in reverse humans’ actions can result in modifications and re-design of technology. Arrows c and d describe the duality of influence between institutional properties and human agents. That is, the interaction of humans with technology can re-structure institutional properties e.g. strategies, policies and so on and in reverse implication of institutional properties can result in modifications of technology. Arrows e and f present the duality of influence between institutional properties and technology through the interaction of humans with technology. In arrow e, institutional properties can reinforce or transform the state of using/designing technology and in reverse technology can reinforce or diminish existing institutional properties.

![Figure 15. Suggestion: Duality of Constructors - Modification in Structuration Model of Technology](image-url)
9.2. Future Research

The focus of my research is on information society for all in general and the equality of use and access to public e-services in Sweden in particular. To extend the understanding of experiences and demands of citizens, it would be interesting to conduct another studies with particular attention on: (1) comparing varying literatures about the equal use and access to public e-services, (2) comparing public e-services in the same or different contexts in order to explore and evaluate equality of use and access, (3) conducting action research about relationship between the behaviour of people with disability in using public e-services, public administrations’ policies and other related entities, (4) also conducting comparison studies on how other governments or public administrations practice information society for all, (5) how other EU governments or public administrations encourage people with disability to use and access public e-services, (6) applying other types of theoretical framework such as actor network theory to the similar empirical materials in order to find out the role and influence of each of participants (e.g., policies, humans, technology) in equality of use and access to public e-services.

In the section 9.1 of the current chapter, I have opened a discussion about the modification of Orlikowski’s structuration theory (the duality of technology). Accordingly, as my research is limited, there is need for more studies in order to criticize and contribute to my idea. Therefore, I suggest more investigations that can be conducted in the same studying area or other areas in order to discuss the limitations and shortcomings of Orlikowski’s theory in exploring duality of influence among all constructors of the model. Also, the current study can be re-analyzed by applying the duality of constructors (my suggestion) to the same empirical findings. This helps to examine, evaluate and compare this model with Orlikowski’s model.
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Appendices

Appendix A – Information Consent

Followings are both Swedish and English versions of information consent that delivers to interviewees involve in this research:

- **English Version**

  About the project:
  Thesis Topic: (The possibility of changing the title is not waived.)
  “Evaluation of e-government services for people with disabilities” [Currently Thesis Topic is changed]
  
  A short Summary:
  This study is focusing on evaluating e-services of public sector for Citizens with disability. It is planned that these people are becoming involved in interviews and telling or writing narratives about nominated e-services. However, part of this study is aiming evaluating regulations and policies for developing e-services of public sector for disabled people. Therefore, similar data collections can be conducted with agencies in charge of selected e-services.
  
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  Involved parties in research:
  - Swedish Citizens with disability
  - Institute(s) in charge of disabilities
  - Local and National agencies who are owner/developer of e-services. [Two local/regional (Växjö kommun and Landstinget Kronoberg) and national (Skatteverket)]

  About participation in the project:
  Data Collection Methods for this study
  Interviews: some open ended questions – in areas like accessibility, usability of e-services - will be asked and people can discuss their ideas over those questions. This can help to analyze on which points in e-services people are more agreed and which one is new to them.
  Written or verbal narratives: People will be invited to talk about or write their experience of working with specific e-services (as their diaries for a specific period of time, for example one time use of selected e-services). It is expected that they talk or write about tools and technologies they used for surfing e-services, good and bad things they faced at the time of working with selected e-services, ease and hardship of that, how they are removing errors or problems when they are surfing on those e-services and etc. This can be practical also because people are freely talking or writing their idea without having any worry about limitations such as time.
  Documents: published regulations, policies and action plans of the e-government projects conducted by government/agencies.

  Participation Rules:
English is the main language of this study. Participants with Swedish or other languages can ask for translator(s).

Participating in this study is volunteer-based.
Participants in the research can only access to their own data at any time.
Participants in the research can stop their contribution in the study at any time and also can ask for removing the data they gave to the author of the thesis.
Collected data from participants will be used for master thesis.
Data can be recorded by the means of audio recorders and/or photos. However, if participant refused that, then data will not be recorded as the mentioned types.
Only, Author of the thesis and supervisor of the work will access whole data through all steps. And participants of the study can just access their own data.
Participants can ask for further information about the whole study. It will be provided for them if by doing so the rights of other participants will not be broken.

Scope and Limitations of this study

E-government services will be discussed in two local/regional (Växjö kommun and Landstinget Kronoberg) and national (Skatteverket) levels and we will not enter to country or other possible levels. For this research, number of intended e-government services is limited and their selection will be random. This study will be conducted in Sweden and consequently agencies and citizens with disabilities – not all citizens - will be chosen from this country. Moreover, ethical considerations in data collection and analysis phase regarding participated individuals and groups should be very focused and explicit.

Ethical issues(!) of this study

In this research citizens with disabilities will be expected to be involved. In case that any of them – or a group of them- prefers to involve as an unknown/anonymous attendee, then a policy should be thought of to prevent any problem in future. Also, regarding the interviews and narratives which will be collected citizens with disabilities, it is important for them to be aware of their rights during the time of written or verbal explaining or answering intended questions and comments.

Besides citizens with disabilities, there can be assistants who are helping them during the time of research. Assistants can be those who are helping in translation from English to Swedish and vice versa and also those who are helping people with disabilities in doing their activities. Ethical considerations stated above and probably some others will be applicable to them as well, for example identity clarification and etc.

Generally, it is also required to make clear all aspects and steps of the research including research aim and purpose, contribution of the research, tools and methods, procedures and any other element related to the research for the participants. In doing so, recording data, writing, and analyzing them all should be discussed with and illuminated for both citizens with disabilities and agencies that their e-services are employed for this research.

Moreover, part of documents about nominated e-government services might be confidential and using them publicly might not be allowed. So it should be discussed with intended agencies about the possibility of using them as collected data or for final analysis.

Consent:
I agree with audio recording of data ☐ Yes ☐ No ☐ Conditional ☐ please indicate:

I agree with taking photos. ☐ Yes ☐ No ☐ Conditional ☐ please indicate:

I understand the above explanations and agree with the statements above. Yes ☐ No ☐

Any further condition(s) or explanation(s) from participant:
I understand that my participation in this research is volunteer-based and I can withdraw from the research anytime I want. Yes ☐ No ☐
I understand that I can ask researcher to remove my data any time I want. Yes □ No □
By signing this document I consent to participate in this study and the data/information I share with you can be used in your master thesis "Evaluation of e-government services for people with disability".
Signature of participant
Date     Place

Swedish Version
Samtycke om Deltagande
* Läs följande information, och kontrollera sedan de olika alternativen och välj det alternativ som Du välj de din favorit alternativ. Underteckna formuläret om samtycke.

Om projektet:
Master Uppsats: (eventuellt kan titeln ändras något under precessen)
"Evaluation of e-government services for people with disabilities"
"Utvärdering av e-tjänster med deltagande av personer med funktionsnedsättning"

En kort sammanfattning:
Denna studie undersöker e-tjänster som tillhandahålls av kommuner, landsting och offentliga myndigheter och hur dessa är utformade för medborgarna med funktionsnedsättning. I studien planeras deltagande av ett antal personer. Dessa deltagande kommer att intervjus om användning av olika e-tjänster samt vilken erfarenhet de deltagande har av att använda e-tjänster. En annan del i studien undersöker handlingsplaner och policies utvecklade inom den officiella sektorn och hur dessa inkluderar medborgare med funktionsnedsättning. Data kommer att samlas in med hjälp av olika metoder.

Studien kommer att genomföras av:
Samira Atashi
Handledare (som också kommer att ha tillgång till det insamlade materialet)
Docent Christina Mörtberg
E-post: christina.mortberg@lnu.se
Institutionen för datavetenskap, fysik och matematik, Linnaeus University

Deltagare i projektet:
Personer med funktionsnedsättning
Handikapporganisationer
Kommuner (Växjö), landsting (Kronobergs) och statlig myndighet (Skatteverket)

Om deltagande i projektet:
Datainsamlingsmetoder

Dokument: publicerade plocies, strategier och handlingsplaner om e-förvaltning som utvecklade av kommun, landsting och statliga myndigheter.

Deltagande:

Omfattning och begränsningar i denna studie


Etiska frågor i denna studie


Samtycke:
Jag tillåter inspelning av datamaterial. Ja □ Nej □ Ja, med följande villkor □ ange vilka:
Jag tillåter fotografering. Ja □ Nej □ Ja, med följande villkor □ ange vilka:
Jag förstår det som har beskrivits ovan och att detta är i enlighet med mina ståndpunkter. Ja □ Nej □
Ange andra villkor (er) eller förklaring (s):
Jag förstår att mitt deltagande i denna forskning är frivilligt och att jag kan dra mig ur projektet när jag vill och utan någon förklaring. Ja □ Nej □
Jag förstår att jag kan be forskare att ta bort mina uppgifter när jag så önskar. Ja □ Nej □
Genom att underteckna detta dokument samtycker jag till deltagande i denna studie och insamling av data / information samt att insamlat material kan användas i din uppsats
"Evaluation of e-government services for people with disability". Utvärdering av e-
förvaltning med deltagande av personer med funktionsnedsättning Underskrift av deltagare

Datum Placera
Appendix B – Interview Themes

- Interview Theme for Citizens with Disability

* Notice: Questions are formulated in English. Swedish translation of questions can be found in parenthesis.

Observera Frågorna är formulerade på engelska och en svenska översättning av frågorna finns inom parentes.

A. General Questions (Allmänna frågor)
1. Please briefly explain about your background. For example Education, work, etc (fråga på svenska: Kan du kortfattat berätta om din bakgrund. Exempelvis utbildning, arbete...)
2. Please could you tell how you are you using internet, web browsers and web pages? (fråga på svenska: Hur använder du Internet, webbläsare och websidor?)
3. Do you use internet for activities like reading news? or for entertainment (game, music etc)? (fråga på svenska: Använder du Internet för att t.ex. läsa nyheter? För spel, musik, film)
4. Are you using internet for important activities like paying bills and etc? How often? (fråga på svenska: Använder du Internet för att t.ex. betala räkningar och etc?) Hur ofta?
5. Could you tell what kind of technologies you are using? Do you have any specific technologies when you use Internet? (A special keyboard or a voice commander, etc? Do you have any problems to use the technologies? (fråga på svenska: Vilka teknologier använder du? Har du någon speciell utrustning när du använder Internet? (Till exempel särskilt tangentbord eller röststyrning, etc?)
6. How did you get information about technologies that you can employ for using internet? Did you get it from responsible agencies or institutes (municipality, county council?) Do you think you are given enough information? (fråga på svenska: Hur har du fått information om olika teknologier (utrustning) som du kan använda för att använda internet? Har du fått information från kommunen, landstinget eller andra som ansvariga myndigheter? Vänligen argumentera ditt svar.)
8. Are you using other types of facilities like phoning or sending sms or mailing or face-to-face meeting rather than using those three websites for doing a specific action? For example instead of applying online for receiving your personal information, calling the center or going there? fråga på svenska: Använder du andra typer av anläggningar, ringa eller skicka sms eller e eller anskikte mot anskikte möte stället för att använda dessa tre webbplatser för att göra en särskild åtgärd? Till exempel i stället för att tillämpa på nätet för att ta emot din personliga information, ringer centrum eller äka dit?)
9. If you are colour blindness, please explain what you think of background colour of page, font colour, images... (fråga på svenska: Om du är färgblindhet, förklara vad du tycker om bakgrundsfärgen på sidan, teckenfärg, bilder ...)
10. If you can see with difficulty, please explain what you think of colours of links and fonts and background, size of fonts, image resolution and size, size of links... (fråga på svenska: Om du kan se med svårighet, förklara vad ni anser om färger på länkar och typosnitt och bakgrund, storlek på typosnitt, bildupplösning och storlek, storlek på länkar ...) 
11. How can you navigate and move between pages of website? (fråga på svenska: Hur kan du navigera och bläddra mellan sidorna av webbplatsen?)
12. Is there any voice/audio feature for you to use? If yes, then do you think it is practical and helpful for you to do different actions in the website? If no, do you think it can be practical and helpful to provide this feature for you in order to do different actions in the website?
Interview Theme for Civil servants

* Notice: Questions are formulated in English. Swedish translation of questions can be found in parenthesis.
Observera Frågorna är formulerade på engelska och en svenska översättning av frågorna finns inom parentes.

1. Please briefly explain about your activities and responsibilities of XYZ agency (fråga på svenska: Förklara kortfattat om er verksamhet och ansvar XYZ byrå)
2. When and why did XYZ agency decide to develop a website? (fråga på svenska: När och varför började XYZ byrå beslutar att utveckla en webbplats?)
3. How did development of ABC.se affect XYZ agency activities? Did it help to improve its aims? (fråga på svenska: Hur kom utvecklingen av ABC.se påverka XYZ byrå verksamhet? Hjälpte det att förbättra sitt mål?)
4. How did people’s (users’) expectations and needs meet in different stages of developing ABC.se? (fråga på svenska: Hur kunde människor (användare) förväntningar och behov möts i olika faser av utvecklingen ABC.se?)
5. How people with different disabilities contribute in developing ABC.se? (fråga på svenska: Hur personer med olika funktionshinder bidra i utvecklingen ABC.se?)
6. What are the rules and regulations restricting or helping municipality in involving people with disabilities in development of ABC.se? (fråga på svenska: What are the rules and regulations restrict or help municipality in involving people with disabilities in development of ABC.se?)
7. What technologies are installed on ABC.se for people with different disabilities? (fråga på svenska: Vilka tekniska hjälpmedel finns installerade på ABC.se för personer med olika funktionshinder?)
8. How information and feedback is collected about accessibility and use of ABC.se from people with disabilities? (fråga på svenska: Hur information och feedback som samlas in om tillgänglighet och användning av ABC.se från personer med funktionshinder?)
9. How information is collected from technology developers about new features that can be used in ABC.se website? (fråga på svenska: Hur information samlas in från teknikutvecklare om nya funktioner som kan användas i ABC.se hemsida?)
10. How information about new technologies available on ABC.se is distributing to people with disabilities? (fråga på svenska: Hur information om nya tillgängliga teknik på ABC.se distribuerar till personer med funktionshinder?)
11. What can be future plan for ABC.se regarding expectations and demands of people with disabilities? (fråga på svenska: Vad kan man framtidsplan för ABC.se, förväntningar och krav för personer med funktionshinder?)
Appendix C – Selected Public E-services

Through followings, it is tried to give a whole picture of public e-services are investigated in this study:

1. **Local/regional level (Växjö kommun) [http://www.vaxjo.se](http://www.vaxjo.se)**

In Sweden, about 290 municipalities (Kommun) are in charge of serving society and citizens (public services) with varying services including permissions and licenses such as building permits, social services, (pre)school utilities, cultural and social events, responsible for caring old people. However, some of municipalities’ tasks are obliged by law and some of them are volunteer activities. As it is explained in Växjö kommun website ([http://www.vaxjo.se/VaxjoTemplates/Public/Pages/Page.aspx?id=30149](http://www.vaxjo.se/VaxjoTemplates/Public/Pages/Page.aspx?id=30149)), “Preschool and childcare, Pre-school, primary, secondary and special schools, Municipal adult, Swedish for Immigrants, Social services, including individual and family, Care for the Elderly and Disabled, Health care and some medical care in special housing, Urban planning and construction issues, Health and Environmental Protection, Sanitation and Waste Management, Emergency services, Water and sewage, Library, Emergency Management, Public transport (along with county councils), Housing” are municipalities’ obliged tasks and activities including “Open preschool, Recreation, Construction of housing, Energy, Health care and some medical care at home, Employment, Business development, Culture” are optional for them. Municipalities should obey framework of laws that are approved by Sweden’s government and parliament. Yet, each municipality is also following a self-government behavior. This means, based on conditions and situations of their region, solutions and services can be offered differently. Anyhow, these activities and tasks are all controlled by specific inspection groups for example national agency that is controlling municipalities and schools are acting based on school laws.

Municipalities of Sweden (Svenska Kommuner) are distributing information via differing ways for example by calling centers answering questions or serving individuals or visiting agencies in their offices. Municipalities are also accessible on the internet by entering the name of the region.se ([http://www.inetmedia.nu/kommuner/welcome.shtml](http://www.inetmedia.nu/kommuner/welcome.shtml)). Vaxjo.se which belongs to municipality of Växjö city in Kronoberg County is one of the e-services in public sector that is chosen for this study. This website as is stated in it “is home to municipal websites”. It is providing users (for example citizens of Sweden …) with range of information about different (online or usual) services and facilities that municipality is offering. In vaxjo.se similar services are categorized under same title: Children & Education (BARN & UTBILDNING), Building & Housing (BYGGA & BOENDE), Environmental & Transportation (MILJÖ & TRAFIK), Support & Care (STÖD & OMSORG), Work & Business (ARBETE & FÖRETAG), Experience & Do (UPPLEVA & GÖRA), Municipality (KOMMUNEN). Besides these categorizations, on right top of vaxjo.se, there are two fixed drop down menus that by users’ selection, are navigating them to a particular webpage. The upper one is moving users to specific subjects and the lower one is directing users to available online services. In section 1.1 we will explain online services of vaxjo.se in detail.

On very top of vaxjo.se, some links are some available that are given attention for this study, because they are providing facilities for people with disabilities to brows vaxjo.se. These links are: Very Legible (LÄTTLÄST), Sign Language (Teckenspråk), Listen (Lyssna). These features will be elucidated later in section 1.2.

Below are three snapshots (Fig. 1.1) of homepage of vaxjo.se which is demonstrating its main categorizations and links.
1.1. E-Services on Vaxjo.se

Discussing this subject needs to consider e-services in two orientations: first, available information about different topics that individuals might need them in their daily life. This can be accessed via categorized links on menu bar of vaxjo.se (Fig. 1.1):

- Children & Education (Barn & Utbildning): contains information and links about child/adults/youth education, language schools, arts school and etc.
− Building & Housing (Bygga & Boende): links to information about urban planning, waste and recycling, water and sewage, energy and heating, housing, building, and accommodation.

− Environmental & Transportation (Miljö & Trafik): includes links to Environmental activities in Växjö city, Parks and nature, Streets and squares, Parking, Transport and communications, and Lakes.

− Support & Care (Stöd & Omsorg): links to details about children, youth, family and elderly care, disabilities, alcohol and drug addictions, security, financial help and etc.

− Work & Business (Arbete & Företag): contains links to business guidance such as statistics, e-commerce, careers and related information.

− Experience & Do (Uppleva & Göra): provides guidance toward events, associations, cultural and entertainments, sport and exercises, parks and recreations, venues, clubs and facilities.

− Municipality (Kommunen): provides basic information about municipalities in Sweden and also Växjö municipality, their policies and decisions, politicians and parties, boards and administrations, auditing and controlling, and similar enlightenments in this regard.

or categorized links in drop down on top of page. Its links are navigating users to (Fig. 1.1):

− Archive – Municipality archive (Arkiv - Kummonarkivet): Archive of documents including information about events, laws, and other subjects in Växjö from 1862.

− Library (Bibliotek): delivers information about library of Växjö including news and events about/in library, searching and borrowing books, and etc.

− Events (Evenemang): consists of information about events in Växjö. Events can be searched by dates or by subjects for example sport events.

− Associations (Föreningar): includes links to different associations in Växjö.

− Maps (Kartor): Providing maps for different activities such as walking, jogging, or buildings and constructions and etc.

− Consumer Advice (Konsumentrådgivning): helps users to find information about the center for consumer in order to collect advices about their rights for the services they are using such as price comparison of electricity. They can also find telephone number of related consumer agencies.

− Announcements (Kungörelser): includes information and announcement that municipality is required to announce.

− Minutes (Protokoll): providing links to protocols of policy boards in different area such as school board, cultural board.

− Social Links (Samhällslänkar): contains links to varying social centers such as Tax agency (skatteverket), or Swedish Parliament (Sveriges riksdag) and etc.

− Statistics (Statistik): provides statistical information about Växjö for example Växjö inhabitants. It also includes statistics about Växjö population, businesses and big employers, and commuting.

− Availability (Tillgänglighet): consists of information about availability of facilities and features for specific aims for example a person with moving impairments wants
to check if she/he can enter to church with her/his wheelchair or availability of a place to stay in Evedals area.

- Plots (Tomter): written and visual information about constructions in Växjö city.
- Transport and services (Trafik och service): contains links about transportation and traffic services for example busses, trains and etc.
- Tourism (Turism): links to information that is important and practical for tourists for example hotels, accommodations, and similar tourism details.

The second group of services are those services which people can use them for specific online actions (Fig. 1.1):

- Fees and charges (Avgifter och taxor): links to Växjö Municipality fees and tariffs including alcohol serving and supervision, waste – taxes and fees, childcare fees, photocopies and transcripts from diary and registry and etc.
- Photos (Bilder): contains free download images and photos of Växjö city.
- Forms (Blanketter): links to forms of each subject: Children & Education (Barn & Utbildning), Building & Housing (Bygga & Boende): Environmental & Transportation (Miljö & Trafik), Support & Care (Stöd & Omsorg), Work & Business (Arbete & Företag), Experience & Do (Uppleva & Göra), If the Municipality (Om Kommunen)
- E-services and self-services (E-tjänster och självservice): consists of links to main services of Växjö municipality; If the municipality (Om kommunen), Experience and make (Uppleva och göra), Work and business (Arbete och företag), Support and care (Stöd och omsorg), Building and Housing (Bygga och boende), Library (Biblioteket), Children and Education (Barn och utbildning). Under each of these main subjects, different links to specific information and form is available.
- Maps (Kartor): links to maps for different activities such as constructions or Växjö city and etc.
- Find Jobs (Lediga jobb): providing links to available job position.
- Provide water meter reading (Lämna vattenmätarställning): gives the possibility of being aware of water use in houses or organizations by reading water meter. It contains information about how to read water meter and types of water such as drinking water and etc.
- Telephone directory (Telefonkatalog): provides contact information of Växjö municipality. Teletal for those who have difficulty in calling and links to social agencies are accessible in this page.
- Tenders (Upphandlingar): contains information about e-commerce chances, benefits and challenges in Växjö municipality and other municipalities of Kronoberg County.

1.2. Disability Features on vaxjo.se

On the very top of vaxjo.se some links are available that supporting varying possibilities and features for those who have limitation in using and browsing vaxjo.se (Fig. 1.1):

- Very Legible (Lättläst): directs users to a page stated information in easier words and statements (Här hittar du information på lättläst svenska.). It also consists of links to several main categories. At first glance, these links seem similar to those which are already existed throughout vaxjo.se but these ones are providing information about
main topics in more easier (simpler words and statements ...) and accessible (adding thumbnails to text ...) way:

- **OMS Leisure (OMS-fritid):** contains information about OMS Leisure that is organizing different cultural and recreation events for residents of Växjö with disabilities such as mental retardation, autism or pervasive developmental disorders.
- **Associations (Föreningar):** contains web addresses to different associations. This page is accessible both with and without disabilities.
- **Library (Bibliotek):** contains contact information, opening hours, membership information and links to other libraries in Växjö.
- **Schools (Skolor):** including links to contact information of special and adult schools.
- **Help for those who are older (Hjälp för dig som är äldre):** provides links to information about services Växjö municipality should deliver to the elderly and people with different functional disabilities.
- **Help for those with disability (Hjälp för dig som har en funktionsnedsättning):** contains specific links for informing people with disabilities about services and helps.
- **Accessibility Guide (Tillgänglighetsguide):** contains links to guide people with disabilities about accessibility and availability of specific features in different places.
- **Sign Language (Teckenspråk):** navigates to a page containing movies showing written information about different subjects on vaxjo.se in sign language.
- **Listen (Lyssna):** provides users first with a menu bar on top of the page and also a help page explaining what each button means. The menu is offering buttons for:
  - Read more (läs allt): reading the whole page.
  - Read links (läs länkar): reading all links in the page.
  - Read text (läs text): reading the selected text.
  - Stop (stopp): stop reading.
  - Explain (förklara): explaining selected word.
  - Settings (inställningar): users can change the settings such as reading speed, text size and etc.
  - Close (avsluta): exiting listen application.
  - Help (hjälp): helping about application use.
  - Language (språk): providing a selection between Swedish and English language.

Helps for those with disabilities such as mental retardation, autism or pervasive developmental disorders.
2. Regional level (Landstinget Kronoberg) http://www.ltkronoberg.se
About twenty county councils (Landstinget) are available in Sweden which mainly responsible for public services including health care and dental care, health care education, services for people with disabilities, regional transportation, enterprise and business investments, and cultural developments (The Swedish Association of Local Authorities and Regions – activities: http://english.skl.se/municipalities_county_councils_and_regions/activities_1). All these county councils are obeying Sweden laws, however, they have the authority to manage and conduct their activities and tasks independently with regard to the approved laws structure. Organizing activities and developments, taxations, and tariffs and fees are all part of this independent decision making.

County councils can be accessed via different ways such as phone, fax, email, and personal visiting. One of ways that county councils are introducing themselves and also their services is their website for example Kronoberg County Council (Landstinget kronoberg) which is available on web address: http://www.ltkronoberg.se/ (The Swedish Association of Local Authorities and Regions – Addresses of the county councils and regions: http://skl.se/kommuner_och_landsting/om_landsting_och_regioner/landsting). As it is stated ltkronoberg.se belongs to Kronoberg County Council (Landstinget Kronoberg) and it is one of the e-services in public sector which is selected for this researcher. This website is supporting its users (for example citizens of Sweden) with number of services. These services can be pure information about specific subject or can be online-service for a particular action such as collecting a medical test result. The structure of ltkronoberg.se is designed by classifying related information under discrete groups: Health and social work (Hälsa och vård), Dental care (Tandvård), Careers (Jobba hos oss), Research and education (Forskning och utbildning), and If the county (om Landstinget). These categorizations are accessible on menu bar of the website. Besides, on the right menu quick links to health centers (GP - vårdcentral) and important topics, and links to e-services are provided. Throughout section 2.1, online services of ltkronoberg.se will be explained in more details.

In ltkronoberg.se, it is claimed that universal guidelines of web design is followed. Also, it is promised to provide equal accessibility and usability for all users of ltkronoberg.se. In this regard, on very top of this website, several links are located: Customize (Anpassa), Very Legible (LÄTTLÄST), Sign Language (Tecken), Listen (Lyssna). They will be explained in section 2.2.

Below is a snapshot (Fig. 1.2) of homepage of ltkronoberg.se which is demonstrating its main categorizations and links.
2.1. E-Services on Ltkronoberg.se

In Kronoberg Council (Landstinget Kronober) website different services are planned. One category of these services (as named in Ltkronoberg.se) is e-services (e-tjänster). This category is designed to deliver services to people as quickly as possible. It is expected to replace these online services with paper-based forms or calling tradition (Fig. 1.2):
− Diary (Diarium): is a search facility in order to find archive or latest cases (ärenden), letters (skrivelser), decisions (beslut).
− My health care contact (Mina vårdkontakter): is an online service that navigating users to an e-service called 1177.se. Users by logging in to that can facilitate themselves with main requirements such as make an appointment, cancel reserved appointment, order Chlamydia test, renew prescriptions, renewal tool, ask questions, get advice, get reminder of the booked time via email or SMS, see ordered recipe, view checked out drugs, and see your high cost of medicines.
− Find and compare health care (Hitta och jämför vård): connects users to a novel service minavardkontakter.se in which different types of services are offering to people in health area. This link (available on ltkronoberg.se, navigating to 1177.se) is assisting users find their intended query by the means of some keywords along with specifying municipalities.
− Test results (Provsvar): provides a search facility for people who are taking Chlamydia test by entering their (received) code.
− Citizens (Medborgarförslag): provides opportunity for people living in Kronoberg County to share their ideas and suggestions about Kronoberg Council, its activities and tasks, efforts, policies and decisions and etc.
− Order prints (Beställa trycksaker): consists of links to publications, brochures and guidelines about different subjects such as health care policies, disability policies, entrepreneurship for developing health care services and other related information.

Besides stated e-services, in the main menu of ltkronoberg.se, several heading are located that are connecting users to fundamental tasks and activities of Kronoberg Council (Landstinget Kronoher) (Fig. 1.2):
− Health and social work (Hälsa och vård): consists of links to main policies,, services, guidelines and tasks that Kronoberg Council is in charge of:
  o Public Health – the good life (Folkhälsa - Det goda livet): includes information in different areas that can affect people’s health.
  o If you become ill (Om du blir sjuk): includes links to guidelines about emergency, illnesses, e-services and related information.
  o For health care professional (För hälso- och sjukvårdspersonal): provides information for professionals working in any of health care fields.
  o Find the right to health care (Hitta rätt i vården): links to varying health care centers in specific areas of health issues.
  o How the health cares (Så fungerar vården): contains specific information in areas related to life and health issues. It can be information about rights, organ or blood donation, health care laws and etc.
  o Follow-up for good care (Uppföljning för en God vård): includes explanations about and links to health care Kronoberg Council visions and missions.
− Dental care (Tandvård): consists of information about general dentistry and special dentistry and related concerns.
− Careers (Jobba hos oss): includes information about training and internship programs offered by Kronoberg Council.
- Research and education (Forskning och utbildning): provides guidelines to research development activities support by Kronoberg Council. This information includes research funding and grants, tutorials, policies, publications, trainings, conferences and similar related information.

- If the county (om Landstinget): contains essential information about main goals, activities and tasks, and structure of Kronoberg Council. They group links on this page as: This allows the County Council (Detta gör landstinget), Work Areas (Arbetsområden), Organization (Organisation), Policy documents (Styrdokument), Register of my cases (Diarieförda ärenden), Development and projects (Utveckling och projekt), Crisis Information (Krisinformation), Democracy and the impact (Demokrati och påverkan), Grants, scholarships and funds (Bidrag, stipendier och fonder), Media Service (Mediaservice), and Contact (Kontakt).

2.2. Disability Features on ltkronoberg.se
Ltkronoberg.se is providing its users with disability with varying features that are giving them possibility of browsing this website. These features are located on top of page as link on (Fig. 1.2). These links are aimed to assist people with vision, hearing, and development disabilities:

- Customize (Anpassa): is a feature for adjusting the appearance of ltkronoberg.se to high contrast (hög kontrast), large text (stor text) and normal (normal).

- Very Legible (LÄTTLÄST): is supporting users with easier and more understandable words and statements. This page includes links to essential easy to read information that people are looking for:
  - If you become ill (Om du blir sjuk): provides users with brief explanation about the thing they should do when they become sick, day sickness, night or weekend sickness. Mainly, this links providing users with contact information.
  - Your rights in health care (Dina rättigheter i vården): links to explanations about different rights people have regarding health area.
  - Travel in health care (Resor i vården): contains information regarding travelling between health care, how people can get money for that and related guides.
  - What you need to pay (Vad du får betala): includes inform concerning tariffs and fees for health care.
  - Calling your health care (Ringa till vården): includes explanation about phoning process.
  - If you are not satisfied (Om du inte är nöjd): consisting guides about reporting and claiming damages, harms, mistakes in health care process or related things.
  - Dentistry (Tandvård): supports users with information about using dentistry service, its fee policies for different aims, and its agreements.
- Young (Ung): provides guides regarding youth and children health care such as reception for drug and alcohol (Hub), relationship and sexual relations (UMO), and children rights in society (BRIS).
- Support and facilities (Stöd och hjälpmedel): contains guidance for people with regard to their needs for example people with vision impairments who need support, and etc.
- If you are new in Sweden (Du som är ny i Sverige): explains about health care rights for new comers to Sweden.
- You are a foreign citizen (Du som är utländsk medborgare): includes information about health care for those who come from EU/EEA country, non-EU/EEA counties, or Algeria, Australia, Israel and Quebec.

- Sign Language (Tecken): contains links to several movies in sign language about information available on ltkronoberg.se: If you become ill (Om du blir sjuk), Show that you are you (Visa att du är du), Travel in health care (Resor i vården), Your costs (Dina kostnader), Guarantees for the care and treatment (Garantier för vård och behandling), If something went wrong (Om något blev fel), Dentistry (Tandvård), Young (Ung), Your rights (Dina rättigheter), and Disability (Funktionshinder).
- Listen (Lyssna): introduces how people with hearing impairments can use ltkronoberg.se. It is explained that some of information on this website are available in audio format. However, main tool for facilitating people with vision impairments is Browsealoud website and software. It is explained that the software should be downloaded and then it can assist in reading text and saving them in mp3 format for further use.
Appendix D - Keywords

Following keywords are applied to investigating and analyzing collected materials of current research:
Use, Accessibility, Public E-services, Citizens/People with Disability, Experiences, Expectations.
Preferably they combine as:
Use and accessibility issues of public e-services in Sweden with regard to experiences and expectations of citizens/people with disability.

Following keywords are plied to reviewing literatures together with main ones stated above:
1) About e-government: E-government services, public e-services, e-services in public sector
2) About use issues: Web use, use(ing) of public e-services/e-government services/ e-services in public sector.
3) About accessibility issues: Web accessibility, access to public e-services/e-government services/e-services in public sector, access to information/services
4) About what people want: Expectations/Demands/Needs of Users/Individuals/Citizens/All/People with disability/Citizens with disability/Users with disability or Disabled Users/Citizens/People [Important: the latter keywords are merely searched for in order to find related materials and such concepts are not intended to use in this study]
5) About consciousness about what people want: user (-) oriented, demand (-) oriented, need (-) oriented, user (-) centred, demand (-) centred, participation, involvement, expectations of, demands of, needs of, voice of

Some general concepts are also employed for the whole study:
## Appendix E – Transcribing the Empirical Data

For transcribing collected data, they are categorized based on keywords and then are put into tables. A sample of table is given below:

<table>
<thead>
<tr>
<th>Keywords</th>
<th>Using internet</th>
<th>Using public e-services</th>
<th>Interaction with public e-services</th>
<th>Other keywords...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviewee</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Person 1</td>
<td>Yes, for reading news</td>
<td>Yes, for finding required information</td>
<td>No, “I don’t know how”</td>
<td>...</td>
</tr>
<tr>
<td>Person 2</td>
<td>No. Listening to music, browsing websites</td>
<td>No. “I am not interested”</td>
<td>No, “I am not interested”</td>
<td>...</td>
</tr>
<tr>
<td>Person...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
Appendix F – Acronyms

There are some acronyms available in current research that their full form is as below:

ADP = Automatic Data Processing
E-A = Electronic-A (e.g., e-government = electronic-government)
EU Countries = European Union Countries
ICT = Information and Communications Technology
IS = Information System
IT = Information Technology
OECD = Organisation for Economic Co-operation and Development
UN = United Nations
Verva = Swedish Administrative Development Agency (no longer in operation)
W3C = World Wide Web Consortium
WAI = Web Accessibility Initiative
WCAG = Web Content Accessibility Guidelines
Of one Essence is the human race,
Thusly has Creation put the Base;
One Limb impacted is sufficient,
For all others to feel the Mace

By Saadi Shirazi