Development of Web-based Health Care Services in Swedish County Councils:

Strategies, Usage and Challenges

Master Thesis within Business Informatics

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Abstract

eHealth has been adopted by many countries across the globe in response to cut down cost and improve the quality of life. Sweden has been engaged in providing web-based health care services for its citizens for the past decade and county councils have the responsibility to develop them. The main aim of this thesis is to present answers to the following research questions:

What strategies (formal and informal) guide the development of web-based health care services provided by the Swedish county councils?

What barriers exist in relation to the development and usage of web-based health care services provided by the county councils from the viewpoint of their IT leaders?

From the perspective of IT leaders in the county councils and in their capacity to develop, manage and monitor their organizations’ website content, which web-based health care services are mostly accessed by users and what age group utilize the services most?

The thesis is an exploratory research conducted through a survey based on a mail questionnaire that was posted to all 21 county councils in Sweden with 18 councils responding. The results show that all county councils have formally adopted the National eHealth Strategy to guide the development of web-based health care services and some have other informal strategies as well. Technological barriers, resistance to use the web-based services and changing business process to integrate ICTs have been identified by IT leaders as major challenges that impede the development of web-based health care services in Swedish county councils. Swedish citizens more frequently access prescription renewal and booking and cancellation of appointments than other available web-based health care services which depicts a trend towards the use of advanced interactive services than basic information seeking, and people in the ages of 46 to 55 have been identified as the frequent users of web-based health care services according to IT leaders from the county councils.
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Faustina Acheampong
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1 INTRODUCTION

Provided in this section is a background and a problem discussion about eGovernment and the provision of web-based health care services in Sweden. The research questions are followed by the purpose defining the objective of this study. Other sub-sections include use of previous study, delimitation, defined terminology and a disposition of the thesis.

1.1 Background

The advent of the worldwide web has revolutionized business processes and radically changed the dissemination of information which has spectacularly influenced the society and thus the role of Information and Communication Technology (ICT) cannot be overemphasized. While it could be said that a lot of research has been carried out on the impact of ICT applications in traditional business processes in the private sector, it is also true that over the past decade research on eGovernment has increased enormously. This can be attributed to the growing interest of the use of ICT in public administration.

eGovernment as the name suggests means electronic government. Like other contemporary terminologies, the term is defined and used in different contexts. However, the common premise is that eGovernment involves the automation of current non-computerized procedures to communicate with citizens, transact business, and disseminate information by government agencies. It mostly involves the use of the internet but it is not limited to it. eGovernment enhances interaction with business and industry, provision of government services to citizens and easy access of information to citizens. Consequently, when well implemented, eGovernment has the potential to enhance access to and delivery of government information and services to citizens. It also reinforces governments’ aim of achieving effectual governance, and boost transparency to better run a country’s social and economic resources for development (Pascual, 2003).

According to a United Nations report on eGovernment in 2008, Europe on average was the highest-ranking region and Sweden ranked first in the 2008 UN eGovernment Readiness Index with Denmark and Norway occupying the second and third places respectively (UN eGovernment Survey 2008).

Sweden is a unitary state governed by a central government at the national level. At the regional level, Sweden is divided into twenty-one counties governed by county administrative boards (government agencies) on one hand, and county councils whose decision makers are elected by the citizens of the county on the other hand. At the local level, these counties are further divided into municipalities and Sweden currently has 290 municipalities and about 240 other central government agencies (Swedish Government publication 2004).

Swedish public agencies started developing web-based services or e-services in the mid 1990s. The Swedish approach to eGovernment is highly decentralized with each agency responsible for its provision of public services. In 2004, the government in an attempt to facilitate eGovernment set up the ICT Strategic Advisory Board, Government Interoperability
Board and 24/7 Commission. The counties and municipalities are responsible for the development and delivery of web-based health care services and the strategies that guide their formulation (Lundbergh, 2004).

1.2 Problem

Across the globe, many governments have resorted to the use of ICT applications in healthcare delivery in an effort to increase efficiency with varying degree of success. The European Union as a regional unit in 2004 adopted eHealth Action Plan to facilitate a more harmonious and complementary European approach to eHealth which required member states to formulate tailored national and regional eHealth strategies to respond to their own specific needs. This has resulted in a range of projects being implemented or in the process of development in most of these countries, for instance: fully functional ICT infrastructure purposely for eHealth (e.g. Denmark, Sweden, and Norway); Electronic Health Record systems (e.g. Austria, the Czech Republic, Denmark, Estonia, Finland, Romania, Slovakia, Sweden, and Spain); national health portals (e.g. Denmark, Finland, France, Hungary, Luxembourg and Slovakia); forms of eCards (e.g. Austria, France, Germany, Slovenia, and Italy) and ePrescription (e.g. England, Finland, Greece, Portugal, Spain, Sweden and Northern Ireland) [eHealth ERA Report – March 2007].

The Swedish county councils are responsible for the provision of health and medical service to a greater extent resulting in a highly decentralized health care system. Under the terms of the Health and Medical Services Act, county councils are required to provide health and medical services of a high standard to all those in the county (National eHealth strategy 2006). ICT has been recognised as a strategic tool in the delivery of health care to promote efficient, safer, and more accessible health care in Sweden. In March 2006, Sweden launched the National eHealth Strategy which is a national citizen-centred strategy aimed at achieving improvement for patients, health professionals, and decision makers through the strategic use of ICT. It seeks to establish improved basic conditions for ICT in health care by creating common information structure and technical infrastructure or “backbone” to improve eHealth solutions and adapt them to the needs of patients while promoting interoperability between national, regional, and local agencies (National eHealth strategy 2006). In short, the National eHealth Strategy provides a framework within which county councils must formulate their own strategies to guide the development, delivery, and progress of web-based health care.

Not all eHealth projects yield the expected results. For instance in England, the NHS’ £12.7billion IT project “Connecting for Health” which seeks to create a single centrally-mandated system for storage and transmission of patients health records amid delays has being criticised as a waste of taxpayer’s money because it has provided little clinical functionality till date (http://www.guardian.co.uk/society/2008/oct/29/nhs-health). This may be attributed to a combination of factors. A 2004 World Health Organization report cited the lack of vision, strategies, and national plans as a contributing factor to the failure of health ICT projects (http://www.spidercenter.org/files/najeeb%20al-shorbaji.pdf). Wiklund and Lindh (2004) identified the lack of strategy as a barrier to the development and usage of e-
services. Thus it is imperative to explore the strategies—formal and informal that guide the development of the web-based health care services as it contributes to the success or failure of eHealth initiatives. Informal strategy or policy as used in the context of this thesis refers to a set of guidelines which are not strictly in legal form and which may be published or not, written down or not that guides decision-making. Informal strategies may be in the form of manuals, general notes, guidelines, usually developed by an agency itself and in many cases may not even be written down for internal use, but amount to a practice or a rule of thumb (Clark, 1987). In essence, these informal strategies are different from formal policies in that they are not laws established by the government but rather guidelines that may be developed by the county councils themselves to aid in decision-making.

Like any other public service, there are problems associated with the delivery of web-based health care in terms of development and usage which may have a direct relationship with the strategies used to develop these services. The evaluation of web-based health care services is another important factor of eHealth delivery because it gives an insight into the efficiency and effectiveness of services provided. The monitoring and evaluation of the delivery of web-based health care services is important especially for health care providers and decision makers to assess the services and information being accessed by citizens. Through this, health providers may elucidate eHealth services that are mostly utilized and those that are not in order to improve them and create awareness among users. According to Tapscott and Williams (2008), younger generations perceive and use technology differently from older generations. While it has often been acknowledged that younger people are more technology savvy than the elderly, such simplistic generalization could be misleading. Generally, health deteriorates with age and therefore provision of web-based health care services must be targeted at those who need them most. Exploring the adoption of web-based health care services with respect to user demographics like age is especially imperative when different eHealth services have to be developed for different age groups.

1.3 Purpose and Research Questions

From the above discussion, it is apparent that the potential of ICT in the Swedish health care industry cannot be overstated because it makes it possible to organise, coordinate and deliver health care and carry out clinical research in various ways that were impracticable previously at a relatively reasonable cost. Used as a strategic tool, ICT can promote safer, more accessible and efficient health care for citizens. Timely and quality information are needed by health care professionals, decision makers, and stakeholders to provide better services. It is therefore imperative to research into the strategies upon which the web-based health care services provided by the county councils are developed; identify problems associated with their development and usage and determine user patterns with respect to age and services accessed most. However, a previous study was conducted to analyze strategies that guide the development of web-based services and problems encountered with their development and use in 2004 by Hans Wiklund and Jorgen Lindh on the same population that will be used for this thesis. Their study was conducted before Sweden as a nation formulated eHealth policies in 2006. The motivation for this particular topic was borne out of the interest to examine what
has changed or developed from a period when Sweden had no formal eHealth strategy to an era when such a policy exists. Subsequently, the main goal of this thesis is to present answers to the following research questions:

- What strategies (formal and informal) guide the development of web-based health care services provided by the Swedish county councils?
- What barriers exist in relation to the development and usage of web-based health care services provided by the county councils from the viewpoint of their IT leaders?
- From the perspective of IT leaders in the county councils and in their capacity to develop, manage and monitor their organizations’ website content, which web-based health care services are mostly accessed by users and what age group utilize the services most?

The purpose of this thesis therefore is to investigate the above research questions all from the perspective of IT leaders of county councils, and compare findings of the current research to those from the study conducted by Wiklund and Lindh (2004) to discuss new developments with respect to strategies that the county councils adopt to develop eHealth services and barriers to their development and usage.

1.4 Use of Previous Studies

In 2004, Jorgen Lindh and Hans Wiklund carried out a research titled “Development without Strategy” to analyze the relationship between the development of web-based health care services and the strategies that guide them. The researchers also identified a number of barriers to the development and usage of these eHealth services. Their results showed that while all the county councils had websites, not all of them provided advanced services and about two-thirds had no formal strategies for the development of web-based health care services. This consequently contributed to a number of barriers to the development and the usage of these services.

The findings of the current research will be compared to the findings of Wiklund and Lindh (2004) to discuss what has happened within this time period with respect to strategies that the county councils adopt to develop eHealth services and barriers to their development and usage. The grounds for comparison are based on the following premises:

- The same study population will be used for the current research.
- Apart from the third research question that concerns services mostly accessed by users and the age group of frequent users, the first two research questions under investigation in this study are the same research questions raised by Wiklund and Lindh (2004).
- The questions presented in their survey will form the basis of a slightly modified questionnaire that will be employed in the current research (Please refer to the Method chapter for detailed description of the questionnaires).

Wiklund and Lindh conducted their research in 2004 when the Swedish National eHealth Strategy had not been formulated and their findings indicated that majority of the county councils did not have any formal strategies that guide the development of eHealth services. The lack of strategies in part contributed to barriers to the development and usage of eHealth.
services. However, the European Commission since 2004 has played an official role in policy support to eHealth deployment, with the adoption of the eHealth Action Plan to facilitate a more harmonious and complementary European approach to eHealth (http://www.eppractice.eu/files). In this regard, Sweden formulated its national eHealth strategy for improved health care through the use of ICT. The choice of this topic for the current thesis was motivated by a personal interest to identify what has changed during the time period (before and after the formulation of the Swedish eHealth Strategy) and attempt to explain the reasons for the changes if any.

“The IT Support in County Councils”, an annual report prepared by Lars Jerlvall and Thomas Pehrsson in August 2009 will also be used as a consultant or practitioner’s report from which particular references will be drawn in an attempt to analyze empirical findings. In effect, this report will be used as a major secondary data source and does not form a basis for comparison of measurements in the report with empirical findings from this thesis.

1.5 Interested Parties

Interested parties that this thesis might be of benefit include authorities and agencies responsible for decision-making in the provision of health care. It could also be of interest to health care professionals who need to access ICT-based support systems in their line of duty. Again, citizens who access health care information and services might also find the findings from this thesis beneficial. Finally, the study could be of interest to the scientific community as a basis for prospective research.

1.6 Delimitations

In defining a scope for this thesis and considering the fact that it covers a relatively broad range of issues, it is important to mention that the main intent is to investigate a number of issues related to eHealth in Sweden by focusing on the extent of the issues and not the depth. This thesis focuses on county councils and the web-based health services they provide for the residents in the county. It focuses on Swedish county councils and therefore might not be applicable to other countries. Again, the concern here is about health services and thus the study may not be appropriate for drawing inference from concerning other e-services provided by the Swedish government. The study will only focus on health care services that are provided online and exclude other eHealth services delivered through different technologies like mobile phones.

1.7 Definition of Key Terminologies

eGovernment: - the term means electronic government and it refers to the use by government agencies of information technologies such as the Wide Area Networks, the internet and mobile computing that have the ability to transform relations with citizens, businesses and other arms of government. Like e-commerce, electronic government also exist in various forms including government-to-government (G2G), government-to-citizen (G2C) and government–to-business (G2B) (World Bank report).

eHealth: - eHealth is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced
through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology (Eysenbach, 2001).

**Web-based services**: - web-based services are services which provide access to information resources based on worldwide web technologies and which can therefore be accessed anywhere from the web (Web-based services; Wilde).

**Strategy**: - strategy is the direction and scope of an organization over the long term which achieves advantage in a changing environment through its configuration of resources and competences with the aim of fulfilling stakeholder expectations (Johnson et al, 2009).

**ICT**: the acronym stands for information and communication technologies and is defined as a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information (Blurton, 1999). These may include technologies like telephony, computers, the internet, radio, and television.

**Public policy**: According to Cochran (1999), public policy refers to the actions of government and the intentions that determine those actions and examples include laws, bills, acts etc.

**Informal strategy**: Informal strategy or policy refers to a set of guidelines which are not strictly in legal form and which may be published or not, written down or not that guides decision-making. Informal strategies may be in the form of manuals, general notes, guidelines, usually developed by an agency itself and in many cases may not even be written down for internal use, but amount to a practice or a rule of thumb (Clark, 1987).

1.8 **Disposition**

**Introduction**: The thesis opening is commenced by a related introduction to the subject of eGovernment, eHealth, problem discussion that culminates in research questions and a description of the purpose of the thesis that is meant to direct the research.

**Method**: Chapter 2 presents and argues for the research methods chosen. These include discussion on research approaches including inductive versus deductive, qualitative versus quantitative, research strategy and data collection. Moreover, the subject of validity and reliability are also discussed.

**Frame of reference**: In the third chapter, existing literature is reviewed to identify and present different theories within eGovernment and eHealth. Particular emphasis is placed on the formulation of policies or strategies in public administration concerning the development and provision of e-services and the problems associated with their development and use by citizens.

**Findings from Previous Studies**: This chapter presents findings from two previous studies conducted in Sweden concerning the use of ICT applications in health care delivery from which references and comparisons would be drawn with collected empirical results.
Empirical Findings: the fifth chapter presents the description of survey summary and the empirical data collected to provide a framework for subsequent analysis.

Analysis: in the sixth chapter, findings from the questionnaire are discussed further and analysed using the previously reviewed theories, models, and concepts with the aim of answering the research questions.

Conclusion: finally, this chapter presents a summary of the analysis and findings that are drawn as conclusions and a presentation of the reflection on the research process in its entirety.
2  METHOD

In this chapter, the research methods used for conducting the study are presented and justified. The presentation of the selected methods includes discussions on research approach, research strategy, and data collection. Also, reliability and validity of the research are discussed.

2.1  Research Approach

Perhaps one of the most important parts of a research is the research method, which underpins the success and credibility of any study. In a broader sense, research can be classified from the viewpoint of its objective or purpose, application and process or enquiry mode (Kumar, 2005). When a study is examined from the perspective of its purpose, a research could be classified as descriptive, exploratory, explanatory or analytical, and correlational.

Explanatory research normally clarifies why and how a relationship exists between two variables of a phenomenon and thus often referred to as causal research. In correlational research, the main emphasis is to establish or discover the existence of a relationship, association or interdependence between two aspects of a situation or a phenomenon (Kumar, 2005). Descriptive research seeks to give a more detailed and systematic description of a phenomenon, situation, or problem as it exists to provide a clearer understanding of the situation. Normally, data collected in descriptive research are quantitative and subjected to statistical analysis. This kind of research thus usually answers a “why” and “what” question (Ruane, 2006). On the other hand, exploratory research is undertaken when the objective of the research is to explore a research area where little is known or just few earlier studies exist from which reference could be drawn. It could also be conducted to develop, refine, and/or test measurement tools and procedures (Kumar, 2005). The main purpose of this kind of research is to identify trends, patterns, hypothesis, or theory instead of testing an existing hypothesis.

This study involves some elements of both exploratory and descriptive research. It could be described as exploratory because the main intent is exploring the extent of the issues to be investigated with the focus of acquiring more insight and looking for patterns and trends in the strategies, barriers, and usage of web-based health services provided by Swedish county councils. On the other hand, the first research question seeks to find out what strategies guide the development of web-based health care services. This question aims for clearer description of these strategies whether formal or informal. The second research question of this thesis seeks to point out barriers to the development and use of web-based health care services. Yet again, the third research question aims for clearer description of what web-based health care services are mostly accessed by users and possibly why and the most frequent age group of users.

From the above, all the three research questions are of the descriptive nature asking the “what” questions when investigating the answers and therefore demand for a descriptive
research. In view of this, while this research is mainly exploratory, descriptive research will also be made use of because they are relevant and appropriate for this study.

2.1.1 Quantitative or Qualitative Research

While there is no consensus on how to conceptualize the actual process of research, there are mainly two schools of thought when a research is examined from the process perspective. These are quantitative and qualitative research. The research process for both kinds of research is broadly the same but differ in terms of the methods of data collection, the procedures adopted for data processing and analysis and the style of communication of findings (Kumar, 2005).

According to Teorell and Svensson (2007), a quantitative, also known as experimental, or traditional research quantifies the extent of variation in order to explain, predict, and control a phenomenon or situation. Quantitative research involves a structured approach whereby the composition of the research process is predetermined and emphasizes on forms of measurement or classification of variables, and usually makes use of a large sample size with a narrow focus in terms of mode of enquiry (Kumar, 2005). In this type of research, information or data is collected using mainly quantitative variables which are subjected to statistical analysis to ascertain the magnitude of the variation.

Quantitative research is objective and comparisons can be made from the measured variables. Also, quantitative methods are easily replicated and thus have greater reliability. It also allows for a broader study involving a greater number of subjects that enhance generalization (O’Neill, 2006). However, it is subject to structural bias from researcher’s perspective and often occurs in unnatural settings due to the provision of control.

Qualitative research, also known as interpretive or phenomenological research describes the qualities or variation in a phenomenon (Teorell and Svensson, 2007). According to Kumar (2005) a study is classified as qualitative if the purpose of the research is essentially to describe a phenomenon or problem; the information is gathered through the use of nominal or ordinal scales (qualitative measurement scales); and if analysis is done to establish the variation in the phenomenon or problem without quantifying it. Firestone (1987) argues that qualitative methods are built on a post positivistic phenomenological worldview and assumes that “reality is socially constructed through individual or collective definitions of the situation and thus the purpose is to understand the current situation from the participant’s perspective.

This type of research provides depth and detail about the phenomenon described and generates new theories. However, few generalizations can be made from qualitative research. It is also difficult to make systematic comparisons from this type of research and may also be prone to subjectivity of the researcher’s perspective. Qualitative research has very low reliability due to the difficulty to replicate its unstructured of non-standardized procedure (Reason and Rowan, 1981).

The choice of qualitative or quantitative research depends on the accompanying research questions being investigated (Yin, 2003). Nevertheless, they both complement each other in
spite of their differences. The phenomena under investigation in this research including strategy formulation, barriers to development and usage of web-based health care services requires description of the variations of variables of the phenomena and thus lends itself to a qualitative mode of enquiry. In essence, the focus here is not to measure or quantify the extent of variation of the phenomena under investigation. Nevertheless, the third research question which involves statistics on the use of web-based health care services requires the collection of quantitative data. In any case, other qualitative data collected will be codified in order to also allow for quantification in data analysis.

The issue of quantification becomes imperative in a qualitative study when there is a need to identify the frequency of certain occurrences. For instance, in quantifying the qualitative data from respondents on the issue of ideals of developing web-based health care services (availability, confidentiality, integrity, efficiency) a 5 point Likert scale (5=Very Important, 4=Important, 3=Less Important,2=Unimportant, 1=Totally unimportant) is used with the mean value determined to allow for ranking of the ideals.

2.1.2 Deductive and Inductive Research

In research, there are two broad methods of reasoning known as inductive and deductive approaches. It is imperative that empirical evidence is connected with theory in research. Theories help to explain and even predict a phenomenon.

According to Chambliss and Schutt (2006) in social research, deduction or deductive reasoning starts with a theory and then testing some of its implications with empirical data. It is most often the strategy used in quantitative methods. This implies that the research proceeds from generalizations to more specific theory and deduce hypothesis that can be tested. Data is then collected to either confirm or disprove the hypothesis made from the original theory. Deduction represents the commonest view of the nature of the relationship between theory and research (Bryman and Bell, 2007).

Induction or inductive reasoning on the other hand begins with the collection and analysis of data to develop or induce a theory, model, or explanation. It is more often associated with interpretive qualitative studies (Gratton and Jones, 2004). This means that induction moves from specific observations to broader generalizations and theories through the detection of patterns and regularities.

The purpose of the research as earlier mentioned is not to test a hypothesis regarding the broad subject of eHealth or information management for that matter, but explore strategies that guide the development of web-based health services, their use, and problems associated with them. Due to the fact that this research is concerned with individual county councils’ views or explanation of stated issues and not predominantly to measure extent of variables of a phenomenon, it could be described as inductive. This implies that explanations to the problems under investigation would be generated from the data collected as trends and patterns are established among variables in order to make broader generalizations. On the other hand, this study would make use of existing and pre-determined knowledge in the form
of a previous study and a modified existing questionnaire to fulfil the purpose of this research which clearly indicates a deductive approach.

While a particular research could lend itself to an inductive or deductive reasoning, it is also true for most social research involving both approaches within the same study, that is, an abductive research because deduction and induction reasoning are not totally exclusive of each other (Ghauri and Gronhaug, 2008 p 25). In view of this an abductive approach would be utilized as this research cannot be described as purely inductive or deductive.

2.2 Data Collection

2.2.1 Literature Study

Literature review is an integral part of every research process and must be carried before and during the research. According to Kumar (2005), the literature review among other things helps to:

- Bring clarity and focus to the research problem
- Improve research methodology
- Broaden knowledge base in the research area to further position the study
- Provides a theoretical background to the study
- Contextualize research findings

This research has made use of existing literature from a range of sources including books, scientific reports and publications, presentations, journals, articles, organizational websites and others to gain general information on eHealth and information concerning the development and use of web-based health services in particular. Publications from the Journal of Public Administration and the Journal of Health Informatics Management were found to be most helpful in providing information concerning the topics under investigation. This has been useful in framing the research problem and subsequently developing the methodology and theoretical framework to investigate and answer the cited research questions.

2.2.2 Primary and Secondary data

Data fall into two broad categories: primary and secondary data. According to Ghauri and Gronhaug (2005), secondary data are information collected by others for purposes that can be different from the current research. Primary data on the other hand are original data collected by researchers for the current study at hand.

It is expedient to collect secondary data first before primary data in order to help establish purpose, scope, and reliability from what has already been done within the subject area. The use of secondary data is important because it saves time and resources; can provide high quality and reliable data; facilitates cross-cultural research and can suggest suitable methods and techniques to handle data. Tuma (1971) argues that secondary data are used more frequently than primary data regardless of the generalizations to be made. Sources of secondary data include journals, databases, websites, etc. However, secondary data may be
inaccurate, expensive, and unsuitable for the current problem under investigation due to the fact that they might have been collected for different purposes as well as difficulty in cross-cultural comparisons (Ghauri and Gronhaug, 2005).

Primary data are collected at firsthand experience from experiments, communication, and direct observations. While the significance of secondary data cannot be disputed, certain studies require primary data to fulfil its purpose. Besides, primary data ensures that the data collected is consistent and ideal for the current problem being investigated. The down side with primary data is that it could be expensive, difficult to access and has a high dependence on the willingness and ability of intended respondents.

This research will make use of both secondary and primary data. As already mentioned, the research is a comparative study to the research carried out by Lindh and Wiklund in 2004 and therefore will draw heavily on their work for comparisons to be made. Major inferences will also be drawn from the annual report on “IT Support in County Councils” prepared by Jerlvall and Pehrsson (2009). Again while the study is predominantly concerned with eHealth services within Swedish county councils, references will be made to eGovernment and eHealth developments within the European Union context in comparison with Sweden’s advances in the development of e-services. Primary data is collected by administering mailed questionnaires to the intended respondents.

2.2.3 Research Strategy

Different research strategies exist for different types of research. The choice of research strategy depends on a number of conditions including research objectives, questions, existing theories, and knowledge among other things. According to Yin (1994), there are five types of research strategies pertaining to social research. These are experiments, surveys, archival research, case studies, and historical review. Ethnography, grounded theory, and action research are also suitable research strategies for various kinds of research.

2.2.3.1 Survey

According to Yin (1994), the research strategy used for a study is dependent upon the type of research question, extent of control over behavioural events and general circumstances of the phenomenon to be studied. Surveys are often associated with quantitative research but can also be used for other types of research and that any of the research strategies can be used for exploratory research including surveys, case studies, experiments, and historical reviews.

Groves et al (2004) defines a survey as a systematic method for data collection from (a sample of) entities for the purposes of constructing quantitative descriptors of the attributes of the larger population of which the entities are members.

Concerning the nature of research questions, a survey is suitable when “what”, “where”, “who”, “how much” and “how many” questions are being investigated. The “what” questions could be exploratory, analytic, or descriptive in nature. Analytic surveys are concerned with measuring the relationship between two or more variables while descriptive surveys focus on describing the variables of the phenomenon of interest. In surveys, the researcher has little or
no control of events and the phenomenon under investigation is a contemporary phenomenon within its real life context (Yin, 1994).

De Vaus (2002) asserts that while questionnaires are often used, other techniques including structured interview, observation, content analysis among others are employed in survey research and that the distinguishing feature of surveys are the form of the data collected and the method used to analyze the data.

The use of a survey for this study is justifiable on a number of grounds. Primarily, the “what” research questions under investigation are exploratory in the nature and aim to describe strategies and barriers associated with the development and use of web-based health care services. Again, I as the researcher have no control of behavioural events concerning the development of web-based health services. Finally, the development of web-based health care services provided by the Swedish county councils is contemporary and is being studied in its real life context.

2.2.3.2 The Choice of Questionnaire

Perhaps the use of questionnaire is the most popular approach to collect primary data. It is normally appropriate for a descriptive research design. According to Mcnabb (2002), it is used in an estimated 85% of all quantitative research. This is due to the flexibility questionnaires provide as they can be custom designed to suit almost every research project in terms of the intended group of respondents, structure, complexity, and the way they are administered. Besides, it is easy to codify and analyze the responses gathered from the respondents. However, factors like precision, simplicity, appropriateness, design or layout, and brevity of the questions can all affect the credibility and response rate of the questionnaires. Questionnaires can be administered through face-to-face interviews, telephone interviews or mailed.

This research is focused on a clearly defined group of respondents – the IT managers or personnel in a similar role for instance IT strategists, IT directors and IT project leaders in all the twenty-one county councils in Sweden. To fulfil the purpose of this research, questionnaires would be mailed to all respondents due to the geographical expanse of Sweden. While the most convenient way to administer the questionnaires was to send them online, respondents did not reply emails sent to them during the initial stage of contacting them to verify their positions within the county councils. This may have been due to filtering of the emails into their junk box. The use of interviews was also considered but language barriers and the cost involved proved it unfavourable. In any case, due to these issues, mailing the questionnaires was eventually decided upon to be the most suitable option. Nevertheless, it is worthy to mention that mailed questionnaires have the lowest return rates. Again the willingness and ability of IT managers to answer the questions and the bias they will possibly attach to some questions which they deem controversial, represent the weakness of this method for the current research.
2.2.3.3 Region of focus
This research concerns the development and use of web-based health care services in Sweden. Below are some important statistics about Sweden that may be necessary for discussing issues raised in this research.

Population: 9,354,462 (31st March 2010 estimate)
Total area: 449,964 km²
Average life expectancy: male – 79.36; female – 83.37
Median age (total): 41.5

Source: Statistiska centralbyran (SCB)

According to an EU Information Society benchmark report in 2009, Sweden is a matured information society and leads on most eGovernment benchmarks of which eHealth forms a major component of eGovernment developments. The vision of the Swedish eHealth system is to provide safe, accessible and quality health and social care primarily based on citizen/patients’ needs through the strategic use of ICT applications.

County councils have the responsibility to ensure that this vision becomes a reality and thus they provide a range of web-based health care services that are accessible from county councils web portals. There are also other web-based health care services that are available on nation-wide portals like www.minavardkontakter.se, www.UMO.se, and www.1177.se all geared toward the provision of improved health care.

2.2.3.4 Procedure and Questionnaire Formulation
As already mentioned in this chapter, self-administered mailed questionnaire was found to be appropriate for this research due to the geographical expanse of Sweden and the need for consistency in data collection. A clearly defined group of respondents – IT managers or
personnel in similar role e.g. IT directors, IT project leaders in all the twenty-one county councils in Sweden were selected. It is expected that these officials are familiar with the formal strategies as well as the routines for the development of web-based health care services within their organizations bearing in mind that the main responsibility of a county council is the provision of health care for its citizens (Wiklund and Lindh, 2004).

In order to ensure that respondents were in the right position to answer the questionnaire, telephone calls were made to each and every county council to inquire about the contact details of the respondents. These officials were further contacted to confirm their positions in their organizations and that they are familiar with the development of web-based health services within their county councils. Thus, it could be confidently stated that the questionnaires were sent to the right respondents with knowledge in routines for the development of web-based health care services. Due to the fact that this research is not interested in finding prevailing conditions in specific county councils, the questionnaire was presented in a way to ensure anonymity of answers given by individual county councils. While many people in Sweden understand English, the questionnaire was translated into Swedish to ensure that respondents fully understand the questions. Each questionnaire was posted along with a cover letter stating the purpose of the survey and directives for intended respondents. The cover letter sample is appended in appendix 2.

2.2.3.5 The Questionnaire

It is important to state at this point that the current questionnaire is a modification of the one used by Wiklund and Lindh (2004) which is presented in appendix 1. As already mentioned, it forms the basis for comparison of the findings. The questionnaire was thoughtfully reformulated to reflect the current research questions under investigation. It is a semi-structured questionnaire with both open and closed questions. Like the old version, the current questionnaire starts by querying the position of the respondents within their county councils. This is to confirm that the answers given are from officials who are familiar with the subject under discussion. County councils were also asked when they first created their website and when they started developing web-based health care services to establish the period within which the provision of eHealth services began in Sweden.

Next the questionnaire queries the respondents on the different web-based health care services currently provided by the county councils. A list of some web-based health care services and the type of information available is provided for respondents to select what applies to their
councils. New services e.g. checking test results were added to the previous list. This gives an idea of the range of web-based health services that can be accessed by citizens. The subsequent set of questions asked what web-based health services are being developed currently and those planned for the future. The next set of queries concerned the formal and informal strategies that guide the development of web-based health care services in the counties. As a new question, respondents were queried on the issue of coordination with other organizations in the provision of eHealth services. The councils were also asked to mark the degree of importance they attach to availability, integrity, confidentiality, and efficiency as development ideals in creating their web-based health services.

It is apparent that many barriers impede the provision of eHealth services and as such, county councils were queried on the challenges they face in order to realize the potential of these web-based health services. The last set of questions were newly added and queries the respondents about the web-based health services accessed most by users and the age group of citizens that use these services the most. In summary, some additional list of web-based services and four new questions have been added to the previous questionnaire used by Wiklund and Lindh in 2004. The current questionnaire sample is appended in appendix 3.

The questionnaires were posted on 12th March 2010. By 10th April 2010, 10 out of 21 had been answered. Reminders were then sent to respondents and they requested for the questionnaires to be sent to them again. The second batch of questionnaires was then posted on 16th April 2010. Follow up reminders were sent to all the respondents who had not returned the answered questionnaires. As at 25th May 2010, 18 out of 21 had been answered and due to time constraints the research had to proceed with the 18 received. This could have been the result of the respondents not available or unwilling to answer the questionnaires and as research ethics demand, respondents could not be forced to participate.

2.3 Research Credibility

The general purpose of research is basically to systematically contribute to existing knowledge and improve an academic field. Therefore it is imperative that research carried out is not only relevant but also reliable, credible, trustworthy and applicable.
2.3.1 Reliability

According to Joppe (2000), the extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and as such, if the results of a study can be reproduced under similar methodology then the research is considered reliable. In other words, it is the degree to which consistent findings will be generated from similar data collection techniques and analysis. Saunders et al (2009) describe bias and errors from both participants and observers as factors that can threaten the reliability of research. It is particularly important to achieve reliability in the results from data collection due to the fact that findings will be compared with survey results from the previous study. To help achieve reliability, consistent data collection have been adopted and clearly formulated questions presented in the questionnaire.

2.3.2 Validity

Holloway (1997) defines validity as the extent to which an instrument measures what it is supposed to measure and in qualitative research; it is the extent to which the findings of a study are true and accurate. Ruane (2006) asserts that there are mainly two types of validity; internal and external validity. He further emphasizes that internal validity means the extent to which a study shows changes within an entity or variable which is dependent on another entity, i.e. causal variation. This means that internal validity questions the truthfulness of the findings of a study.

External validity on the other hand refers to the generalisability of a study. In other words, it questions whether the findings can be generalized or applicable to other populations, times and settings (Greenberg and Schroder, 2004). History, instrumentation, testing, drop out, maturation and ambiguity about causal direction are all factors that threaten validity (Saunders et al, 2009).

Due to the subjective nature of qualitative research, this study could be susceptible to a level of subject or participant (respondent) bias and error. In an attempt to achieve reliability and validity, various relevant literatures have been used to guide the way data is collected and the questionnaire have been formulated to gather the appropriate information to fulfil the purpose of this study.
3 FRAME OF REFERENCE

This chapter presents a review of existing literature on eGovernment and eHealth development with particular emphasis on Sweden. There are also discussions on strategy formulation within public policy process, barriers, and the acceptance and eventual use of web-based health services in Sweden to develop a conceptual and theoretical frame to analyze empirical findings.

3.1 eGovernment

The rapidity of developments in technology in the past decades has resulted in the incorporation of information and communication technologies (ICT) within the private and public sectors. While private companies have continued to take advantage of ICT to improve their businesses, services offered by government organisations have remained deficient over the years (Thermistocleous and Sarikas, 2005).

ICT is a powerful instrument that can effectively re-engineer government processes and transform governance to enhance the relationship with governments, citizens, and businesses. ICT applications guarantee improvement in the delivery of public goods and services to citizens by enhancing the process and management of government and redefine the traditional concepts of citizenship and democracy. However, due to the relative lower rate of change or restructuring in the public realm coupled with other factors like bureaucracy, limitations in legacy infrastructure systems, many public agencies have not tapped into the full potential of ICT.

3.1.1 The Concept of eGovernment

Perhaps to clearly define the term “eGovernment”, it is important to clarify government. The word “government” is used to explain the machinery and the agent responsible for political and social control and the delivery of public goods and services to tackle social issues. Riley (2003) affirm that a government consists of a superstructure that is both bureaucratically organized and constitutionally legitimized through established and enforced rules, regulations, decisions and roles that are often found in its constitution.

eGovernment, a rather contemporary idiom has been given various definitions and explained in varying contexts. For instance, the World Bank explains that the term refers to the use by government agencies of technologies (such as Wide Area Networks, internet, and mobile computing) that have the ability to transform relations with citizens, business, and other arms of government. McClure (2000) in his address to the US Congress testified that “Electronic government refers to government’s use of technology, particularly web-based Internet applications to enhance the access to and delivery of government information and service to citizens, business partners, employees, other agencies, and government entities. It has the potential to help build better relationships between government and the public by making interaction with citizens smoother, easier, and more efficient. Indeed, government agencies report using electronic commerce to improve core business operations and deliver information
and services faster, cheaper, and to wider groups of customers” (Layne and Lee, 2001). The common premise is that eGovernment involves the automation of current non-computerized procedures to communicate with citizens, transact business, and disseminates information by government agencies and is not limited to only the use of internet.

eGovernment exists in different forms including government-to-citizen (G2C), government-to-business (G2C), government-to-government (G2G) and government-to-employee (G2E). G2C applications involve dissemination of information to the public and basic citizen services like licence renewals, ordering of birth/death/marriage certificates and filing of income taxes, as well as citizen assistance for such basic services as education, health care, hospital information, libraries, and so on (Pascual, 2003). G2B applications support the purchase of goods and services from the private business community by government procurement offices, enable organizations to bid on government contracts, and aid businesses to access information about laws and regulations related to their operation (Stair and Reynolds, 2009). Other services include obtaining current business information, downloading application forms, renewing licenses, registering businesses, obtaining permits, and payment of taxes.

G2E services include G2C services as well as specialized services that cover only government employees, such as the provision of human resource training and development that improve the government’s routine functions and dealings with citizens. G2G services take place at two levels: at the local or domestic level and at the international level. G2G services are transactions between the central/national and local governments, and between department-level and attached agencies and bureaus. At the same time, G2G services are transactions between governments, and can be used as an instrument of international relations and diplomacy (Pascual, 2003). Examples of eGovernment services include e-tax payment, e-voting, e-procurement, eHealth etc.

The drivers for eGovernment are numerous, and include greater efficiency, broader access to government services, improved levels of service, government reform, greater transparency, reduction in corruption and citizen empowerment (Lam, 2005). eGovernment could best be described as evolving, from its initial presence on the internet (or other technologies) to a more complex system where various services are integrated across all functions of the government.
The figure above describes the eGovernment maturity model in terms of complexity and level of integration as postulated by Layne and Lee in 2001. At the catalogue stage, the government creates records and presents its information on the web. The transaction stage involves connecting in-house government system to online interfaces to enable users to transact electronically with government for instance renewing licenses online. The third stage vertical integration is achieved when eGovernment services within similar functions are connected across national, regional, and local levels of government with the idea of removing organizational barriers. In the final stage which provides eventually a "one stop shopping" for users, there is an augmented horizontal integration of eGovernment services for different functions. After this stage, there is a fully integrated system both vertically and horizontally and this is considered an ideal and matured eGovernment environment. It is however important to elucidate that these stages may not be mutually exclusive of each other in reality but technological complexity is needed to achieve a high level of integration.

When well implemented, eGovernment improves access to and delivery of government services to citizens, strengthen toward effective governance, and increase transparency to better manage a country’s social and economic resources for development (http://jnnurm.nic.in/nurmudweb/). The advantages of eGovernment adoption include reducing transaction costs; avoidance of duplication; simplifying bureaucratic procedures; greater efficiency; greater coordination; enhanced transparency; information sharing between agencies and security of information management (UN eGovernment Report 2008).
3.1.2 The Development of eGovernment in Sweden

Sweden, a nation of approximately 9,340,000 (2009 estimate) people is a constitutional monarchy with a representative democracy based on a parliamentary system of government. Executive power is held by the central government and headed by the prime minister and legislative power lies with the parliament or Riskdagen made up of 359 members. The political structure of Sweden has three levels of public administration: approximately 400 central government agencies, 21 regional government authorities (county councils) and 290 local government authorities (municipalities) with regional and local authorities are independent of the government (EU factsheets 2009).

The development of eGovernment within the European Union began in the mid 1990’s. Sweden joined the EU in January 1995. The evolution of eGovernment in Sweden started with the launching of Government eLink project in 1997 to secure the exchange of information among government agencies and between these and their customers. Over the years, other bills, offices, and projects were established to reform and enhance the application of ICT in the public domain. Among these include:

- “Central Government Administration in the Citizen’s Service Bill” in 1998,
- “24/7 Agency” in 2000,
- “Carelink “(concerns the use of ICT in health care) in 2000,
- Creation of “Sverige.se” government portal in 2004
- Issuing of biometric passports in 2005,
- “National Strategy for eHealth” in 2006,
- “EGovernment Delegation 2009” (EU factsheets 2009).

Europe as a region is at the forefront of eGovernment development and together with the other Nordic countries, Sweden leads in most eGovernment indicators and benchmarks as shown in Table 3.1. The European Union sets out policy goals which shape the development and provision of e-services in member countries and to allow for monitoring of targets across the union.

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Ranking</th>
<th>Size peer group</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC eGovernment benchmark 2009 (Availability/Sophistication)</td>
<td>5/3</td>
<td>31</td>
</tr>
<tr>
<td>UN eGovernment Readiness Index 2008</td>
<td>1</td>
<td>189</td>
</tr>
<tr>
<td>WEF Global Competitiveness Index 2009-2010</td>
<td>4</td>
<td>133</td>
</tr>
<tr>
<td>WEF Networked Readiness Index 2008-2009</td>
<td>2</td>
<td>134</td>
</tr>
<tr>
<td>EIU eReadiness Ranking</td>
<td>2</td>
<td>70</td>
</tr>
</tbody>
</table>

Table 3.1: Sweden’s position in international benchmarks (EU 8th eGovernment Benchmark Measurement 2009)
The EU currently stipulates 20 basic e-services of which 12 are public services for citizens including police declaration, request for certificates, enrolment in higher education, and health related services and 8 are public services for business; for instance public procurement, customs declaration and so on.

3.1.3 Policy-making in the Public Sector

It is important to note that the development and provision of public services and especially health care in Sweden is highly decentralised where government agencies, regional and local authorities are considered as autonomous and their activities are directed by goals and policies set within an overarching framework provided at the national level.

According to Cochran (1999), public policy refers to the actions of government and the intentions that determine those actions. Laws are very good examples of public policies. Public policy is generally initiated by government and its agencies; interpreted by public and private actors and thus it is what a government decides to do or not to do (Birkland, 2005). The policies made at any level of public administration affects all individuals in that locality, region, or country. These policies direct the distribution of economic resources or otherwise that impact the public. The decisions made by those in legitimate authority may arise as response to pressures from within and outside government in reaction to public needs. Public policy may be developed horizontally, with numerous agencies coordinating efforts at the national, regional, or local levels. It may also be developed vertically; that is policies are made at one level (normally at the national level) are carried out on behalf of all other parties or assigned to another level for execution (Gerston, 2004).

Public policy-making process is dominated by three major stakeholders and these are: interest groups that are affected by or concerned with a particular policy; the executive agency that has administrative responsibility over the related and the committees that have legislative authority in the particular policy (Huber, 2006). The interaction of these stakeholders has often being associated with the “Iron Triangle” model of public policy-making due to the lock in the development of policies (Kronenfeld et al, 1984). While other models exist, the common premise is that public policy-making is not idiosyncratic but rather involves interaction of groups that debate, set agenda, oppose, and implement these policies.

Public policy or decision-making occurs in a chronological manner known as the policy process. Lasswell in 1956 modelled the stages in policy making into to the policy cycle as a framework for policy study comprising seven steps: intelligence, promotion, prescription, invocation, application, termination, and appraisal (Fischer et al, 2007). Over the years, many versions have been developed to describe the process. Conventional policy-making can be described in at least five stages: agenda setting, policy formulation, adoption, implementation, and evaluation (Schmidt et al, 2009). It is imperative to note that in real life policy-making does not follow clean and isolated stages but rather involves interplay of different stages at a time. Figure 3.2 describes the stages of the policy-making process.
3.2 The Swedish Health Care System

3.2.1 Delivery of Health Care Services

In Sweden, public health can be described as primary, secondary, or tertiary care. Primary health services involve the provision of care at health centres (approximately 1200 across Sweden) with general medical practitioners; mother and child centres for maternity control and children clinics; district nursing health care; district physiotherapy; home visiting and community dental services within a specified geographical area (Hypponen et al, 2007). Vaccinations, health examination, and consultation all fall under primary health. A patient is first seen by a district nurse before directed to a general practitioner and then referred to the hospital if need be.

When conditions are beyond the resources of the primary health centres, a referral to a hospital becomes necessary and this is considered as secondary and tertiary care. There are approximately 79 hospitals in Sweden and are classified as: regional hospitals (6), central county hospitals (26), and district county hospitals (47) depending on their size and extent of specialization (Hypponen, 2007). As expected the regional hospitals are the largest with extremely specialized care in a wide range of medical specialties than the county and district hospitals which also provide health and medical care including psychiatric conditions. The sale of drugs is carried out by the state-owned National Corporation of Swedish Pharmacies and purchased from pharmacies.
County councils are responsible for providing health care including dental care. Municipal councils are responsible for social welfare services, care and institutional housing for the aged, disabled, and patients with psychiatric conditions.

The health system is primarily funded through taxation and county councils and the municipalities levy proportional income taxes on the population to cover for the services that they provide. The county councils and the municipalities also generate income through state grants and user charges. The mechanisms for paying providers vary among the county councils, but payments based on global budgets or a mix of global budgets and per-capita payments are the most commonly used systems (Glennård et al, 2005). Figure 3.2 shows a detailed overview of the health system.
Figure 3.2: Overview of the Swedish Health System (adapted from Glenngård et al, 2005)
3.2.2 Health care policy setting at the national, regional and local levels

The Swedish Health care system is decentralized and organized at three different levels; the national, county council and the municipality levels as shown in Figure 4. The Ministry of Health and Social Affairs holds authority over all welfare issues. Its areas of responsibility are: children’s rights policy, dental treatment, disability policy, family financial policy, financial security for the elderly policy, health and medical care policy, elderly policy, public health policy, sickness insurance, social insurance, social services policy and eHealth.

![Diagram of government stakeholders in the Swedish healthcare system]

**Figure 3.4: Main government stakeholders in Swedish health care system**

The focus of the Swedish public health policy as set in the 1982 Health Care Act is to provide high quality, and cost effective health care with equal access to all citizens irrespective of their background.

At the national level, the ministry’s main duty is to supply the government with decision support data, frame objectives for health care and social services, and set laws that govern their implementation, monitoring, and evaluation. There are also central agencies under the jurisdiction of the Ministry of Health and Social Affairs and it allocates resources to them.
However, the ministry cannot instruct these agencies concerning the application of laws or handling of matters that appear before them (National eHealth strategy 2006). These agencies concerned with health care include the National Board of Health and Welfare, National Institute of Public Health, Medical Products Agency, Swedish Association of Local Authorities and Regions, Carelink and National Corporation of Swedish Pharmacies (Apoteket AB).

At the regional level, Sweden is divided into 21 counties governed by county administrative boards (government agencies) on one hand, and county councils whose decision makers are elected by the citizens of the county on the other hand. At the local level, these counties are further divided into municipalities and Sweden currently has 290 municipalities (Swedish Government publication 2004). With the 1982 Health Care Act financial responsibility as well as political resource allocation decisions were decentralized to county council level. The 1982 Act transferred responsibility for all health services provision from the national level to the county council level formalizing the needs based approach to health care planning, making county councils responsible for preventive care and health promotion; and it constituted the framework for health planning and health activities (Hypponen et al, 2007).

The act also requires municipal councils to offer health and medical care of a high standard to specific groups, including the elderly and the disabled and social services. Again county councils and municipalities make their independent decisions concerning the use of ICT applications and they generate the eHealth solutions implemented in their area. In effect, Swedish county councils and municipalities have flexibility and considerable freedom in the organization of health and medical care.

3.3 E-health: A Key Enabler

3.3.1 The Application of ICTs in health care

Globally, the use of ICT in the health industry has received enormous interest since the beginning of the 21st century. The health care sector is one of the largest service industries and thus receives top precedence and huge investments all geared toward improving efficiency in the delivery of quality care for all citizens. Due to the broad and evolving nature of eHealth, different definitions have been proposed for the term. For the purpose of this research, the definition espoused by the World Health Organization will be used; that is, eHealth refers to the leveraging of the information and communication technology to connect provider and patients and governments; to educate and inform health care professionals, managers and consumers; to stimulate innovation in care delivery and health system management; and, to improve our health care system (Oh et al., 2005).

eHealth intersects medical informatics, public health, and business and the main stakeholders are patients (citizens), health professionals, health care providers, and decision makers. All over the world, governments are often involved in health care delivery (Eysenbach, 2001). Thus as the definition of eHealth implies, the government becomes a major stakeholder in its
authority as the decision-making machinery and a providing agency of health care. With the introduction of ICT applications in the public domain, the concept of eHealth also emerged. In other words, eHealth is a component or element of eGovernment that relates to the government’s responsibility toward the delivery of health care and thus eHealth needs to be in line with eGovernment (Sarivougioukas and Vagelatos, 2007).

According to a report published by the European Regional Information Society Association (http://www.broadband-europe.eu/Lists/Competences/IANIS_Guide_eHealth.pdf), the main factors that drive the adoption of eHealth are:

- Growing demand and high expectations from the health sector as patients seek rapid, quality and individually tailored health care.
- The need to improve cost-benefit ratios and to rationalize health care – so as to contain costs within manageable proportions, delivering patients’ growing expectations at limited or no additional cost.
- Growing concern regarding medical error and the increasing costs of insurance and litigation, dissemination of information and new knowledge for coordination and international exchange.
- The transition from organizational focus to a patient perspective with emphasis on citizens’ needs and their active participation in health care.
- Supporting citizens’ mobility across the world – as more and more people spend more time ‘abroad’ (to live, in retirement, for extended vacations, for work), the need for access to national health records and other services grows (Hughes, 2005).

The benefits of eHealth cannot be overemphasised and according to Stroetmann et al (2007), these benefits can be measured in terms of quality, access, and efficiency. Quality included factors such as informed citizens and carers, timeliness of care, safety, and effectiveness, but also streamlining of health care processes. Access has to do with health care being available to all those in need, when and where they need it. Improved information flows and use of different forms of eHealth solutions may lead to better access with regards to both capacity and geography. Efficiency benefits consist of improved productivity and optimal use of health care resources that result in time saving, and cost avoidance (Hughes, 2007).

eHealth enables stakeholders including patients to obtain information and communicate with professionals. It also helps in the delivery of health care particularly where distance becomes a vital aspect and enhances preventive care. In effect, eHealth can deliver considerable benefits to the entire society, through improvements in access to and quality of care. It contributes to focus on citizen health systems and to the general efficacy, efficiency, and sustainability of the health care industry. Jung (2009) however argues that on the other hand, eHealth replaces direct social and physical contact; is susceptible to low quality health information online; raises privacy and security issues; and not all citizens may have access to eHealth. eHealth services include e-prescription, online appointment booking, electronic health records, ask a doctor online for advice etc.
3.3.2 Perspectives of eHealth

The subject of eHealth is often viewed from different dimensions but the concern is that it must be patient focused with emphasis on the needs of patients.

3.3.2.1 The EU and regional interoperability perspective

For the purpose of this study and to present the eHealth developments in Sweden, it is important to shed more light on eHealth within the European Union. While eHealth has been widely implemented in member countries, eHealth systems, standardization, and security are still segregated due to different interpretations of regulations, standards, laws, and so on. Increasing mobility across borders within the EU has necessitated coordination of eHealth efforts to facilitate quality health wherever they are. Thus an eHealth Action Plan was adopted by the European Commission in 2004 which sets out the steps needed for widespread adoption of eHealth technologies across the union by 2010 (Europe’s Information Society 2009).

Central in this action plan is the need for interoperability in eHealth services and tools including infrastructure. For instance, the proposed pan-EU electronic health insurance card will enable EU citizens to prove their right to receive treatment anywhere within the union due to access to electronic health records and services like e-prescription, e-referral and so on. eHealth is an integral component of the EU’s i2010 policy framework which seeks to promote an open and competitive digital economy, ICT-related research, as well as applications to improve social inclusion, public services and quality of life (Europe’s Information Society 2008).

3.3.2.2 The citizens’ perspective

The ultimate receiver of health care is the patient. The needs of citizens and patients for that matter are dynamic and there is increased demand for health care as a result of advances in technology, increased mobility, ageing population, changing lifestyles etc. The implication is that citizens would require access to quality, effective, rapid and individually tailored health care for which eHealth is needed.

3.3.2.3 The perspective of health care delivery systems

Over the years, health services have remained organizational centred with unintegrated services that require patients to visit hospitals severally to receive care. As eHealth develops, there is a need for transition to a more patient-centred approach. By reducing unnecessary visits to hospitals through use of ICT supported communication, remote diagnoses and monitoring, some serious health care problems such as surgery, complicated diagnoses, or face-to-face meetings can be effectively planned and performed (Hughes, 2007).

3.3.2.4 The development of ICT tools perspective

There is no doubt about the impact of ICT in the service sector. However, not all investment in ICT yields the desired expectations. The development of ICT for health care may not always support the needs of users (patients, health professionals, and decision-makers) and
the intricacy of health care processes. Thus for successful eHealth projects, the development of ICTs must be focused on the needs of the user (socio-technical approach) and not just a complex technical design.

3.3.2.5 The perspective of stakeholders

Normally, several actors are needed to provide effective health care even at the health professional level. Thus for eHealth to be effective, there is a call for coordination between citizens, health care professionals, health care providers and decision-makers at all levels to enhance the transfer of information and knowledge necessary for integrated care. Figure 3.5 describes these perspectives in their relation to the “10 e’s” of eHealth goals which is an adapted model from Eysenbach (2001).

*Figure 3.5: a model of the perspectives of eHealth and their drivers*

3.3.3 Development of eHealth in Sweden

The application of ICT in the Swedish health care system began in the late 1990’s. During this time, eHealth services were developed through deliberate arrangements between agencies at the national level and county councils. This meant that county councils and municipalities used ICT differently, and the infrastructure for the many services provided is unevenly developed. Among the limitations created by this situation include difficulty in information exchange, non-flexible systems that do not allow the addition of new features and functions, inefficient communication of information to other agencies, lack of common user interfaces
and legacy systems that do not support cost-effective operations and management. Then, in the spring of 2006, the National High-Level Group for eHealth – a group comprising representatives of the Ministry of Health and Social Affairs, the Swedish Association of Local Authorities and Regions, the National Board of Health and Welfare, the Medical Products Agency, the National Corporation of Swedish Pharmacies (Apoteket AB) and Carelink – agreed on a National eHealth Strategy (EU Factsheets: Sweden 2009).

The National eHealth Strategy was formulated out of the vision for an improved health care using ICT as a strategic tool and the visions fall within the following premises:

- **Citizens, patients, and relatives** will enjoy quick, trouble-free access to all-round information on health care, health issues and their personal health status. They will receive good-quality service and be actively involved in their care and treatment according to both their circumstances and their abilities;
- **Health and elderly care professionals** will have access to efficient, interoperable eHealth solutions that guarantee patient safety and make it easier for them to carry out their daily tasks;
- **Authorities and other bodies responsible for care provision** will have appropriate ICT-based tools for following up patient safety and quality concerns, and to support management functions and resource distribution (National eHealth strategy 2006).

In order to use ICTs as a strategic tool to improve health care delivery in Sweden, six main action areas have been stipulated. These are to:

- Bring laws and regulations into line with extended use of ICT;
- Create a common information infrastructure;
- Create a common technical infrastructure;
- Facilitate interoperable, supportive ICT systems;
- Facilitate access to information across organizational boundaries;
- Make information and services easily accessible to citizens (National eHealth strategy 2006). Figure 3.6 shows a graphical representation of these strategies.

Improved integration of ICT support systems for health care and social services requires synchronized measures at several levels. At the utmost level, citizens and patients need a web portal in order to access information and services. Health care professionals require centralised access to all pertinent information and process support systems used in their day-to-day work. Infrastructural support services, such as effective security systems, are required to ensure that these tools can be used, and can work together. Standards and regulatory frameworks form the basic structures underpinning all ICT support.
The first three action areas regard creating better basic conditions for ICT in health and elderly care. The last three are about improving eHealth solutions and adapting these to patient needs. Education, training, and research initiatives are crucial to all six areas (EU Factsheets Sweden 2009).

As local self-government bodies, county and municipal councils must make their own independent decisions with regard to how and for what purpose ICT is to be used, and themselves procure or develop the eHealth solutions they opt for. Private care providers also decide on their own ICT use in the same way. However, they must comply with the information handling and reporting requirements set out in their agreement with their county or municipal council. This means that cooperation on and coordination of ICT-related issues involving principals on the one hand and private care providers on the other must take place on a voluntary basis. The strategy requires commitments of the parties involved, and encourages the formulation of local operational strategies to guide the process and direction of change. This local focus helps the principals involved to ensure that the local measures taken
can be placed in a national perspective and that ICT use will function efficiently and effectively from a strategic operational perspective (Swedish National eHealth strategy 2006). These local operational strategies that county councils must embark upon to implement the national eHealth strategy include: enhancing the status of citizens and patients and providing greater scope for participation; delivering health care unimpeded by operational or administrative boundaries or geographical distance; providing care professionals with user-friendly, quality and skills enhancing work tools; seeking to ensure good resource management and economic efficiency in health care services and creating conditions conductive to ICT use in health care (Hyppönen et al, 2007). In short, the national eHealth strategy requires coordination between agencies and all stakeholders to realise its impact.

The projects to be executed in the national eHealth strategy are at different stages of implementation. For instance, the Patient Data Act which provides the legal framework for the handling and exchange of personal data took effect from 1st July 2008; the national format for ePrescription is currently in the administrative phase; web-based youth family planning clinic (UMO.se) was introduced in 2008 and so on.

3.4 Barriers to the Development of eHealth Services

It is safe and true to contend that ICTs have come to stay and their applications in the public domain is also increasing. Many countries now provide eGovernment services which may be at different stages of maturity. While ICT can be used as a strategic tool to achieve considerable benefits in health care delivery, it is worthy to mention that not all eHealth projects yield the expected desired results due to a host of challenges that undermine this kind of ICT projects.

An objective of this thesis is to identify barriers or challenges that exist in relation to the development of web-based health care services and the use of such services by citizens and professionals. In order to provide a framework for identifying and categorizing challenges that impede the development and use of web-based health care services, emphasis would be placed on the works of Themistocleus and Irani (2001) and Lam (2005) concerning ICT integration and e-services. The different barriers identified in existing literature can be grouped into four categories: technology, strategy, policy or legislation and organizational barriers.

3.4.1 Technology barriers

Lack of infrastructural interoperability

As mentioned earlier, a matured eGovernment system involves a high degree of integration and complexity. Differences in architecture result in systems that cannot interact with each other. This situation can be caused by different technology platforms, use of proprietary technologies, closed design of existing applications, absence of application interfaces and differences in programming frameworks (Lam, 2005).
Incompatible technical standards
The provision of eHealth services may involve different public and private agencies. Differences in technical standards in relation to design, modelling, programming, and methodological approaches hinder interaction of systems.

Varying security models
The issue of trust and security in an eHealth environment is imperative for its success. However, security models may not be in sync with each other. Volchkov (2011) suggests that independent applications have different security architecture that does not support compatibility and thus the process of authorization and authentication varies from one application to the other.

Inflexible legacy systems
According to Brodie and Stonebraker (1995), the legacy systems of many government agencies were created as stand-alone mainframe based applications that may limit networking and integration in addition to lack of documentation, outdated programming languages and file formats etc (Lam, 2005).

3.4.2 Strategy barriers

Lack of shared eHealth vision and goals
The setting of a common vision and goals that direct the planning, development and adoption of web-based health care services is a very important factor for successful projects. These common goals must be communicated to all stakeholders involved in eHealth projects to avoid role conflicts, provide a sense of direction and clarity in order to generate full cooperation.

Unrealistic eHealth goals
In the quest to provide eHealth services, government agencies and related stakeholders may set goals that are impossible to achieve within a set period of time. Themistocleus and Irani (2001) discuss that the integration of ICTs normally involve organizational restructuring due to its complexity. However, public reforms especially can be slow which can lead to time and budget overruns in eHealth projects.

Lack of guidance on implementation
Implementation of eHealth strategies or policies is a very critical stage. When central government creates a policy on eHealth or any other e-service for that matter, regional, local, and all other agencies involved must received guidance on how to translate the policy in their operations and implement it.

Lack of funding for eHealth projects
Access to funding and management of the funds may pose as a challenge for rolling out planned eHealth policies. In the case of Sweden, county councils have the responsibility of funding such projects from taxes. This creates inequality in the web-based health care services provided by the different county councils.
3.4.3 Policy barriers

The issue of citizen or user privacy
Successful eHealth projects require seamless sharing of information but the concern of user’s privacy remain a huge challenge and thus efforts must be taken to protect sensitive information and identity of users. The lack of clarity in the privacy policies between specific government agencies is also a major barrier. Questions regarding why data is being collected, how it will be used and secured, and with whom it will be shared requires the establishment of clear policies with respect to citizen privacy. In the absence of these, efforts to achieve eHealth integration can become stagnated (Lam, 2005).

Policy development in eHealth
Apart from eHealth strategy at the state level, many regional, local, and government agencies have the responsibility of formulating their own specific strategies for eHealth. The lack of explicit and thorough eHealth policies or their premature stage of development undermines the success of such initiatives.

The rights to data ownership
Many government agencies perceive themselves as owners of a particular set of data, and are therefore obviously very protective about sharing that data with other agencies. The reluctance to share data acts as an obstruction to the development of eHealth projects. To address this issue, the definition of access rights to data would appear critical to establishing what constitutes legal and legitimate access to data (Lam, 2005).

3.4.4 Organization barriers

Resistance to change legacy government procedures
Resistance to change old legacy government processes has been identified to be a great challenge to the development of eHealth services. Kaylor et al (2001) cite the risks of repeating manual inefficiencies in an online environment and therefore the need for business processing re-engineering. Many eHealth projects involve the definition of new collaborative processes between government agencies and it has been indicated that the definition of such collaborative processes was problematic because such processes were novel, requiring domain knowledge of the workflows of each government agency and an appreciation of what was achievable with the technology (Lam, 2005).

Lack of agency readiness
Among barriers identified in existing literature to be hindering the development of eHealth services, is the fact that many government agencies and stakeholders including health care providers are unprepared for the immense efforts required for undertaking exigent e-service initiatives. The fact that eHealth is a rather recent concept implies that many state, regional and local agencies are still involved in a learning process about what eHealth is and how it can be implemented within their own agencies. Sweden is one of the countries with the highest eGovernment readiness index.
Slow pace of public sector reforms
The public sector is probably one of the domains with relatively slower rate of reform or restructuring due to especially its bureaucratic nature. Many government agencies find it difficult to cope with a rapid pace of reform which in the case of e-services development must not only be technology-driven but also a more service-oriented with the right outlook (Teicher et al., 2002).

Lack of relevant in-house management and technical skills
Lack of appropriate internal skills within government agencies is of key concern, including both the management skills needed to manage complex and major eHealth projects, as well as the technical skills needed to develop and implement eHealth integration solutions. Most major eHealth projects involve the use of external consulting firms to provide manpower resources. Curtis et al., (1988) argue that while this may provide short-term benefits in helping government agencies deliver e-service solutions quicker, it raises longer terms issues on the over-dependence on external partners for ongoing support and maintenance, and the departure of critical knowledge when individuals leave projects. Indeed, the importance of maintaining key personnel or “gurus” on IS projects have long been recognized (Lam, 2005).

Inadequate coordination
As earlier mentioned, eHealth often cuts across a number of agencies and ideally should be global. However, poor coordination or the lack of it could impede the setting up of eHealth systems and services that transcend various governmental, administrative, and geographical limits.

Lack of leadership support
Many eHealth projects fail as a result of lack of a dedicated leader who has the influence to ensure the provision of resources, funds, and commitment during any phase in the commencement, implementation, and ongoing support for eHealth development.

3.5 User Acceptance and Adoption of eHealth Services
One of the primary objectives of eHealth is to provide patient-focused health care with citizens taking active participation in health care delivery. Thus, the user perspective in the acceptance and adoption of eHealth services remains a very significant dimension in the provision of these services. The adoption of eHealth like any other technology is influenced by an individual’s behaviour and intention to use the technology. Literature that relates to user acceptance and adoption of eHealth is limited. In an attempt to develop a framework for discussing user adoption of eHealth, some theories of technology acceptance will be studied.

3.5.1 Theory of Reasoned Action
Theories on technology acceptance can be traced to the Theory of Reasoned Action (TRA) developed by Fishbein and Ajzen in 1975 on the premise that an individual’s particular behaviour is determined by the intention to perform that behaviour. This intention is further determined by firstly, the attitude toward behaviour that concerns the individual’s personal influences and secondly the subjective norm which reflects the social pressures on the
individual to perform the behaviour or not (Ajzen and Fishbein, 1980). Therefore in this theory, an individual performs a behaviour when they have a positive attitude to perform and believes that society think they should actually perform it.

### 3.5.2 Technology Acceptance Model

The Technology Acceptance Model (TAM) developed by Fred Davis in 1986 is built on TRA and more applicable to information technology. This theory also proposes that an actual behaviour, in this case the use of an IT system, is determined by the individual’s attitude concerning use of the system. However, in TAM, the social pressure (subjective norm) of the TRA model is excluded but rather breaks down the attitude or behavioural beliefs dimension into perceived usefulness and the perceived ease of use as applied to technology adoption. Figure 3.7 illustrates this model.

![Technology Acceptance Model](image)

*Figure 3.7: original Technology Acceptance Model (Venkatesh and Davis, 2000)*

Davis (1989) defines “perceived usefulness” as the degree to which a person believes that using a particular system would enhance his or her job performance. He also defines “perceived ease of use” as the degree to which a person believes that using a particular system is free of effort. The TAM model suggests that a person will weigh the trade-off between the expected results of an action and the effort required to do it. According to Venkatesh and Davis (2000), while both perceived ease of use and perceived usefulness have significant impact on intention to use, perceived usefulness strongly determines the intention to use than perceived ease of use. This in effect means that a person will use a particular technology if the benefits outweigh the efforts required. From this model, the following propositions can be made:

**P1:** Perceived usefulness has a direct influence on IT system use  
**P2:** Perceived ease of use has a direct influence on perceived usefulness

### 3.5.3 Theory of self-efficacy

Perceived ease of use holds two main mechanism by which it influences attitude and behaviour namely, self-efficacy, and instrumentality (Jung, 2008). The exclusion of social pressure or subjective norm from TAM has become a topic for extensive studies leading to the proposition of TAM 2 with antecedents of perceived usefulness and perceived ease of use. Venkatesh (2000) proposed the construct “computer self-efficacy” as an antecedent of
perceived ease of use in which he defines it as the perceptions of internal control that reflects an individual’s belief in his or her ability to do a task. The theory of self-efficacy as proposed by Banduras (1977) posits on the premise that people with strong beliefs about their ability to execute a task are more confident in their capacity to perform that task.

Borrowing this theory into the information systems context, computer efficacy has been described as an individual’s belief that he/she has the capability to make good use of information technology systems. Empirical findings from the works of Venkatesh et al (1996), Igbaria and Livari (1995) and Compeau and Higgins (1995), show that computer self-efficacy has direct effect on perceived ease of use, technology adoption and system usage respectively (McFarland, 2000). Thus the following assumptions can be developed:

**P3: Computer efficacy directly influences the use of IT system**  
**P4: Computer efficacy directly influences perceived usefulness**  
**P5: Computer efficacy directly influences perceived ease of use**

According to Venkatesh and Davis (2000), moderators like demographic features have an impact on user acceptance and adoption of a technology. Age, gender, experience, and voluntariness are thought to be moderators that influence technology adoption. McFarland (2000) asserts that the relevance of chronological age has been well documented and affects the following: intelligence, information processing ability, job-related attitudes, job satisfaction, changing psychological needs, accomplishments, social pressure and influence, memory, IT acceptance and performance. In a study conducted by Gilbert et al (2004), empirical evidence collected showed that age has an influence on a person’s ability to adopt new technologies. Therefore the following assumptions can be made:

**P6: Age has a direct influence on the use of IT system**  
**P7: Age has a direct influence on perceived usefulness**  
**P8: Age has a direct influence on perceived ease of use**  
**P9: Age has a direct influence on computer efficacy**
The above figure is a graphical presentation of the afore-mentioned propositions and their relationship. This model shows that age and computer efficacy directly affects intention to use and subsequently, actual adoption of eHealth services including web-based health care services.

### 3.5.4 Antecedents of eHealth Adoption

Literature on eHealth adoption is limited and as Jung (2008) indicate that most research on eHealth are descriptive in nature with aim of simply testing the acceptance of a system empirically that often lacks theoretical grounding. One of the few literatures on eHealth acceptance is the one provided by Wilson and Lankton (2004). In the study, they tested five antecedents of eHealth and prove their conceptual importance and they are as presented in the table 2.

<table>
<thead>
<tr>
<th>Proposed antecedent</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with medical care</td>
<td>Patients who are more satisfied with their medical care will have higher acceptance of e-health</td>
</tr>
<tr>
<td>Healthcare knowledge</td>
<td>Patients with lower perceived health knowledge will have higher acceptance of e-health</td>
</tr>
<tr>
<td>Internet dependence</td>
<td>Patients with higher Internet dependence will have higher acceptance of e-health</td>
</tr>
<tr>
<td>Information-seeking preference</td>
<td>Patients who have a higher information-seeking preference will have higher acceptance of e-health</td>
</tr>
<tr>
<td>Healthcare need</td>
<td>Patients with higher health care need will have higher acceptance of e-health</td>
</tr>
</tbody>
</table>

*Table 3.2: Antecedents of e-Health Acceptance, source: Wilson and Lankton (2004)*
Gummerus et al (2004), contend that trust is a major determinant in the adoption of eHealth service and that it embodies customers’ beliefs of actually receiving a promised service and a manifestation of customers’ confidence in an exchange for partners’ reliability and integrity. Prior to patients using eHealth services, they must trust that the provider of the service is capable of offering it. According to Gummerus et al (2004), trust on the other hand is influenced by the following antecedents:

- **Quality** involves the provision of effective and efficient health care in an online environment.
- **User interface** refers to the technical functionality of the website in terms of its design.
- **Responsiveness** involves the extent to which customer feedback is taken into consideration and promptness of the reply. This is particularly important when anonymity is of the essence.
- **User needs** indicate the ability of health care providers to understand the needs of patients or citizens for that matter.
- **Security** concerns the safety to use the eHealth service especially in terms of protection of personal information and it is a very important factor that determines eHealth adoption.

These five antecedents have direct positive effects on trust which in turn influences satisfaction. While accessibility does not actually influence trust, it is an important dimension in eHealth adoption. Accessibility involves the ease or difficulty with which a user gets availability to the eHealth service. In terms of web-based health care services, accessibility is largely affected by access to the internet. By integrating the determinants of the adoption of web-based health services into the extended TAM in figure 8, it becomes apparent that trust is an antecedent to perceived usefulness while satisfaction and accessibility directly affect intention to use. Figure 3.9 illustrates a modified and extended TAM in relation to the adoption of web-based health services. From the model it implies that age, computer efficacy, satisfaction, and accessibility have direct effects on intention to use web-based health services in the presence of antecedents of trust.
Figure 3.9: Proposed model: Antecedents of eHealth in an extended TAM model

3.6 Summary of Theories and Concepts

In summary, a number of theories and concepts have been discussed in this chapter but not all of them will be used in discussing and analyzing empirical findings in this thesis. The eGovernment maturity model as proposed by Layne and Lee (2001) will be used to explain the evolving nature of the provision of web-based health care services in Sweden. The policymaking cycle was used to explain how public policies are formulated and eventually implemented in the context of governance in the public domain, and to comment on the decision-making process with respect to eHealth services in the Swedish county councils. The perspectives of eHealth, the six action areas of the Swedish eHealth Strategy, and issues raised concerning barriers to the development and usage of eHealth services will all be used for discussion and analysis of findings.
The theories on technology acceptance and adoption including Theory on Reasoned Action; Technology Acceptance Model; Theory of computer self-efficacy and the subsequent modifications of the TAM developed will be essentially used to discuss the context of general user acceptance of web-based health care services and not specific evaluation and assessment of the user patterns and statistics of these services in Sweden. In effect, the findings of this thesis concerning usage of eHealth services will not in any way be tested against any of these theories to prove or disprove them. This is due to the fact that the issue of user acceptance is not investigated from the perspective of citizens who are actual users of these services. Instead, the topic is discussed from the perspective of IT managers, directors, project leaders, strategists and so on from the county councils in their capacity as developers and managers of website contents in their organizations. This means they are in the position to monitor the use of these services in their respective county councils.
4 FINDINGS FROM PREVIOUS SCIENTIFIC STUDY AND PRACTITIONER’S REPORT

This chapter presents findings from two previous studies conducted in Sweden concerning the use of ICT applications in health care delivery from which references and comparisons would be drawn from collected empirical results.


In 2004, Hans Wiklund and Jorgen Lindh conducted a research to analyse the relationship between the development of web-based health care services and the strategies which guide their growth in Swedish county councils and the barriers associated with the development and use of these services.

The analysis was based on a mail questionnaire that was sent to all and answered by all 22 (currently 21 with the consolidation of Gotlands Kommun) county councils IT managers or personnel in similar role with knowledge of the development of their website in early 2004. Respondents were queried on the following: when county councils started to develop web-based health care services, current health care services offered, future health care services planned, strategies for developing these web-based health care services, barriers to the development and usage of the eHealth services.

Results from the study showed that all the councils have a website and offer web-based health care services. Figure 4.1 illustrates the development over time of websites and web-based health care services.

![Figure 4.1: Development over time (Source: Wiklund and Lindh, 2004)](image)

Their findings also confirmed that the county councils provide a number of web-based health care services with some more services planned for the future. Tables 4.1 and 4.2 represent summaries of these services.
In order to explore informal strategies, the councils were asked to mark the degree of importance they attach to four ideals guiding the practical development of web-based health care services on a five-point scale ranging from very important to not at all important. The four development ideals are efficiency (E), confidentiality (C), availability (A) and integrity (I). The results are summarised in Figure 4.2.

The authors also identified a number of barriers to the development of web-based health care services and professionals’ and clients usage of such services which were grouped into three major dimensions:

- Insufficient integration of information systems and lack of coordination between county councils
- Technological and legislative obstacles
- Professionals’ and clients reluctance to use web-based services
4.2 Practitioner’s Report - “IT support in Swedish county councils” (Jerlvall and Pehrsson, 2009)

This report is prepared by SLIT (IT-strategy division of county councils) annually. There is considerable interest in in-depth knowledge of health care use of IT support from authorities, suppliers, and media. Interest is particularly high for the implementation of the national IT strategy for health care services and the county council’s action plan agreed upon in 2006. The strategy highlights that the information should follow the patient over organizational boundaries as well as using IT to increase patient safety and participation in care. A prerequisite for achieving the objectives of the national IT strategy is that there is an increased local IT support to hospitals, health centres, and in private health care providers. There is currently no official statistics or summary that describes the extent to which IT support is introduced within the various counties. This report presents findings with data collected during 2009. Data relating to systems, use etc. refers to the situation in early 2009. The inventory system is based on a survey collection that has been answered by the members of SLIT. Similar inventories have been made over several years in order to provide a basis for comparison and benchmarking between councils in Sweden. The survey consists of over 100 questionnaires areas. Data was collected for each area ratio (i.e. how much is introduced in relation to goal) about system, provider, mode of operation, etc. All counties have responded survey.

The complete report shows that councils continue introduction of IT and that IT is used increasingly in the core processes of care. Notable is that IT costs as part of the trial shows a tendency to decrease (from 2.82% in 2008 to 2.77% for 2009). All IT costs for the county councils (including self- staff) is estimated at about 6.7 billion. Since last 2008, the number of counties that have IT support for all care documentation increased from 14 to 16. In other counties pending the establishment and they will be ready within the next years. The conditions for realizing the national IT strategy is starting to appear. The basic services for security (Health and Health care Address Register, Secure IT in Health and Health care) have largely been introduced. Introduction of NPÖ (National Patient Overview, based on national services) began in 2009 and planning for the introduction of all county councils is in progress. The IT support for coordinated care planning is now in 20 counties.

Each county has a comprehensive IT infrastructure for communication and a unifying National Network (SJUNET). The density of the PC / clients in health care is increasing every year and is now 1:14 staff / PC. The great common challenge of the next few years is to implement the national services (e.g., NPO) in the county councils' IT environments. The county councils have agreed on a new common action plan and funding for the next three-year period from 2010 to 2012. This agreement and the national IT strategy (a clearer long-term coordination and an increase in the national IT infrastructure) will form the basis of the continued improvement efforts.

The need to document (write "log") is large and central to health care. The county councils have worked for many years with the introduction of IT support care documentation. In
primary health care, IT health care documentation is introduced in all counties but has been difficult in hospitals and psychiatry.

There are major efforts in the county councils to consolidate and integrate the technology information for common access. There is a strong movement towards standardizing systems for hospitals, psychiatric and primary care. Strong motivation is the vision of “one patient - one record”, common list of drugs and common terminology and conceptual structure. Internal consolidation with only one point (a database) that facilitates achieving the vision of "a patient - one record" within a county is important. Seven counties currently have the same system at the hospital, psychiatric and primary care and 9 counties have this as a strategic direction (Figure 4.2) and within the next few years most counties are expected to have adopted the same system.

![Care documentation- strategic direction](image)

**Figure 4.3: The county councils strategic direction to consolidate health information (Jerlvall and Pehrsson, 2009)**

A specific aim is to provide a comprehensive picture of the medicines prescribed for one patient in various health care providers in the form of a common drug list within a county and nationally. To establish a common list of products within a council is a complex process if it has many different systems or facilities that take into account. This is simplified if there is only one single system for all health care but still makes great demands on the individual caregiver. Nationally, a project dubbed Pascal for a national drug list has been initialized.
Medical service covers support for laboratories and medical imaging. IT support for laboratories has been established a long time ago and processes in laboratories are now completely computerized. Within radiology both administrative and visual processing in principle are completely digital in Sweden. Digital referral or response management in radiology is included in the majority of county councils. 14 county councils or regions have a common repository for all radiology organization. In pathology, there has been strong growth in 2008. The process of care major consultant referral has increased sharply in 2008. This support is especially facilitated in those counties that have adopted a unified IT support.

ICT support for collaboration between municipality and county from a patient perspective is of vital interest. 20 county councils / regions have coordinated system of care planning. The share of private health care providers is increasing, and it is therefore essential that health care information can be communicated (to follow the patient) between the county and the private health care provider. Figure 4.5 shows the existence of specific agreements and
various IT services that the private health care providers can use. In 2008, a marked increase occurred in interactions with private health care providers.

Figure 4.6: Presence of IT services between the county and private health care providers (Jerlvall and Pehrsson, 2009)

There is also development of other eHealth services aside common ones like appointment booking and prescription renewal within a number of county councils and the figure below describes the current situation.

Figure 4.7: Presence of eHealth services in county councils (Jerlvall and Pehrsson, 2009)
5 EMPIRICAL FINDINGS

In this chapter, there is a presentation of the empirical data collected to provide a framework for subsequent analysis.

5.1 Results of Survey

The questionnaires were posted to all the 21 county councils in Sweden. In total, 18 respondents answered representing 86% response rates which is relatively high considering the lower response rates associated with mail surveys. Concerning the position of respondents, there were 9 IT managers, 3 IT project leaders, 2 IT strategists, 3 IT directors and 1 system administrator. This is presented in the figure 5.1.

Respondents answered that the county councils started developing websites from 1995 but the provision of web-based health services began in the late 90’s to 2002. The development of websites and health care services over time is graphically presented in figure 5.2.

![Figure 5.1: Positions of respondents](image-url)
All the 18 county councils that responded indicated that they provide web-based health care services. In the previous study by Wiklund and Lindh (2004), both information and web-based health services have been placed together as services. However, information and services are separated in this study. All county councils provide the following information: information on the range of health services, information on political leadership, contact information, information about county council and their activities, information on particular complaints, and price information. Web-based health care services including e-prescription, checking status of laboratory or other test results are not provided by all the councils. The summary of these services are presented in table 5.1.

<table>
<thead>
<tr>
<th>Services / Information</th>
<th>Number of counties</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information on the range of health services</td>
<td>18</td>
<td>100</td>
</tr>
<tr>
<td>Information on political structure</td>
<td>18</td>
<td>100</td>
</tr>
<tr>
<td>Contact information</td>
<td>18</td>
<td>100</td>
</tr>
<tr>
<td>Information about county council and their activities</td>
<td>18</td>
<td>100</td>
</tr>
<tr>
<td>Price information</td>
<td>18</td>
<td>100</td>
</tr>
<tr>
<td>Information about particular complaints</td>
<td>18</td>
<td>100</td>
</tr>
<tr>
<td>Information on diseases, treatment and prevention</td>
<td>16</td>
<td>89</td>
</tr>
<tr>
<td><strong>Web-based health care services</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescription renewal</td>
<td>15</td>
<td>83</td>
</tr>
<tr>
<td>Booking and cancellation of patients' appointments</td>
<td>14</td>
<td>78</td>
</tr>
<tr>
<td>Ask -a- doctor -online</td>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>Access to records on immunization, blood donation</td>
<td>4</td>
<td>22</td>
</tr>
</tbody>
</table>
Table 5.1: Current web-based health care services and information provided by county councils

<table>
<thead>
<tr>
<th>Services</th>
<th>Number of county councils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check status of tests/exam results</td>
<td>2</td>
</tr>
<tr>
<td>Access to patient case notes (electronic health records)</td>
<td>2</td>
</tr>
<tr>
<td>Listing of doctors</td>
<td>2</td>
</tr>
<tr>
<td>Order for Chlamydia test</td>
<td>2</td>
</tr>
<tr>
<td>Comment/ have your say</td>
<td>1</td>
</tr>
<tr>
<td>Choice of health centre</td>
<td>1</td>
</tr>
</tbody>
</table>

Twelve county councils indicated that they are currently developing new web-based health care while the remaining 6 are not. Among the services being developed at the moment include my health care contacts (Mina vårdkontakter), access to patient case notes (electronic health records), drug list, booking of appointment, patient portal, choice of health centre and ordering for Chlamydia test and are presented in table 5.2.

Table 5.2: Web-based health services under development

<table>
<thead>
<tr>
<th>Services</th>
<th>Number of county councils</th>
</tr>
</thead>
<tbody>
<tr>
<td>My health care contacts</td>
<td>6</td>
</tr>
<tr>
<td>Booking and cancelling appointments</td>
<td>4</td>
</tr>
<tr>
<td>Access to patients' case notes</td>
<td>2</td>
</tr>
<tr>
<td>Drug list</td>
<td>2</td>
</tr>
<tr>
<td>Patient portal</td>
<td>2</td>
</tr>
<tr>
<td>choice of health centre</td>
<td>1</td>
</tr>
<tr>
<td>Order for Chlamydia test</td>
<td>1</td>
</tr>
</tbody>
</table>

Out of the 18 county councils that responded, 13 stated that they plan to introduce new web-based health services in the next 5 years especially between the years 2011 to 2013. A summary of these services planned for the future are presented in table 5.3.

Table 5.3: Future web-based health care services

<table>
<thead>
<tr>
<th>Services</th>
<th>Number of county councils</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Booking of appointments</td>
<td>5</td>
<td>28</td>
</tr>
<tr>
<td>Access to patient case notes</td>
<td>5</td>
<td>28</td>
</tr>
<tr>
<td>Checking status of test results</td>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>Following referrals</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Patient portal (my page)</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Video consultation</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>My health care contacts</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Comment (have your say)</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>
It is apparent that the most progressive county councils have more advanced and interactive web-based health care services and those providing only basic services are planning to develop more advance services.

All county councils replied that they have adopted the National eHealth Strategy and it provides the framework of formal policies within which they provide web-based health care services. Concerning informal policies, 8 out of 18 confirmed that they have informal strategies that guide the development of web-based health care services. The strategies mentioned include: initiatives from health care professionals and health care providers, political goals, patient needs within the county council, available resources and, provisions. Again all 18 county councils answered that they coordinate with other county councils, municipalities, private health care providers and other agencies in the provision of health and social care.

County councils were asked to mark the degree of importance they attach to availability, confidentiality, integrity, and efficiency in exploring informal strategies that steer the development of web-based health care. The mean values for these development ideals are: 4.6 for availability, 4.6 for confidentiality, 4.9 for integrity, and 4.1 for efficiency across a scale of one to five. The results are presented in figure 5.3

![Figure 5.3: Development ideals](image)

This means that in developing web-based health care services, system managers attach less importance to efficiency and place most emphasis on integrity.

In order to gain an idea on the issues that require urgency in future developments in web-based health care, county councils were asked to identify the barriers or challenges they face with regard to the provision of web-based health services. The respondents identified the following short-term barriers: integration of different local systems, ensuring security, integration of e-ID, resistance of health professionals to use the information technology as a platform for health care delivery, authentification of users, organizational culture, the issue of
data possession rights, ensuring IT maturation, executing organizational restructuring to accommodate the integration of e-services, and changing business processes. In the long-term, the respondents cited these challenges: developing cost efficient systems and processes, building systems to ensure integrity, policy barriers with regards to patient data, changing business process, incompatible legacy systems and ensuring a higher level of citizen participation in eHealth. It is apparent that barriers are may be both short–term and long-term. However, it is also obvious that the major challenges that county councils face in the provision of web-based health care services are:

- Technology barriers to the development of accessible, secured, efficient and integrated systems and the policies on the use of patient data
- Resistance of health professionals and citizens to patronise web-based health care due to attitude
- Changing business processes and organizational culture to support the integration of ICTs in health care delivery.

In order to gain an idea about the acceptance of web-based health services, the respondents were asked to list at least three of the services mostly accessed by citizens. A range of services were given as the most accessed by users and these are: renewal of prescription, booking and cancelling of appointments, checking test results, my health care contacts, request information on diseases, and ordering for Chlamydia tests. Among these services, it is apparent that booking and cancelling of appointments and renewal of prescription are the most common among users. Figure 5.4 illustrates the distribution of these web-based health care services.

An objective of this thesis is to examine the age group of users that access web-based services the most and queried respondents on this issue. The categorised age groups are: 25 and below, 26–35, 36 - 45, 46 - 55, 56 – 65 and 66 and older. The distribution of the age groups in relation to the use of web-based services is presented in figure 5.5.

![Figure 5.4: Distribution of the use of eHealth services among citizens](image-url)
Figure 5.5: Incidence of web-based health care usage by age
6 ANALYSIS AND DISCUSSION

In this chapter, empirical findings are analysed and analysed using the reviewed theories, models, concepts, and results from previous studies with the aim of answering the research questions.

6.1 Sweden within EU eGovernment Context

It is an established fact that the use of ICT applications has great impact on the public sector like its private counterpart. Even though the adoption of these technologies in the public domain was quite recent in the European Union, Sweden among other Nordic countries has been noted for its leading position in terms of the development of eGovernment. A European Commission report prepared in 2009, confirms that Sweden is a matured information society with indicators like online availability and sophistication above the EU averages. This may be due to the increasing broadband access and internet use in Sweden. The percentage of households with broadband connection in Sweden is 84% against EU27 average of 60%. Again, the Swedish government’s ICT expenditure as a percentage of GDP is 3.8 which is slightly larger that EU27 average of 2.7. This ensures that a large amount of the citizens, approximately 52% use eGovernment services which is significant difference from EU 27 28% average (EU 8th eGovernment Benchmark Measurement 2009).

Due to the decentralised nature of public administration, Sweden’s eGovernment model is not a “one-stop-shop” but rather has different portals for different government functions and agencies. The country continues to experience continuous growth in eGovernment services of which eHealth forms a major component, particularly web-based health services.

6.2 Provision of web-based health care services

The strategic use of technology to improve health care delivery is a priority for the government of Sweden. eHealth has the potential to transform the health care industry through the provision of efficient and effective care. Through eHealth, stakeholders can make informed decisions in order to develop services that focus on the needs of citizens. eHealth exists in different forms but this thesis focus on web-based or online health care services.

According to Wiklund and Lindh (2004), the development of web-based health care started mainly between 1997 and 1998, just few years after many county councils created their websites (refer to figure 4.1). From the empirical results, this is confirmed as the 18 county councils created their websites for the first time between 1994 and 1998 but the development of web-based health care services began in 1996 to 2001 (refer to figure 5.2). In 1996, only 4 county councils offered web-based health care services and this figure rose sharply to 15 in 1998.

The provision of health care in Sweden is the responsibility of the Ministry of Health and Social Affairs and it highly decentralized. Health care accounts for 9% GDP (Jerlvall and Pehrsson, 2009). Swedish county councils have the responsibility of providing quality health
care for all the citizens within the county with emphasis on accessibility, quality, and cost-efficiency at primary, secondary, and tertiary levels of health care.

As part of their responsibilities, county councils develop and provide web-based health services. In order to explore the different web-based health care services, the county councils have identified the services they currently offer and those planned for the future. From table 5.1, information on contacts, the range of health services, prices, political structure of the county council and particular complaints are provided by all the 18 councils surveyed. These are basic information seeking that involve little or no user interaction. However, advanced and more interactive web-based health services are less common and not provided by all the county councils. Nevertheless, it is apparent that the development of more advanced health care services has increased in the past six years as evidently indicated by Jerlvall and Pehrsson (2009) in figure 4.7 concerning the presence of eHealth services within county councils.

From the study of Wiklund and Lindh (2004), 45% of the councils were offering renewal of prescription and 36% for booking and cancelling appointments (refer to table 4.1). Currently, 83% of the 18 county councils that responded provide electronic prescription renewal while 78% offer booking and cancellation of appointments. This evidence proves that the county councils are engaged in developing more advanced web-based health care services.

It is rather interesting to note that in the 2004 study, only one county representing 5% was offering accessibility to patients’ case notes (electronic health records) and six years down the line, just 2 county councils out of 18 (11%) are offering the service. The context of this issue became more evident after data was collected. While it is possible that only one county council was providing access to patient case notes or electronic health records in 2004, this may be due to the fact that the rest of the councils had not integrated all documentation on health care in their IT systems. According to Jerlvall and Pehrsson (2009), all county councils have integrated documentation of health care information in their IT systems. Therefore, all county councils have care documentation electronically but only two provide patients with access to their medical records. Nevertheless, the health care professionals have access to such electronic health records.

The Electronic Health Record (EHR) is a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting. Included in this information are patient demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data, and radiology reports. The EHR automates and streamlines the clinician's workflow. The EHR has the ability to generate a complete record of a clinical patient encounter, as well as supporting other care-related activities directly or indirectly via interface including evidence-based decision support, quality management, and outcomes reporting (www.himss.org). In order to design a proper chain of trust, Iakovidis (1998) suggests that fundamental rules need to be defined and respected at all times and these include:
The patient owns his/her EHR, however, his access rights exclude editing the EHR.

Any query or transfer of all or part of an EHR should be done within a consent agreement that the patient is aware of.

Any exception to such fundamental rules should be defined by related policies.

EHR promotes quality care and evidence-based health care and support patients’ mobility across geographical borders. However, it requires a high degree of integration, standardization, and regulation rendering its implementation costly and explains to some extent why a small percentage of county councils provide this service. The National Patient Summary (NPÖ) is a project designed to facilitate access to EHR, with the procurement phase completed in 2008. (National eHealth Strategy: Status Report 2009). In order to implement EHR, there is the need for county councils to consolidate and integrate systems and standardize them to support the vision of “one-patient-one-record”. In Jerlvall and Pehrsson’s (2004) report, 7 out of the 21 councils have integrated all their systems at the hospital, psychiatric and primary care to achieve the same system for all types of health care with the rest intending to follow suit (refer to figure 4.3).

The new services that have been developed since 2004 are: ask-a-doctor-online; access to records on blood donation, immunization; check test results; order for Chlamydia test; listing of doctors; comment or “have your say”; and choice of health centre (refer to table 5.1). Information on disease, treatment, and prevention has also been added on the new provisions. Among these new web-based health care services, 89% of county councils offer information on diseases, treatment, and prevention which is being provided through the nation-wide portal www.1177.se. The remaining services are offered by relatively a small percentage (approximately between 6 – 22%) of county councils.

This situation proves that there is growing demand and high expectations from the health sector as patients seek rapid, quality and individually tailored health care and often compounded by high mobility especially across the EU. It therefore becomes important that health care providers are able to understand patients’ needs and provide patient-centred web-based health care services.

Twelve out of the 18 county councils indicated that they are currently developing web-based health care services which include booking and cancelling appointments, access to patients’ case notes, my health care contacts etc (refer to table 5.2). Again, 13 from the 18 county councils have plans to introduce new web-based health care services within the next 5 years and the top three of these services are booking of appointment (28%); access to patient case notes (28%); and checking status of test results (22%) as shown in table 5.3. Comparing these figures with those of Wiklund and Lindh (2004) in table 4.1, a clear trend emerges. While basic information and services are provided by all county councils, the more advanced web-based health care services that involve the user interaction are offered by the more progressive regions. These regions plan to introduce even more advanced web-based health care services like access to patients’ case notes, ask-a-doctor-online, video or distance consultation with doctors etc. On the other hand, the regions that provide less advanced services are planning to...
develop the services that are currently being provided by the progressive regions such as prescription renewal, booking and cancelling appointments.

An interesting feature from the empirical data is tracking referrals online was not cited as a service that is currently being offered by any of the county councils. Rather, three county councils indicated that they plan to provide the service in the future (refer to table 5.3). However, Jerlvall and Pehrsson’s study proves that online referrals and response is well developed by majority of the county councils. It is not clear what may have accounted for this variation.

This analysis confirms the notion that integration of functions and subsequently complexity increases after the initial cataloguing stage during eGovernment evolution (Layne and Lee, 2001 refer to figure 3.1). The evolution of eHealth and its current status can be analysed using Layne and Lee’s maturity model by building models of the different stages of development.

As already mentioned, eHealth forms a major component of eGovernment services in many countries. At the cataloguing phase or stage of the maturity model, the government makes its presence known online where citizens can seek for information and access services. As evident from the empirical findings, in the mid 1990’s Swedish county councils started establishing their presence online and with the aim of disseminating information to the public. At this stage, the websites are normally non-interactive and users can search for health information and for instance download forms. While it is not clear the exact information and services offered by the county councils during this cataloguing stage, it is apparent that web-based health care services were not immediately provided by the councils when they first created their web-portals. This is due to the fact that this stage is normally more information seeking oriented and thus represent a one-way communication without citizens interacting back with the government.

During the transaction stage of the eGovernment maturity model, eGovernment initiatives focus on connecting the internal government system to on-line interfaces and allowing citizens to transact with government electronically (Layne and Lee, 2001). From 1996 to 2001, all the county councils began providing web-based health care services. Some of these services are interactive and may involve financial transaction of some sort. For instance appointment booking, renewal of prescription, ordering for Chlamydia tests, checking clinical tests results etc., as provided by Swedish county councils are all interactive and could be transacted electronically. This is convenient for both patients and health professionals as physical contact between them is reduced. This represents the transaction stage in the maturity model and involves two-way communication between the government and its citizens. The transaction phase however requires more complex technologies in terms of data security, user privacy etc. than the cataloguing stage.

The vertical integration stage in the maturity model involves the integration of related eHealth services that are currently offered by the different levels of the Swedish government including county councils and municipalities. There was no organized collaboration between agencies in the delivery of eHealth services before the National High-Level Group established the
Swedish National eHealth Strategy in 2006. This meant that county councils and municipalities were using ICT differently, and the infrastructure for the many services provided is unevenly developed. However, to help maximize the potential of eHealth in Sweden, it is important that county councils, municipalities, other agencies, and private care providers collaborate. This requires integration of their different systems to allow for communication between government agencies at the national level, county councils, municipalities, and private health care providers. Figure 4.6 shows the different integrated services between the councils and private care providers in Sweden.

Central to the National eHealth strategy is collaboration between agencies and their roles to sustain coordination by promoting a uniform information structure, common technical infrastructure that facilitate exchange of information. Systems at all levels of government must be interoperable to ensure the exchange of data across organizational boundaries. eHealth initiatives at the national level must be clearly formulated, funds readily allocated for them while improving communication and exchange of information between government agencies at the national, regional and municipal levels of administration. According to the Swedish eHealth Strategy (Status Report 2009), while all county councils have adopted the strategy municipalities and private care providers were for a number of reasons unable to organise and take part as quickly as county councils in ICT collaboration, in accordance with the eHealth strategy. The report further states that as at December 2008, 207 out of 290 municipalities had formally adopted the eHealth strategy. Different projects like the Patient Data Act, Pascal, S-junet etc. have been established and others are yet to be implemented in the county councils and the municipalities to ensure interoperability and therefore complete vertical integration as described in the maturity model is currently still in progress.

The full potential of information technology, from the citizen’s perspective, can only be achieved by horizontally integrating government services across different functional walls (Layne and Lee, 2001). At this phase, different government services are all integrated across national, regional or federal, and local levels of public administration. This requires that databases across different functional areas will communicate with each other and ideally share information, so that information obtained by one public agency will propagate throughout all government functions. Thus for Sweden to achieve horizontal integration in eGovernment with respect to eHealth, electronic health records for patients must be linked various stakeholders including hospitals, health centres, private healthcare providers, pharmacies and all similar or related groups that are concerned with the delivery of health care in the country. It is however important to note that the attainment of such “one-stop-shop” where all the systems are integrated across different functions in a country may be difficult to achieve in Sweden due to its decentralized nature of public administration. The last status report of the Swedish eHealth strategy and empirical results from this study indicate that eHealth services in Sweden are currently progressing from the transaction stage towards establishing vertical integration. This progression is depicted in figure 6.1.
The stages of this maturity model progress towards providing enhanced value to users that access these web-based health care services with time as technological and organizational complexity increases. While the cost of providing these web-based health care services may increase as county councils proceed through these maturity stages, it is also true that savings over expensive traditional or paper-based health practises may help to balance the costs. As more health services become integrated across a broad range of functions and traditional processes are gradually replaced with online services, the benefits of eHealth become more evident.

In summary, county councils are involved in the development of web-based health care services. A range of these services are currently offered by the councils for their citizens while more advanced web-based health care services are planned to be developed in the future. The development of new web-based services will be determined to a large extent by the policies, funds, and resources of the county councils.
6.3 Strategies for developing web-based health care services

The development of web-based health care services like any other public service must undoubtedly be guided by strategies. Web-based health care services as a subset of the much broader eHealth service is a public electronic service in Sweden. This is due to the fact that the government is a major stakeholder and plays an important role in their provision of these services. Prior to 2006, eHealth services were deliberately developed by county councils in conjunction with other agencies. The situation implied that the use of ICTs was unevenly distributed among county councils leading to ineffective exchange of relevant information and lack of common infrastructure that supports integration of other systems and functions. These factors served as the driving factors for the creation of the Swedish National eHealth Strategy. Due to the decentralized system of public administration in Sweden, this policy was developed horizontally with numerous government agencies forming the National High-Level Group for eHealth coordinating efforts at the national, county council and municipal levels (Gerston, 2004).

The National eHealth strategy was formulated out of the vision for an improved health care using ICT as a strategic tool. As independent agencies, county councils have the responsibility to make their own decisions with regard to how and for what purpose ICT is to be used, and themselves procure or developed the eHealth solutions they opt for. At the regional level, the decision to adopt and implement the strategy must be taken separately and independently by each county council. The formal decision process in this case begins with a proposal from the chief executive officers of Swedish Association of Local Authorities and Regions (SALAR), the joint administrative office of the Swedish Association of Local Authorities (SALA) and the Federation of County Councils (FCC), that the strategy be approved by the governing boards of the latter organisations. It is further proposed that the boards instruct SALAR to seek to prevail on its members, i.e. all county and councils, to adopt the strategy and implement its provisions in their health care services (National eHealth Strategy 2006). This implies that eHealth is indeed a public policy in Sweden and the decision to implement it progress through the public policy-making process in which problems identified by stakeholders lead to formulation of strategies and subsequent adoption, implementation and evaluation.

From the empirical findings, all 18 county councils indicated that the development of web-based health care services occur in the framework of the National eHealth strategy. This is in line with the 2009 status report for the strategy which documents that all 21 county councils have formally adopted the National Strategy for eHealth and have drawn up a joint action plan towards its realization. In the study of Wiklund and Lindh (2004), 6 counties declared that they had formal policies while 15 lacked these policies. This is due to the fact that the eHealth strategy was formulated in 2006 and its adoption began mainly in 2008 and since it is a national policy, all county councils are obliged to adopt it. The formulation and adoption of a nation-wide eHealth policy by Sweden is an indication of the country’s position as a matured information society.
The National eHealth Strategy reflects different perspectives of eHealth. From figure 3.6, the **first area of action** for which stakeholders must tackle is complying with laws and regulations concerning eHealth. The regulatory framework is particularly important for the protection of patients’ personal data to ensure confidentiality and privacy. The Patient Data Act has been set up within the strategy to establish these regulations and it came into effect on 1st July 2008.

Another important feature of the national eHealth strategy is the **second action area** that will ensure that there is a common infrastructure that supports a uniform information structure. A uniform information structure guarantees that data collected in health care is well documented and accessible by stakeholders to help in decision-making, research, and improving the quality of care delivered to citizens. In respect of this, the National Information Structure project which seeks to provide the fundamental prerequisites for uniform documentation was completed last year (Jerlvall and Pehrsson, 2009).

The **third action area** requires common technical infrastructure. Although care providers are responsible for their own technical infrastructure, they must also be able to communicate securely across organisational boundaries. It is thus essential that they undertake the joint development and management of a national technical infrastructure that will guarantee high standards of quality and security with regard to the transfer of information between care providers and between the care services and other stakeholders such as public authorities and suppliers. The principals must simultaneously ensure the development of their own infrastructure so that local and national infrastructures can work together (National eHealth Strategy 2006). In essence, this ensures effective communication and seamless exchange of information across all organizational borders involved in the provision of health care. Developments in this area include the implementation of S-junet, a national network for all digital communication in health care in all 21 county councils. Other projects are the Health Service Address Registry (HSA), Basic Services in Information Maintenance (BIF), Secure IT in Health Services (SITHS), Video/ Distance Meeting Service which are at different stages of development (Swedish eHealth Strategy: Status Report 2009).

Interoperability of ICT systems across organizational boundaries is a very important factor in any eHealth project and this form the **fourth and fifth action areas** in the national strategy. Organizations use ICT applications differently, thus creating low compliance standards. Therefore eHealth systems or solutions must be able to communicate with each other irrespective of the organizational boundaries to ensure effective sharing of information needed to deliver quality health care. In order to realize this objective, the National Patient Summary (NPÖ), a project which will provide access to detailed support data for health care, and Pascal which is designed to provide extensive information on patients’ prescription history are currently being developed.

The ultimate users of eHealth services are citizens and health professionals. The **sixth action area** in the national eHealth strategy is to ensure that information and services are readily and easily accessible to citizens and health care professionals. This implies that citizens will be
able to access information, health services and communicate with health care providers. Health professionals on the other hand will have access to the relevant information they need to effectively carry out their day-to-day operations. In this perspective, it is significant to note that citizens must have access to the internet and be familiar with its use. The Web-based Youth Family Planning Clinic (UMO.se), “My health care contacts”, Care Online, and 1177.se are all services and current projects within this action area.

Underlying all these action areas are education and research initiatives. The strategy emphatically places importance on inter-organizational coordination. This is due to the fact health care delivery in Sweden involves a number of government agencies, local and municipal authorities and private health care providers. All 18 county councils responded that they coordinate with other county councils, municipalities, private health care providers and other agencies in the provision of health and social care. This finding is in line with the study of Jerlvall and Pehrsson concerning the coordination of county councils with other agencies. Figure 4.6 based on their report shows that indeed coordination exists between the county councils and other agencies. Coordinated efforts exist in the area of electronic referrals, common drug list, electronics financial report, access to organizational intranet, connection to internal networks and agreement on IT issues.

Apart from formal strategies, the county councils were also queried on the use of other informal strategies and policies that guide the formulation of web-based health care services and 8 county councils indicated that they employ informal strategies as well. Among the strategies cited include initiatives from health care professionals and health care providers. This is an important strategy because the health care personnel and providers are in direct contact with each other and the citizens and thus they are in the best position to determine patients’ needs which has also been indicated as an informal strategy. According to some county councils, their own business goals, available resources, and provisions also direct the formulation and adoption of web-based health care services. Each region funds the development and provision of web-based health care services mainly through taxation and state grants. The implication of this is that regions with more funds and resources are likely to provide advanced web-based health care services. This explains the disparity or unequal distribution of web-based health care services within county councils.

An important goal of eHealth is to improve the quality of health care delivery and thus realistic strategies must guide its implementation. Accessibility, confidentiality, integrity, and efficiency of web-based health services remain important concerns in their development and use. In order to investigate informal strategies, the regions were asked to indicate the degree of importance they place on these four ideals to guide the practical development of web-based health care services on a five-point scale ranging from very important to not at all important. Efficiency refers to services of a certain quality that are produced in inexpensive ways. Confidentiality ensures that information is only accessible to authorised parties. Integrity means that information can only be modified by authorised parties or in authorised ways. Availability means that information and services are accessible to authorised parties and at appropriate times (Wiklund and Lindh, 2004).
From figure 5.3, it is apparent that integrity is given the highest priority followed by availability and confidentiality. Efficiency receives the least priority among the county councils when they are making policies for web-based health care development. This finding is in line with the results of Wiklund and Lindh as shown in figure 4.2. It is important to note that attaching such high degree of importance to these ideals may not be possible in real life situations due to imbalances in their tradeoffs. For instance, as availability increases, confidentiality, and integrity may become difficult to maintain.

6.4 Barriers to web-based health care services

One of the objectives of this study is to identify the barriers or challenges faced by county councils in the development and usage of web-based health care services. From empirical evidence, a range of challenges have been cited as impeding the provision of web-based health services in Sweden. These barriers could be grouped into three main dimensions.

Technology barriers to the development of accessible, secured, efficient, and integrated systems and the policies on the use of patient data are a major challenge for county councils. Among the problems cited are integration of local systems and services, ensuring security and integrity, and ensuring compatible systems and standards. The lack of integration of local systems may be caused by inflexible legacy systems. Brodie and Stonebraker (1995) argue that most legacy systems in the public sector were mainly created as stand-alone mainframes that may not support integration. The lack of integrated systems according to McKen and Smith (2002) incur huge cost related to the development and maintenance of multiple application interfaces. The integration of local systems to form a single consolidated system ensures common access to relevant information. A consolidated system facilitates a “one-patient-one-record” vision. From figure 4.3, 7 out of 21 county councils have consolidated all systems within primary health centres, hospitals, and psychiatry while another 9 are targeting toward this. This forms part of the objectives of set in the national eHealth strategy in achieving a uniform information structure which all county councils are expected to adopt.

Ensuring security and integrity in web-based health care services is absolutely imperative for its success. However, this is often hindered by the fact that different system architecture may have different security models that do not support each other. Security and integrity involve the safety of the system to ensure personal details remain private and confidential and that only authorised people have access to such information. Security is especially important in transactional web-based health care services. The issue of security as expressed the National eHealth Strategy is to be tackled through the implementation of a common technical infrastructure and guided by laws and regulations e.g. the Patient Data Act.

Interoperability ensures communication across different organizational boundaries. Incompatible systems and standards however, do not allow for seamless exchange of information across different agencies. While lack of interoperability has been cited as a barrier, the implementation of the National Patient Overview and Pascal projects are expected to help solve this problem.
The second major challenge facing county councils in the provision of web-based health care services is resistance of health professionals and citizens to patronise web-based health care services. This may involve the repetition of inefficient manual processes in an online environment (Kaylor et al, 2001). Resistance to change from the social perspective may be as a result of lack of a clear vision and realistic goals. Generally, people will be more responsive to change if they know exactly why they must give up processes they are used to. Many eHealth projects involve the definition of new collaborative processes between government agencies and it has been indicated that the definition of such collaborative processes was problematic because such processes were novel, requiring domain knowledge of the workflows of each government agency and an appreciation of what was achievable with the technology (Lam, 2005). A shared vision and objectives which are obtainable within a time frame must be communicated to all stakeholders.

Resistance may also be due to lack of training. Many eHealth projects fail in the end due to lack of proper training. Often, during the integration of eHealth solutions, training is often given as a onetime event on how to use the system. However, it must be a continuous process so that users are willing to accept the technology and be comfortable to actually use it in their operations by understanding the need for it and its implications on operations in the company. Training for end users with a focus on business practices and processes augment the change management and boost active participation. In the case of citizens’ adoption of web-based health services, resistance may also be due to their perceptions of how useful the services are to them and lack of awareness and education. It is important to create awareness among citizens especially the aged who may not be so much into technology. This is determined by factors like user interface design, security, quality of services and availability. The web-based health care services must reflect the needs of citizens to ensure extensive usage.

The third major challenge for county councils in developing web-based health care services is changing business processes and organizational culture to support the integration of ICTs in health care delivery. Following system requirements analysis, many organizations may need to reengineer their business processes to fit the integration of eHealth solutions into the organization’s current business operations (Ngai et al., 2007). One of the rationales behind the deployment of ICT systems solutions in health care is to eliminate unnecessary operations that do not add value in terms of cost, quality and time. Thus, there should be mutual fit between the IT solutions suite, needs and the business processes of the county council and medical centers.

The appropriate technological infrastructure must be in place for the implementation to be a success. IT infrastructure including, hardware and networking are crucial for the success of eHealth projects. It is clear that eHealth solutions implementation involves a complex transition from legal, information systems and business processes to an integrated IT infrastructure and common business process throughout the organization. Nah et al, (2003) affirm that eHealth solutions implementation efforts must overcome issues of complexity arising from business and IT legacy systems including data accuracy and management.
In comparison with Wiklund and Lindh (2004), the problems cited are not entirely different from the barriers identified now except that coordination between county councils and other agencies has not been cited as a challenge in this current research. This is due to the fact that all county councils have formally adopted the national eHealth strategy which emphasizes on coordination between them and all other agencies and private health care providers. This has further been confirmed as results from the survey and those from the study of Jerlvall and Pehrsson indicated that indeed, coordination exists between the regions and other agencies in all the county councils.

6.5 User Adoption of Web-based Health care services

An aim of this thesis was to explore the web-based health care services that are accessed most by citizens and the age group of users that access the services frequently. Thus respondents were asked to identify the three most common web-based health services among users.

The development of eHealth services has been increasing within EU and particularly in Sweden over the past decade. Due to the relatively high life expectancy and decreasing fertility rates, demographic changes within Sweden and other European countries has led to the prediction that a large percentage of the population would be older than 50 years in the not so distant future. Therefore an aging population, technology advancement and the need to cut down cost in health care have driven governments within the region to adopt more efficient ways of improving healthcare delivery of which electronic health care has taken centre stage. However, eHealth goes beyond just integrating ICT systems in health care. In order to release maximum value from eHealth investments, the targeted users must actually accept and adopt the eHealth services.

It is important to state here that user acceptance and adoption is explored from the perspective of IT leaders in the county councils in their capacity as managers and strategists of IT developments in their organizations. Therefore results drawn are a representation of their opinions and not from the citizens’ or patients’ evaluation of the web-based health care services. From figure 5.4, booking and cancelling of patients’ appointments constitute 46% of the frequently accessed services followed by prescription renewal at 35%. This incidence can be attributed to the fact that online booking and cancellation of appointments, and prescription renewal are offered by 14 and 15 county councils respectively. Results from the report of Jerlvall and Pehrsson also indicate that 20 and 18 out of the 21 county councils offer prescription renewal and appointment booking and cancellation respectively. The implication of this incidence is that majority of the county councils provide these two services and logically, the cumulative frequency of usage of these services will be high. This also signifies that users access advanced and interactive web-based health services than the basic information seeking which are provided by all the regions.

Other web-based health care services like checking test results, requesting information on disease, “My health care contacts, and ordering for a Chlamydia test have also been cited as often accessed by citizens but the frequencies of usage are relatively lower than those of booking and cancellation of appointments, and prescription renewal. Again, the explanation
for this may be the fact that these services are offered by few county councils. For instance, only 2 of the 18 county councils currently provide the platform to order for a Chlamydia test online.

The distribution of the age structure in Sweden is 15.7% for 0-14 years, 65.5% for 15-64 years, and 18.8% for 65 years and over (SCB 2009 estimates). In order to explore the incidence of web-based health care service usage by age, 7 county councils indicated that people from the ages of 46 to 55 accesses the services the most while 5 selected 36 – 45 years age group. Four regions also chose the 56-66 years age group and the remaining 2 selected 26 – 35 years age group. The youngest (25 or younger) and the oldest (66 and over) age groups were not identified to be frequent users. Both mode and median values occur in the 46 – 55 years age group. This connotes that people from 46 to 55 years old are the most frequent users of the web-based health care services.

The user perspective or what other authors call the “human factor” in the acceptance and subsequent adoption of web-based health care services is one of the factors that influence the success of such projects. As already mentioned, there is limited literature on eHealth technology acceptance. However, to discuss the subject, a modified and extended Technology Acceptance Model had been developed to explain the use eHealth services. From figure 3.9, the actual use of web-based health care services begins with an intention to use which depend on how citizens perceive their usefulness and ease of use. However, there are antecedents which influence perceived usefulness of web-based health care services. According to Gummerus et al (2004), satisfaction of a service ensures loyalty and prolonged use of that service and satisfaction is influenced by the level of trust the user has in that service.

In an eHealth service environment, the antecedents of trust are quality, user interface design, responsiveness, user needs, and security. The use of web-based health care service is therefore dependent on how the service fulfils the user needs, and expectations especially in security. This means the development of web-based health services must be focused on the needs of citizens. For instance, the frequent use of prescription renewal, and booking and cancelling appointments gives an indication of how patients can conveniently transact these services from anywhere and anytime. To a large extent, this is also affected by the design of the website. The ease of navigation, interface design, site aesthetics, and user guidance affect user establishment of trust (Roy et al, 2001). Appendix 4 captures screenshot of Jönköping county council as an example.

Accessibility is not influenced by trust but it directly affects intention to use the web-based health care services. Accessibility is however affected by access to the internet in order to use these services. According to Statistiska Centralbyran 2008 estimates, the percentage of households with internet access is 84 which is relatively higher than the EU average of 60%. The percentage of internet use is also high. These figures signify that majority of Swedes have access to web-based health care services and subsequently have more intention to use them. The confidence or capability to use ICTs (computer efficacy) also influences perceived usefulness and intention to use. The implication is that users who believe in their capability to
use web-based health care services are more likely to actually use them and this is often linked to experience.

Active users of web-based health care services provided by Swedish county councils have been identified to be people in the age group of 46 – 55 years. According to Gilbert et al (2004), age has an influence on a person’s ability to adopt new technologies. The testing of the hypothesis that age significantly affects an individual’s intention to use a technology is beyond the scope of this research. Jung (2009) contends that age by itself is not a determinant of eHealth acceptance, yet it has been demonstrated to moderate the impact of access. Younger citizens appear to be more technology savvy and recognize web-based health care services as being easy to fit into their lifestyle, and they have a higher accessibility to them. It is often assumed that older people do not often adopt new technologies. However health often deteriorates with age, and older generations thus represent the biggest users of health care. Again, demographic changes means there is a trend towards an aging population. This explains why the use of web-based health care services is common among the older age group of 46 – 55 years. Many older citizens have become acquainted with the internet and the usage rate in Sweden for 2005 among 55 to 64 year-olds was quite high at 89%, it is already much lower, at just under 50% for citizens in the ages of 65 to 74 (WII, 2007).

6.6 Summary

After analysing the empirical data against existing theories and comparing with results from previous studies, it is possible to answer the research questions being investigated.

Answer to research question 1: Swedish county councils in their capacity as being responsible for providing health care for citizens have formally adopted the National Strategy for eHealth as the formal policy that guide the development of web-based health care services. Aside this formal policy, some regions develop web-based health care services depending other informal strategies like initiatives from health care personnel and care providers, business goals and availability of funds and resources.

Answer to research question 2: three main dimensions of barriers to development and use of web-based health care services have been identified from the perspectives of IT leaders of the county councils. These are:

- Technology barriers to the development of accessible, secured, efficient and integrated systems and the policies on the use of patient data
- Resistance of health professionals and citizens to patronise web-based health care
- Changing business processes and organizational culture to support the integration of ICTs in health care delivery.

Some of these barriers would be solved when certain projects planned within the National eHealth Strategy are fully implemented.

Answer to research question 3: a range of web-based health care services are offered by the Swedish county councils but the most frequently accessed services are prescription renewal, and booking and cancellation of appointments according to IT leaders of the county councils.
This is due to the fact that these services are offered by majority of the county councils and implies that patients are now using more of the advanced interactive services than the basic information seeking services. The most frequent users of web-based health care services are people belonging in the age group 46-55 years. This is largely due to the fact that health deteriorates with age, demographic changes, and high accessibility to these services.
7 CONCLUSION

Sweden is a matured information society that leads in many benchmark indices within the European Union and globally. Regional authorities or county councils have the responsibility of providing quality, accessible and cost-efficient health care for all its citizens. Growing demands and expectations of patients, high mobility across geographical boundaries, the need to lower cost of health care without compromising quality, and the need to move health care from organizational perspective to patient-centred health care have been driving the development of eHealth services.

Swedish county councils provide a range of web-based health care services for their citizens. Six years ago, many county councils did not have formal policies to guide the development of web-based health care services. Today, they have all formally adopted the National eHealth Strategy which provides the framework within which web-based health care services must be developed. Others have different informal policies that direct the provision of these services for their citizens. In using these informal strategies, the councils give higher priority to ensuring integrity, confidentiality, and availability than efficiency of the web-based health services which may be difficult to achieve in real life situations.

The results show that while the problem of coordination between county councils and other agencies that existed six years ago have been solved, county councils still face challenges in providing web-based health care services. Technological barriers, resistance to use the web-based services and changing business process to integrate ICTs have been identified as major challenges that impede the development of web-based health care services in Swedish county councils.

User acceptance and adoption of web-based health care services depend on a host of factors including accessibility, trust, age, and computer efficacy. Swedish citizens frequently access prescription renewal and booking and cancellation of appointments than other available web-based health care services which depicts a trend towards the use of advanced interactive services than basic information seeking services. People from the ages of 46 to 55 have been identified as the frequent users of web-based health care services.

The results suggest that the implementation of planned projects within the National eHealth Strategy is imperative for streamlining the development of web-based health services.
8 REFLECTIONS AND FUTURE RECOMMENDATIONS

8.1 Reflections

➢ The research is a comparative study to the work of Wiklund and Lindh but new perspectives including the investigation of user acceptance and adoption. Thus new questions like the frequently accessed web-based health services and age groups were introduced.

➢ While 86% response rate from the survey was encouraging, evidence from all 21 county councils would have presented a better view of the subjects under investigation.

➢ In terms of user acceptance and adoption, the research could have had a different edge to it if this was investigated from the citizen perspective to explore their patterns in their adoption and use of these services.

➢ It would have been interesting to collect data from users that allowed for correlation and variation analysis to establish relationship between age and the use of web-based health care service

8.2 Future Recommendations

➢ eHealth is still growing within Sweden and the EU and one of the benefits is that it is evident-based implying that its value can be monitored and evaluated. Further studies are recommended to investigate the creation of value from eHealth and how it can be effectively evaluated.

➢ Only one county council was offering access to patient case notes and while many had its development within their future plans, six years later just one more county council had added to the number. It is therefore important recommended that future research explores the development of electronic health records (EHR) in Sweden.

➢ The provision of public services goes through a cycle of policy-making process which comprise of agenda setting, formulation of strategies, adoption, implementation and evaluation. After eHealth strategies are formulated, how do they get implemented at the different levels of public administration?
List of reference


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Appendix 1

QUESTIONNAIRE (Wiklund and Lindh, 2004)

1. What is your position in your organization? _____________________________

2. What year was your county / region's first version of the website available? ______

3. a. Do you provide health care services on your site?
( ) Yes  ( ) No  ( ) Do not know

b. If yes, which services do you provide?

( ) Information on the range
( ) information on the political issues of health services management
( ) Contact information, such as phone number
( ) information about the host organization on various units and their activities
( ) Price information
( ) Information about particular complaints
( ) Booking of patient visits
( ) Prescription
( ) Access to other health services: _____________________________

4. What year were your first health care services available on the website? _____

5. a. Are you developing any web services right now in health care?
( ) Yes  ( ) No  ( ) Do not know

b. If yes, which?

__________________________________________________________________

__________________________________________________________________

6. a. Do you plan to develop new Web services in health care within 5 years?
( ) Yes  ( ) No  ( ) Do not know

b. What types of services?

Type of service _____________________________ When? _________________

Type of service _____________________________ When? _________________
Appendix

Type of service ________________________________ When? _______________

7. a. Do you have a formal policy (strategy) to develop Web-based health-care services? ( ) Yes ( ) No ( ) Do not know

    b. If yes, please describe it briefly.

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

_____________________________________________________________________
_____________________________________________________________________

_____________________________________________________________________
_____________________________________________________________________

8. How important do you consider the following factors be when you develop health care services? (place a cross on the scale)

a) Services available to citizens

    Totally unimportant Very important

    [-----------------] [-----------------]

b) The system's security

    Totally unimportant Very important

    [-----------------] [-----------------]

c) the benefit of patients privacy

    Totally unimportant Very important

    [-----------------] [-----------------]

d) The county council / region cost

    Totally unimportant Very important

    [-----------------] [-----------------]

9. What do you think are the biggest challenges or problems to solve, in order to realize the potential of Web-based services in health care?

    a. In the short term

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

    b. In the long term

_____________________________________________________________________
_____________________________________________________________________
Appendix

Appendix 2

Web-based health care services in Swedish county councils

This questionnaire is addressed to the IT manager or other personnel in a similar role at the county council, and is a follow-up of a previous study in 2004. The focus of issues relate to the development of web-based services for health care. The questionnaire should be completed by someone within your organization who is familiar with site management.

I who have developed this questionnaire am a student at the Jönköping International Business School and this is part of my final master thesis in partial fulfilment of the master degree programme.

All data in the survey will be treated as confidential material and will be presented so that individual counties / regions cannot be identified.

Please fill out the questionnaire as completely as possible and send it in the enclosed envelope to us by 31 March 2010.

Many thanks for your participation! I will send you a summary of the survey as a thank you for your help upon request.

Faustina Acheampong       Jörgen Lindh
Master Student            Associate Professor, Informatics

Address: JIBS
        Box 1026
        551 11 Jönköping

PS! If you have questions about the questionnaire design or order, call us on
tel: 070-078909 2 (Faustina) or 070-739739 5 (Jorgen)
Appendix 3

QUESTIONNAIRE

Development of web-based health care services in county councils

1. What is your position in the organization? .................................................................

2. What year was your county/ region’s website created or first available? ............... 

3. Do you provide health care services on your website?
   Yes [ ] No [ ] Do not know [ ]
   If yes, which health care services do you provide currently?
   [ ] Information on the range of health services     [ ] Information on political leadership 
   [ ] Contact information, such as phone number to various business managers 
   [ ] Information about the host organization, such as different units and their activities 
   [ ] Drug details and prices                        [ ] Information about particular complaints 
   [ ] Booking/cancellation of patients appointment 
   [ ] Prescription/ renewal of prescription 
   [ ] Ask a doctor online for advice 
   [ ] Check status of test results                   [ ] Information on diseases, treatment and prevention 
   [ ] Records on immunization, blood donation etc   [ ] Access to health case notes 
   [ ] Other services..............................................................

4. What year was your first health care service available on the website? ............... 

5. Are you developing any web services in health care currently?
   [ ] Yes     [ ] No     [ ] Do not know 
   If yes, which? ........................................................................................................ 

6. Do you plan to develop new web services in health care within the next 5 years?
   [ ] Yes     [ ] No     [ ] Do not know 
   If yes, what type of services?
   Type of service ...................................................................................... when?........ 
   Type of service ...................................................................................... when?........ 

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Type of service......................................................................................... when?......................

7. Do you have a formal policy (strategy) to develop web-based health care services?
[  ] Yes                               [  ] No                      [  ] Do not know
If yes please describe briefly ............................................................................................... 

8. Do you have other informal policies to develop web-based health care services?
[  ] Yes                       [   ] No                             [  ] Do not know
If yes please describe briefly................................................................................

9. Does your organization coordinate with other organizations in the provision of web-based health care services (interoperability)? E.g. other county councils, public agencies, private health care providers
[  ] Yes [  ] No [  ] Do not know
If yes please describe briefly..........................................................................................

10. How important do you consider the following factors be when you develop health care services? (place a cross on the scale)
a) Services available to citizens

   Totally unimportant       Very important
   [---------------------------]

b) The system's security

   Totally unimportant       Very important
   [---------------------------]

c) the benefit of patients privacy

   Totally unimportant       Very important
   [---------------------------]

d) The county council / region cost

   Totally unimportant       Very important
   [---------------------------]
11. What do you think are the biggest challenges or problems to solve, in order to realize the potential of Web-based services in health care?

In the short term..................................................................................................................................................
.................................................................................................................................................................

In the long term..............................................................................................................................................
.................................................................................................................................................................
.................................................................................................................................................................

12. What web-based health care services are mostly accessed by users? Please specify at least three

1....................................................................................................................................................................

2....................................................................................................................................................................

3....................................................................................................................................................................

13. What age group of people use the web-based health care services the most?

( ) 25 years or younger  ( ) 46 – 55

( ) 26 – 35  ( ) 56 – 65

( ) 36 – 45  ( ) 66 and older
Appendix 4: Screenshot of Jonkoping county council website (www.lj.se)