Dressed for Web Success?
An Empirical Study of Website Quality in the Public Sector

Sørum, Hanne

Document Version
Final published version

Publication date:
2014

License
CC BY-NC-ND

Link to publication in CBS Research Portal

DRESSED FOR WEB SUCCESS?

Copenhagen
Business School
HANDELSHØJSKOLEN

DRESSED FOR WEB SUCCESS?

An Empirical Study of Website Quality
in the Public Sector

Hanne Sørum

DRESSED FOR WEB SUCCESS?

An Empirical Study of Website Quality
in the Public Sector

Hanne Sørum

Supervisors:
Professor Kim Normann Andersen, Copenhagen Business School
Professor Torkil Clemmensen, Copenhagen Business School

LIMAC PhD School
Copenhagen Business School

Hanne Sørum
DRESSED FOR WEB SUCCESS?
An Empirical Study of Website Quality in the Public Sector

1st edition 2014
PhD Series 13.2014

LIMAC PhD School is a cross disciplinary PhD School connected to research
communities within the areas of Languages, Law, Informatics,
Operations Management, Accounting, Communication and Cultural Studies.

ABSTRACT – ENGLISH

In the public sector, we find that traditional face-to-face interaction has, in many cases, been replaced by online communication and transactions during the last decade. The quality of public sector websites is, therefore, of particular importance in order to ensure quality participation in an increasingly digital society by all the citizens. In view of the fact that Norway and Denmark aim to be world leaders of the Web, with regard to innovations, technical standards and user-centred development, easily accessible facilitation for high quality interactions assumes considerable significance. With reference to this particular aspect, the following Ph.D. thesis focusses on perceptions and measurement of website quality and success, by emphasising and highlighting the performance of public sector websites in the Scandinavian countries (respectively Norway and Denmark).

This thesis draws on both qualitative and quantitative data collected during the research process. A grounded theory approach is applied in order to investigate explanations of website quality and statistical analysis is performed to examine perceptions of quality and success in websites. In this regard, the webmasters' perspectives are emphasised, as they are found to be pivotal figures and key contributors in website quality improvements. Website quality criteria, obligated by the central governments are also discussed. These criteria aim to minimise a gap between the governments and the citizens for provision of online information and digital services.

The findings and explanations of website quality cover a variety of features and range from technical standards to a broad definition of usability. Pertaining to this fact, added emphasis is placed on actual usage and subjective issues concerning user-friendliness and ease of use, compared to the criteria implemented by the

governments, which focus more on objective technical measures. This may explain why users are not actually satisfied with high quality websites, when compared to low quality websites, in an annual assessment of hundreds of public websites based on these criteria. Accordingly, explanations and measurements of quality within the public sector are perceived differently, when taking into account the citizens' (users') needs and requirements from websites. Based on the use of quality criteria and evaluation methods applied to such evaluations, there exists a potential argument for adopting an additional user-centred focus.

Furthermore, user satisfaction is emphasised as a measure of success in websites and user-centred development is found to be a key contributor. In view of this fact, the findings also prove that the public sector in general should improve and extend their feedback channels, by extending frequency and methods applied in user testing and continuous quality improvements. The fact that government bodies perform testing to a minimal extent and that more sophisticated methods should be included, demonstrates a potential for advances in facilitation for improved and refined user experiences in online communication between citizens and the public sector. In this regard, organisations which perform user testing tend to see a stronger correlation between website quality, user satisfaction and net (user) benefits.

The concluding observations in the thesis, suggest that further research can decrease a gap between the governments' perceptions of quality, and the citizens' needs and requirements from public websites. Future investments and quality improvements should devote increased attention to testing and issues concerning inclusion of real users, and the benefits of such actions. Implications for practice are also provided in order to move the sector forward and facilitation for improved and refined user experiences and success on the Web.

ABSTRACT - NORSK

Innen offentlig sektor finner vi at tradisjonell "face-to-face" interaksjon i mange tilfeller er erstattet med elektronisk kommunikasjon og digitale løsninger. Kvaliteten på offentlige websider er derfor særlig viktig for å sikre en god interaksjon i et samfunn som i økende grad digitaliseres. I forhold til bruken av offentlige websider finner vi også en bred og lite homogen målgruppe, og brukere med ulike behov og krav må derfor tilfredsstilles. De Skandinaviske landene har som mål å være verdensledende på nett, i forhold til innovasjon, tekniske standarder, brukersentrert utvikling, tilgjengelighet og kvalitet. Med dette som utgangspunkt fokuserer denne Ph.D. avhandlingen på webkvalitet og suksess innen offentlige sektor i Norge og Danmark.

Studien bygger på både kvalitative og kvantitative data som er samlet inn i løpet av forskningsperioden. Webmastere er ansett å være nøkkelpersoner i webutvikling og kvalitetsforbedringer på nett – og har derfor vært viktige bidragsytere i denne sammenheng. Kvalitetskriterier for nett, lansert av sentrale myndigheter i Norge og Danmark, er også omtalt i denne studien. Disse kriteriene fungerer som retningslinjer for kvalitet og suksess innen offentlige sektor, og tar sikte på å minimere et potensielt gap mellom det offentlige og innbyggerne, hva angår elektronisk informasjon og digitale løsninger (services).

Funnene i studien viser at webkvalitet omfatter en rekke aspekter på en webside og spenner fra tekniske standarder til en bred definisjon av brukervennlighet. Det legges vekt på faktisk bruk og subjektive spørsmål om brukervennlighet, noe som står i kontrast med kriteriene for webkvalitet lansert av sentrale myndigheter. Disse kriteriene fokuserer i større grad på objektive og forholdsvis tekniske forbedringstiltak. Det faktum at kriteriene i høy grad er objektive kan være med på

å forklare hvorfor brukerne ikke nødvendigvis er mer fornøyd med websider som holder en høy kvalitet, sammenlignet med websider med en lavere kvalitet. Basert på bruken av kvalitetskriterier innen offentlig sektor og de evalueringsmetoder som der benyttes, finnes det rom for forbedringer i forhold til et økende brukersentrert fokus.

Videre er brukertilfredshet fremhevet som et mål på suksess på nett og brukersentrert utvikling anses derfor å være en viktig bidragsyter. I lys av dette viser også funn fra studien at offentlig sektor generelt sett bør utvide sine tilbakemeldingskanaler. Blant annet i forhold til en økende grad av brukertesting i en kontinuerlig utviklingsprosess. Det at offentlig sektor i liten grad utfører testing og at mer sofistikerte metoder bør inkluderes, viser et potensiale i forhold til tilrettelegging for bedre og mer raffinerte brukeropplevelser i elektronisk kommunikasjon mellom borgerne og myndighetene. Studien viser også at organisasjoner som gjennomfører brukertesting opplever en høyere grad av kvalitet og suksess.

Studien foreslår derfor at videre forskning innen området kan redusere et gap mellom myndighetenes oppfatning av kvalitet, og innbyggernes behov og krav i forhold til bruken av offentlige websider. Fremtidige investeringer og kvalitetsforbedringer bør derfor vies økt oppmerksomhet knyttet til testing og brukersentrert utvikling. Avslutningsvis gis det også anbefalinger som kan være nyttig for praktikere (for eksempel webmastere) og den offentlige sektor især – i det videre arbeidet med å skape gode brukeropplevelser og suksess på nett.

ACKNOWLEDGEMENTS

Writing this Ph.D. has been a long journey for me, but I feel honoured to have experienced this opportunity to challenge myself and extend my knowledge in a self-selected research topic. After completing such an extensive academic work over many years, today, I am finally able to reflect on the journey I have been through.

I have encountered innumerable challenges along the way, meaningful decisions affecting my life and professional career have been carried out and an abundance of experience has been gained. My knowledge has been considerably expanded through working with very attentive and helpful colleagues, who willingly shared their research experiences and thoughts with regard to my academic field. I have come to realise that combining such demanding work, with other important tasks, such as teaching and supervising students, participating in faculty meetings, taking care of my family and engaging in normal social activities, has made me discern the importance of prioritising my work as well as other tasks.

First of all, I would like to begin by thanking my supervisor Professor Kim Normann Andersen, who has inspired me, been very helpful and patiently guided me through the research activities carried out. Long and fruitful discussions have given me the professional knowledge and insights I needed, both with reference to conducting data, data analysis and academic writing. Thank you very much! My co-supervisor Professor Torkil Clemmensen has also contributed with detailed and constructive feedback during the research process. Great discussions with him have given me in-depth academic knowledge and inspiration for completing this thesis. Thank you very much! In addition, I will thank Professor Niels Bjørn-Andersen and Professor Ravi Vatrapu at Copenhagen Business School (CBS) for

TABLE OF CONTENTS

CHAPTER 1. MOTIVATION, OBJECTIVES AND STRUCTURE

1.1 Introduction

During the last decade, we have been witness to rapid technological development in relation to the use of websites for communication, both within public and private sector organisations. We have also experienced that many organisations spend a great deal of time and effort to provide high quality websites, resulting in increasingly more content and services being available online now. With regard to this, we need to take care of the users' requirements and needs on websites, during the development process and through continuous quality improvements. Due to the inevitable use of Web technologies and more demanding users, the presented Ph.D. thesis aims to dig into the world of websites, by focussing on quality and success in online information and services provided by the public sector in Scandinavian countries. To begin with an overall presentation, this chapter presents the motivation for conducting this research, and the study objectives that strive to be fulfilled in this complete thesis. A summary of the four academic papers included in this thesis is provided in Section 1.4, in order to highlight the contributions of each of these papers and link the papers to the research question addressed in Section 1.3. Section 1.5 covers the philosophical viewpoint and considerations within this thesis, and ends with the content and structure of the present Ph.D. research in Section 1.6.

1.2 Background and Motivation

The journey towards writing this Ph.D. thesis actually commenced six years ago. The fact that many websites was found challenging to use piqued the curiosity, with the question as to why many organisations, which expectedly presented high quality websites, were not actually successful on the Web. The opportunity came, as a Ph.D. student, to spend time and effort to conduct research by using scientific

methods. As website success is a relatively complex phenomenon, which can be approached in various ways, the intention was to positively contribute through my research and fill the gap perceived in the literature. In addition, the aim was to give practical recommendations based on empirically grounded data. Before proceeding, the thesis begins with an example that backs up the motivation for completing this study:

I consider myself as a fairly experienced website user, both in a personal context and due to work-related tasks as a lecturer and researcher. Going back two years, I was in the process of applying for a place for my youngest daughter in a school programme. Previously, such applications could be sent by post to the municipality where we live. After introducing new methods, and because of efficiency within the public sector, the sole means to apply at that time (two years ago) was through the municipality's website. Firstly, I had to log-in to the website, locate the right service to apply for and finally, log-in to the service by using my unique username and password. But prior to that, I had to spend time and effort to acquire my personal log-in details. (In Norway, it is customary to receive the aforesaid details from the central government). For me personally, as an experienced user, it was relatively simple and easy to fill in the form, although things could have gone wrong along the way. However, through using the digital online service in this case, an acceptable level of Information Technology (IT) knowledge and after a great deal of patience, the task was concluded. Compared to completing such applications by hand years ago, rather than through a digital service, we are clearly able to witness that there has been a paradigm shift within public sector services during the last years, thus requiring additional types of skills and motivations than before. There are obviously numerous benefits and cogent arguments for advancing forward by using increasingly more Web technologies.

However, the eye-opener in this case, was that the transition I experienced of going from paper based forms to mandatory digital online services, was suddenly more cumbersome than before, although it should have been to the contrary, considering the goals of increasing digitisation between citizens and the public sector.

When reflecting on this experience afterwards, we are undoubtedly able to perceive how the public sector moves forward and expects that citizens follow after. Firstly, I had no alternative except to submit the application online, considering the fact that an online form was the one and only option in this case. Secondly, there was no guarantee that all applicants (citizens) possessed qualifications similar to those I possess, in performing such an application by using the Web. Thirdly, I did not receive any immediate feedback that the application had been received and was registered, as we have come to expect from online applications today. Customarily, we receive a confirmation by e-mail, as opposed to the system two years prior to this, when this type of application was sent by post, and subsequently, the confirmation arrived by post within a couple of days. Last but not least, if I was unable to understand the correct procedure to fill out the application form during the registration process, there was no option other than to try and in the worst case scenario, be unsuccessful. Based on this experience, we obviously see the crucial importance of offering the public online information and services that are easily accessible and therefore, can be successfully used by everyone.

Consequently, digital communication has become a central part of interactions between the public sector and citizens (Panagiotopoulos et al., 2012). Hence, the argument in favour of high quality websites is probably more important than ever, and in the coming years, will assume even greater significance. One challenge is

to satisfy citizens who possess little or no experience using websites or digital services, while the second challenge is to satisfy those users who through experience, become increasingly demanding and require a higher quality of interactions and enhanced user experiences. We find that traditional face-to-face interaction has, in many cases, been replaced by computer interaction and online services. This is more the case, with particular reference to the public sector, which will face numerous challenges in the coming years, both in terms of facilitation for successful use and the failure to achieve its goals, by being increasingly dependent on Web technologies. To a large extent, the public sector has a monopoly on most information and services provided, and to ensure participation in a digital society, the quality of websites is therefore, understood to be an important contributor (Choudrie et al., 2009). By taking into account the requirements and needs of users, increased usability of websites can be translated into effectiveness, efficiency, reduced support provided by the organisation and higher user satisfaction (Lindgaard and Millard, 2002). In public sector websites, we can assert that this is of particular importance and contributes to providing value for the taxpayers' (citizens') money, as the public sector is to a large extent subsidised by citizens and businesses. This also means that we can demand more from the public sector, even when it comes to the use of websites as an increasingly common channel for communications.

With respect to the public sector, we discover numerous projects that have been expensive to set up and are of significant national importance. One such example is the Norwegian Altinn-project, which has achieved success in spreading electronic forms and services in Norway. Altinn promoted a total of 424 digital forms and services in January 2013, and aims to create an easier dialogue between the public sector and citizens (source: www.altinn.no). Despite its obviously

apparent success, this project has been highly debated and discussed in the media and among citizens. Since the portal (website) was first launched in 2003, diverse issues that have caused problems have come to light (Fuglerud et al., 2009). From a user's point view, criticism in this case have been raised against its design features and login-in functions, security issues and handling of sensitive information, thus, accounting for almost all typical features of a website users have to deal with during their interactions with the website. This particular example, which is one website out of many, highlights the significance of satisfying citizens, particularly within public sector websites. Development of information systems typically occurs at the intersection of complexity, which demands for security, usability and interactions between different user groups that hold varying interests. Consequently, multiple requirements must be taken into account, although one of the most important issues to take care of is concerns which the citizens have to deal with in online usage of digital information and services, and how website usage affects their experiences and satisfaction with the public sector. Although Altinn is an example which in many ways are different from other types of public websites (e.g. municipalities), Altinn is a national service with a large group of different users (representing various requirements and needs). This case is only used as an example, in order to shed light on the importance of website quality – in relation to facilitation for use and user satisfaction with online information and services. We can argue that the website design is a small part of a large and complex system, as Altinn is. However, the user interface is what the website users have to relate to when they log on to a website, in order to find information and accomplishing various tasks. How the website actually works and ease of use is, therefore, crucial and often decisive in relation to the extent to which the website (service) is perceived as user friendly or not.

In order to address this concern and ensure successful implementation and use of public websites, central guidelines for quality indicators have been implemented by the governments in Norway and Denmark. Since the beginning of year 2000, hundreds of public websites are annually evaluated and ranked by quality. The overall aim has been to provide valuable feedback for quality improvements and it is observed that the winners are highlighted as best-practice examples. These evaluations are organised by the central governments and have attained growing significance within public sector organisations. Despite the fact that the Scandinavian countries are ranked highly in international benchmarking studies (Accenture, 2007), due to their superior technical standards, innovations and citizen-centred focus - studies conducted, conclude that eGovernment does pay off, and also that public authorities profit more than the users (citizens) (Capgemini, 2004). After more than 15 years of providing online public information and services, the public sector has learnt many lessons, but there is still a way to go if it aims to achieve its targets. However, we also need to focus on and learn from the different eGovernment projects that have been successfully implemented, both in terms of creation of user benefits and organisational values.

In the Scandinavian countries, we also find that many researchers have contributed to the field of Information Systems (IS) research. Apropos this, the focus of this thesis is Web-based systems, which hold many of the same characteristics as traditional information systems (such as systems that aim to support operations and management within an organisation), with regard to information quality, system quality, service quality, satisfaction among users and benefits the systems create. Over the last decades, user involvement in system development has been advocated as one of the fundamental keys to success, and key researchers in this field were among the first to conduct research on this topic, in a Scandinavian

context, for example (Bjerknes and Bratteteig, 1995; Bjørn-Andersen and Hedberg, 1977; Nygaard and Håndlykken, 1981).

Furthermore, when it comes to facilitation for high quality interactions and user satisfaction on the Web, we find that webmasters (or a person in a similar position) are key figures (Liu and Arnett, 2000; Lazar et al., 2004) in taking responsibility for accommodating users' interests on websites. We also find that webmasters are content providers, and in most cases, frequently in contact with website users (Furu, 2006). Therefore, it is particularly interesting to focus on webmasters because of their accountability in the attempt to fulfil the users' requirements and needs in the usage of online information and services. Most research studies that have previously addressed this topic of interest emphasise the users' perspective, rather than taking a service provider's (organisation's) perspective. Although we do find some studies focussing on usability, by taking a management perspective, in a public sector setting, for example (Cajander et al., 2006). However, we are also required to rethink and provide additional insights from a service provider's perspective, as they are responsible for successful implementation and user satisfaction.

There are large differences in public sector websites, aiming to fulfil various requirements and needs. In regards to the webmaster role in this, we can assume that (in some cases) there is a certain gap between the users' and the organisations' perceptions of quality and success. Although we cannot expect a homogeneous view that can exclusively handle this issue, we need to minimise the gap as much as possible. The service provider's (in this case the public sector) perspective can therefore be one approach which has previously received little attention within literature. While many researchers have contributed to this field already, there is an extensive sphere that remains unexplored (Esteves and Joseph, 2008), and the

topics identified within this thesis can be perceived as one of these unexplored areas.

Although the webmaster (service provider) are emphasised in the present thesis and the findings most likely will provide valuable input for website development and quality improvements, this thesis will in addition, have some broader implications in regards to eGovernment adoption. From a government and national point of view, we find strategies and goals for implementation and use of online information and digital services (e.g. Datatilsynet, 2013; Regeringen, KL and Danske Regioner, 2011). In this regard, findings derived in the present thesis can also contribute with additional insights and knowledge concerning upcoming investments and actions taken, which in the end, ultimately stimulate for successful use and benefits (e.g. efficiency and effectiveness). The contribution is primarily related to user interfaces (front-end), website design and user testing, rather than hard core technical issues and back-end design.

Based on the background and motivation for conducting this research, the study objectives that strive to be fulfilled in the present thesis are provided in the following section.

1.3 Research Objectives

A high failure rate within eGovernment projects (Heeks, 2006) encourages an examination of the relationship between practice and research. Although measurement of success has been the object of a wide range of contributions within the IS field, the ever-increasing use of public sector websites, now perhaps more than ever, encourages greater research and an in-depth knowledge of this field. Despite rising expectations fuelled by massive investments within many organisations, success has often proved to be difficult to identify (Petter et al.,

2012). Prior studies point out that a majority of actual government projects end in failure (Goldfinch, 2007), thereby suggesting that the productivity paradox of IT (Brynjolfsson, 1993) appears to apply even more in the public sector. Citizens also experience difficulties whilst using many websites in the public sector, due to issues concerning design features and user interfaces (Clemmensen and Katre, 2012). This also raises the argument about the need for further research and in-depth knowledge in relation to the topic of interest in the present thesis.

The prime reason for failure of successful project implementation is the perceptual gap between users and designers (Lee and Kozar, 2006). Consequently, we need to re-think our strategy on how to decrease the gap, by focussing on quality aspects and what serves to make a website successful. In evaluating success of websites there are many factors that may interact, and insights as to how constructs perform and the relationships between them, contribute to an additional understanding of website success (Petter et al., 2008). Hence, new challenges constantly arise in relation to the growing use of websites, such as more demanding website users among citizens and more importantly, the fact that new technologies and innovations constantly change the world of websites. We are therefore witness to the fact that many systems have failed in terms of being poor in quality and having low user satisfaction, and expensive projects have not been as successful as first expected.

In a public sector website, quality is supposed to be highly significant (Choudrie et al., 2009; Sørum et al., 2009) and, in most cases, is viewed as a prerequisite for success on the Web. We believe that all users should have equal opportunities to participate in a digital society (Meyer, 2005; Accenture, 2007), whilst asserting the point that citizens should be able to easily locate what they are looking for (for example information) and expend minimal effort whilst accomplishing tasks (for

example digital online self-services). Therefore, we need to strive towards a more homogenous and consistent understanding of how to facilitate these requirements, by emphasising the users' interests and needs in websites. Inclusion of real users in activities such as user testing can be one type of initiative, which can provide valuable feedback in website development and quality improvements. In order to investigate the topic of interest in the present thesis, the overall research question is stated as follows:

- *What is website quality and success in public sector websites?*

With reference to this question, we already know that quality in websites is considered to be important in communication between the public sector and the citizens and for this purpose, government bodies need to take into account website users' requirements and needs. A unique point in this thesis, is that it can be linked to the service providers' perspectives on quality and success (i.e. central governments and public sector organisations), rather than the users' perspectives (i.e. the citizens), as compared to other similar studies investigating this topic. This thesis consists of various empirical components (data) collected from the Scandinavian countries, which were absent in previous research studies. Therefore the object of this thesis is to increase our understanding, by investigating explanations and measurements of website quality, constructs of success, the relationships between the constructs and the role of user testing in public sector websites. By taking this approach, we are able to effectively close a perceptual gap between various stakeholder groups (governments' perspective versus citizens' perspective) and contribute additional inputs for future investments and growth, as well as assist prioritisation of resources, in order to move the sector forward.

Website quality in the context of this study is related to aspects the citizens have to deal with, during online interactions with public sector websites and digital services. In most cases, the organisation exercises complete control over the quality of websites, with the recognition and discernment that they can carry out changes to problems related to information and online services, design aspects and more technical features. Occasionally, website improvements can be made easily and with the least possible effort (a temporary solution or quick-fix job), whilst in other cases, improvements may be included as a part of long-term and expensive projects. The quality of websites can also be assessed at various levels and from varying perspectives: for example, user perspective, organisational perspective, central government perspective; and/or by using a number of different approaches (for example various methods of user testing). Organisations and the users (citizens) do not necessarily share the same perception of website quality. For assessment of websites, there are various available initiatives, such as expert evaluations of websites (conducted by usability consultants), traditional user testing with real users and online user satisfaction questionnaires (Rogers et al., 2011).

Website success in this study refers to a broader concept than website quality, and covers different constructs (variables) of success. In this connection, we find that user satisfaction is a common measure in assessment of whether a system is successful or not (Kappelman and McLean, 1992; DeLone and McLean, 2003; Verdegem and Verleye, 2009), and facilitation for user satisfaction is perceived as highly important, particularly in public sector websites (Choudrie et al., 2009; Panopoulou et al., 2008). Thus, in order to stimulate user satisfaction we need to identify important website quality aspects, which in turn would contribute to satisfied user experiences on the Web. We also discern a growing awareness on

websites, to address the need of benefits achievement, driven and motivated by the constructs of success. This in turn can be linked to aspects such as user benefits among citizens (Scott et al., 2009) and organisational impacts in government bodies (Flak et al., 2009).

Moreover, we also find that maturity models have been discussed and refined over a period of time, in order to classify and catalogue the degree to which IS adoption is successful in eGovernment (Andersen and Henriksen, 2006). However, in this particular context, we are unable to discern exactly how public sector organisations facilitate for success, by emphasising explanations and perceptions of quality in the public sector, the relationships among the constructs of success and activities performed (e.g. user testing) for website development and quality improvements. By adopting this approach, the present thesis also aims to give relevance to practice, as it is found to be important in studies in the field of IS (Benbasat and Zmud, 1999). Therefore, based on the findings in this thesis, practical recommendations and implications for future practice will be presented in Section 7.4.

In order to provide an answer to the overall research question addressed in this thesis, four sub-questions have been developed:

- Sub-question 1: *What is a webmaster's explanation of website quality?*

The aim of sub-question 1 is to investigate how practitioners explain quality in websites and the aspects they find to be of particular importance in determining quality. It is relevant to view this from a webmaster's perspective because webmasters are perceived to be key contributors in website development and continuous quality improvements.

- Sub-question 2: *Are website users more satisfied with high-quality websites than low-quality websites?*

The aim of sub-question 2 is to investigate measurement of website quality in the public sector, by emphasising the use of quality criteria and methods applied in testing organised by central governments, and further, the relationship between website quality and user satisfaction among citizens in usage of public websites.

- Sub-question 3: *What is the webmaster's perception of website quality within government bodies?*

The aim of sub-question 3 is to investigate the quality level of public sector websites and how public organisations (represented by the webmasters) perceive themselves to be successful on the Web. With reference to this question, the following quality aspects are emphasised, in order of their importance: information quality, system quality and service quality.

- Sub-question 4: *To what extent is user testing performed in the public sector and how does user testing affect website success?*

The aim of sub-question 4 is to investigate the role of user testing in website quality and success, by addressing the frequency and methods applied within public sector organisations, in addition to the techniques by which user testing affects the constructs identified for website success.

Summing up, this Ph.D. thesis aims to contribute significantly to the research field of IS by investigating website quality and success (Section 3.3). With respect to this investigation, the field of eGovernment is important, in order to set the agenda for studying websites in public sector organisations (Section 3.4). This thesis also

draws on appropriate literature from the field of Human-Computer Interaction (HCI), by emphasising the users' (citizens') interactions with public sector websites and the role of user testing in development and website quality improvements (Section 3.5).

1.4 Summary of Papers

During the course of this Ph.D. study and academic work, a total of thirteen research papers is written and published in various international journals, conferences and workshops. Each of the papers deals with a topic of interest, which in turn, contributes to an understanding of the research objectives that strives to be fulfilled, in this thesis. As this study is paper-based, four of the thirteen papers are chosen to be included in the present thesis. Three of the contributions are journal papers (where I am the first author), and one of the papers is a conference paper (published in proceedings), of which I am the sole author. Although several of the other contributions could have also been included in this thesis, I have opted to use the papers that have received the highest feedback and above all, in my opinion, are best suited to give an answer to the overall research question addressed in the present thesis.

There are several advantages worth mentioning whilst writing a paper-based Ph.D. thesis. One of the most important benefits perceived by me, during this learning process has been collaboration with other researchers. Immense knowledge is gained through writing papers with experienced colleagues from various countries (i.e. Denmark, Ireland and USA). By publishing papers together, we have also received valuable observations and feedback from a selection of reviewers, which have, in turn, improved the quality of the papers and contributed to my expanded understanding of the academic field and work as a researcher. Accordingly, in order to introduce the papers included in this thesis, Table 1 provides a brief

overview of the contributing authors, titles of the papers, publishing channels and years (when the papers was published). In addition, the table presents which sub-question in this thesis that can be linked to each of the papers. All the papers included herewith were published during the last two years, which can be further viewed as a distinct advantage of this study.

Paper	References	Sub-question addressed
1	Hanne Sørum, Kim Normann Andersen and Torkil Clemmensen, "Website quality in government: Exploring the webmaster's perception and explanation of website quality", Transforming Government: People, Process and Policy, 7(3), 2013, pp. 322-341	Sub-question 1
2	Hanne Sørum, Kim Normann Andersen and Ravi Vatrapu, "Public websites and human-computer interaction: an empirical study of measurement of website quality and user satisfaction", Behaviour & Information Technology, 31(7), 2012, pp. 697-706	Sub-question 2
3	Hanne Sørum, "Dressed for Success? Perception of Website Quality Among Webmasters in Government Bodies", Proceedings of NOKOBIT (Norsk konferanse for organisasjoners bruk av IT), 2012, pp. 63-75	Sub-question 3
4	Hanne Sørum, Rony Medaglia, Kim Normann Andersen, Murray Scott and William H. DeLone, "Perceptions of information system success in the public sector: Webmasters at the steering wheel?", Transforming Government: People, Process and Policy, 6(3), 2012, pp. 239-257	Sub-question 4

Table 1. Research papers included in the thesis.

Paper 1 addresses the webmasters' perceptions of website quality and aspects of quality and what webmasters, as intermediaries in website development and maintenance, judge to be of particular importance. Webmasters (web designers) have to focus on the users' needs and requirements to facilitate a superior quality of interactions and heightened user experiences (Lindgaard et al., 2006). Although we encounter many studies based on website quality and system design, there are surprisingly few studies on webmasters' explanations of quality aspects. Most studies identified address specific topics, such as accessibility in websites, for example (Lazar et al., 2004; Snaprud and Sawicka, 2007) and/or specific design features with regard to usability issues, for example (Choudrie et al., 2009), rather than taking the explorative approach adopted by this paper. Moreover, most studies addressing website quality deal with this topic by emphasising the users' explanations, instead of the intermediaries' explanations of quality aspects in websites, for example (Chang et al., 2005; Choudrie et al., 2009). Hence, this paper aims to add to the body of knowledge by emphasising the webmasters' perspectives. Qualitative interviews were conducted for this purpose, among webmasters in website award winning organisations, and the analysis thus accomplished presents a grounded theory approach, by aiming to understand explanations of website quality from a web practitioner's point of view.

Paper 2 investigates measurements of website quality and user satisfaction in public sector websites, and the extent to which users are found to be more satisfied with high-quality websites, when compared to low-quality websites. This study adds to the body of knowledge by investigating the use of website quality criteria implemented by the central governments in Norway and Denmark, which aim to stimulate website development, quality improvements and user satisfaction in public sector websites. By adopting a HCI perspective, the use of quality criteria

and evaluation methods applied in such assessments, are discussed. Moreover, by shedding light on users in public websites this study investigates the quality level of websites versus actual user satisfaction among citizens, by analysing and investigating the correlation between the two variables. In addition, this study reports on available public data, collected and made public by the governments in Norway and Denmark.

Paper 3 addresses perceptions of website quality by investigating how and to what extent public organisations (represented by the webmasters) are perceived to be successful, on the subjects of information quality, system quality and service quality within public sector websites. There is a basic lack of knowledge regarding perceptions of website quality, particularly from a government point of view, and this paper contributes to and addresses this topic. An explorative study is conducted in this paper, and it reports on an online survey questionnaire conducted among public sector employees in Norway and Denmark. By taking a descriptive approach, the aim has not merely been to test any hypothesis or explore any relationships in website quality, but rather, to investigate perceptions of website quality from a webmaster's perspective. The findings reveal how and to what extent public websites are perceived to be successful with regard to website quality.

Paper 4 investigates relationships between constructs of success in websites and how user testing affects perceptions of user satisfaction and net benefits. User involvement in development of information systems occurs when potential users or their representatives are involved in the process (Barki and Hartwick, 1994; Ives and Olson, 1984). The relationships among constructs of success associated with websites, have been explored in prior research contributions, for example (Elling et al., 2007), but this study adds to the body of knowledge by adapting the

DeLone and McLean IS success model to an eGovernment context. Although a few studies have previously used this particular model in a government setting, for example (Scott et al., 2009), the aim of this study has been to additionally investigate to what extent user testing affects these relationships. This study reports on a similar online survey questionnaire, as in paper 3, conducted among public sector webmasters in Norway and Denmark.

1.5 Philosophy of Science

The objective of this section is to address the challenges connected to the philosophical viewpoints expressed in the thesis. It is noticed that philosophical ideas influence the practice of research activities and therefore, must be identified in all research studies (Creswell, 2009). For the aim of this thesis, the summary of "soft" versus "hard" research dichotomies by Fitzgerald and Howcroft (1998) acts a guide for identifying the philosophical view and standpoints taken in the study. The classification of research dichotomies (soft/hard) has been valuable and accorded me the opportunity to identify the philosophical viewpoint in relation to other studies in the IS field, in addition to the relation between theory and empirical data. However, it would also have been relevant to choose other frameworks/approaches regarding philosophy of science. The clear distinction between the four different levels is the fundamental reason for utilising this framework. Besides, these four levels carry significant weight with regard to philosophical considerations in the field of IS research.

The framework separates the four levels in the following manner: (1) Ontological level, (2) Epistemological level, (3) Methodological level, and (4) Axiological level (Fitzgerald and Howcroft, 1998). The ontological level focusses on the nature of things, while the epistemological level is concerned with the means by which we gain knowledge. The methodological level is related to empirical

components and use of techniques for gathering and analysing data, while the axiological level describes the relevance and rigor of the research conducted. Table 2 presents the research dichotomies divided into hard- and soft measures.

Soft Research Dichotomies	Hard Research Dichotomies
Ontological level	
Relativist	Realist
Epistemological level	
Interpretivist	Positivist
Subjectivist	Objectivist
Emic/Insider/Subjective	Etic/Outsider/Objective
Methodological level	
Qualitative	Quantitative
Exploratory	Confirmatory
Induction	Deduction
Field	Laboratory
Idiographic	Nomothetic
Axiological level	
Relevance	Rigor

Table 2. Research dichotomies adopted from Fitzgerald and Howcroft (1998).

To begin with, the dichotomy in ontology discussed by Fitzgerald and Howcroft (1998) is related to two main perspectives, relativist which states, "Belief that multiple realities extist as subjective constructions of the mind. Socially-transmitted terms direct how reality is perceived and this will vary across different languages and cultures" (p. 10), and realist which states, "Belief that external world consists of pre-existing hard, tangible structures which exist independently of an individual's cognition" (p. 10). The qualitative section of this study contains interviews held with webmasters in website award winning organisations, wherein the primary intention is to understand how these webmasters explain website quality from their subjective point of view. The webmasters were not previously exposed to a predefined set of criteria/aspects related to website quality, and in fact, expressed their views in their own words through their explanations. The aim of these interviews was, therefore, to understand the webmasters' interpretations of a specific topic and not guide the research in a predetermined direction.

According to the framework and the use of qualitative methods, this part of the data collection process and analysis, has accordingly taken a relativist approach, by paying attention to and accepting the webmasters' personal explantions and interpretations of the topic of interest when the interviews were conducted. As stated, the webmasters did not adhere to any standards that were pre-defined by the researcher, but rather offered independent explanations in their own terms. The chief advantage of this method was gaining insight and knowledge by offering the respondents the ability to communicate how they, from their subjective point of view, could best explain various quality aspects in websites, without any external influence or pressure from me as a researcher. Although an interview guide was utilised during the interviews, the aim was mainly to guide the conversations and ensure a modicum of control over the situation. Shortcomings of these types of

interviews that can be elaborated are whether the interviews were totally focussed on the research objective they were intended to investigate. In defence, it can be stated that overall, the conversations were very constructive and focussed, and definitely influenced by the study objectives. The respondents were very forthcoming and candid with their explanations. They were also willing to explain and share their knowledge.

When studying website quality and success we can also establish a set of criteria/variables that guide our research. In the quantitative part of the data collection process, an online survey questionnaire was constructed in order to investigate perceptions of website quality and success among public sector organisations, represented by the webmasters (or persons in similar postions). The obvious complexity when investigating these topics, was handled by adopting the IS success model from DeLone and McLean (2003), which to some extent guided the research, by identifying constructs of success. The model has not been strictly followed, but was adapted for the context of this study (public sector websites in Scandinavian countries). This could be viewed as a realist approach, which believed that the constructs of success identified in the online survey questionnaire were relevant and applied to all the respondents, and it was this angle that was generally pursued for the survey.

Although measurement of website quality and success is probably assessed differently in various public sector organisations, it is possible that there are several common denominators that are relevant to most of them. The online survey questionnaire which was conducted, emphasised the use of hard tangible measures that were defined by the researcher, and the respondents (webmasters) encountered no opportunities to influence the methods by which the online survey measured quality and success in public sector websites. Therefore, the respondents

were obligated to adhere to a predefined set of questions and the use of a measurement scale (Likert scale), instead of using their own words and explanations, as they were able to, when the qualitative interviews were conducted. The crucial reason and objective of conducting this survey, and the statistical analysis that was accomplished, was that this approach was found to be the most appropriate means to collect data from a large number of respondents. The amount of time and resources was also taken into account in the present study.

Secondly, the epistemological level, which is the branch of philosophy that studies how we gain knowledge, is in the context of this study, a research setting. The principal question that it is necessary to answer is: What is knowledge and how is knowledge acquired within the context of this research? And how do we really know what we know? Consequently, epistemology covers the scope and limitations of human knowledge, how knowledge is derived and how it is learned. One can argue that this thesis in general propounds a positivistic view explained as, belief that the world conforms to fixed laws of causation and that complexity can be handled by reductionism by putting empathy on objectivity measurement (Fitzgerald and Howcroft, 1998). The qualitative interviews conducted within this research take an interpretivist approach - seeking to understand website quality, through qualitative interviews by adopting a grounded theory approach, whilst performing the analysis. The outcomes derived from the interviews did not affect the method by which website quality and success were empirically measured in this thesis, and in any case, this was not the goal of conducting the interviews. For this thesis, these topics were approached by adopting the IS success model of DeLone and McLean (2003), which clearly defines constructs and the relationships between each of them.

The epistemological dichotomy relates to subjectivist vs. objectivist aspects. In this study, I perceive myself as an objectivist. Although some of the findings that have emerged from the interactions and communications between the respondents and me, as a researcher, have been established, I have endeavoured throughout the process, to accept the respondents' (webmasters') explanations and perceptions as the final word, in order to explain website quality from their perspective. Consequently, for the qualitative element of the data collection process, the webmasters' explanations were derived from their subjective opinions and points of view. My subjective interpretation was not discussed or presented to them by any means, and therefore, this did not affect the explanations proffered by the respondents. The respondents' interpretations are, therefore, their sole personal contributions in this study, and hence, one can contend safely that there was a clear distance between the respondents and me. Regarding the quantitative part of the data collection process, the findings were entirely grounded in the respondents' (webmasters') perceptions of website quality and success, with reference to the questions asked, when the online survey questionnaire was conducted. The final level in the epistemological dichotomy is the emic/etic perspective which was, to a certain degree, related to the dichotomy of subjectivist /objectivist views, as discussed above. In some small measure, I could be perceived as an insider in this study, as I was actively involved in the quality assessment process for a Norwegian website award (Farmandprisen) from 2007-2009. Though, for the sake of this study, I comprehend that this can only be viewed as a positive argument and cannot be considered as having a negative impact or any visible influence on the findings.

Thirdly, for the methodological level, this study combines both qualitative and quantitative data. Combining different methods in this thesis has granted me the

opportunity to understand perceptions of website quality and success by drawing on various empirical components. Although the overall research question addressed could presumably have been answered by using one single method, the reason for applying this approach has not been to overcome the weaknesses of any one of the methods or provide stronger evidence through corroboration of findings, but rather to gain insights from various sources, by utilising different types of data. I acknowledge that this has helped strengthen the contributions of this study, but it has also proved to be a challenging task in terms of handling and analysing the data. The central challenge in qualitative research is to suggest exploration of relevant phenomena in the study context, while quantitative research questions often investigates relationships among variables (Creswell, 2009). This is consistent with the means by which the different methods are applied in this research study, with regard to explanations and perceptions of website quality and success. The quantitative data collected for this thesis aimed to undercover by what means organisations in the public sector perceived their own website quality and success on the Web, and the relationships that existed between the different identified constructs of success. Impacts of user testing conducted among public sector organisations have also been investigated with regard to how testing affects constructs of website success and their relationships. Qualitative data in this thesis also contains available public second-hand data, collected by the central government in Denmark, through measurement of website quality and user satisfaction among citizens. Using this type of data has only strengthened the contribution, by including empirical data collected in the public sector.

The qualitative interviews conducted in this study followed a typical quantitative approach, by asking the respondents open-ended questions in order to explore and understand their description of a phenomenon. The qualitative approach can

therefore be characterised as exploratory, while the quantitative data included in this study was confirmatory, concerned with testing and evaluation of constructs of success and the relationships between these constructs, depending on frequency of user testing involved in website quality improvements. In relation to the dichotomy between the aspects of induction and deduction, Fitzgerald and Howcroft (1998) clearly distinguished between the methods by which knowledge is gained. To be more specific, does knowledge go from "the general to the specific", or is it vice versa? For this thesis, the inductive perspective was used for the qualitative approach, while the quantitative approach could be classified as deductive. The next dichotomy inspects whether data is collected in a field or a laboratory setting, and is related to the use of soft (qualitative) or hard (quantitative) measures. The qualitative data for this research was collected in a field setting (the interviews were held in locations specified by the respondents, such as their offices), while the quantitative data was collected through a classical online survey questionnaire. The final dichotomy linked to methodology is the idiographic versus nomothetic perspective. The fundamental difference between these two is that the former is an individual-centred perspective, while the latter is a group-centred perspective. In this thesis, both these perspectives are emphasised, through conducting individual qualitative interviews and a large scale quantitative online survey among webmasters in the public sector.

Fourthly, the axiological level, which is the last level in research dichotomies, draws a distinction between relevance and rigor. Relevance pertains to external validity and relevance to practice, while rigor applies to internal validity through experimental control and quantitative techniques. According to Hair et al. (2010) validity in general concerns "the extent to which a measure or set of measures correctly represents the concept of study" (p. 3). This can be understood as the

degree to which a measurement instrument, the interview guide and the survey questionnaire, actually measures what it is intended to measure. In relation to external validity (relevance to practice), Creswell (2009) explains external validity threats as follows: "Arise when experimenters draw incorrect inferences from the sample data to other persons, other settings, and past or future situations" (p. 229). Therefore, external validity indicates to what extent we can generalise the results arrived in the research study, and whether these results also apply to other people, in other situations, and/or at different times. A key issue in external validity is therefore generalisability. Regarding internal validity (rigor), Creswell (2009) explains internal validity threats in these terms: "Threats are experimental procedures, treatments, or experiences of the participants that threaten the researcher's ability to draw correct inferences from the data about the population in an experiment" (p. 230). Consequently, internal validity is concerned with the extent to which the findings are valid for the population and phenomena that are under investigation.

Findings from the online surveys conducted in Norway and Denmark, could be generalised to a certain degree, but would require to be accurately verified with data from different study settings, for example, countries with greater digital divides, and different degrees of government IT policy commitments. Above all, applying a webmaster's perspective on website quality and success does not necessarily reflect what the users of the website consider as important. However, the webmasters are in charge of everyday design issues and challenges, and assume the chief responsibility for updates and maintenance of the website. It is also true that the webmasters are generally in daily contact with the users and receive feedback and comments with reference to the website. Although the webmasters' roles and influence in organisations vary, we easily deduce that their

role in an organisation is one of accountability and answerability, as they are constantly responsible for the manner in which the website appears to its users (citizens). Therefore, this thesis argues that webmasters are relevant informants in studying website quality and success in government bodies, as an alternative to the users, who are emphasised by most studies.

Furthermore, various types of public websites presenting varying categories of information and services are included in this thesis. We can argue that quality in websites depends on the type of website and the user groups that the website aims to satisfy. However, in public sector websites we are inclined to think that quality is found to be exceedingly important, in order to satisfy a wide range of user groups with various requirements and needs. In the online survey conducted in this study, various types of public sector websites (such as, local authority and directorates) were not considered separately, but rather investigated as a homogenous group of websites. We could therefore speculate whether cross-analysis of findings due to different classifications (types) of websites influenced the findings. Moreover, all the websites (organisations) included in this study participated in the yearly ranking of public websites conducted by the central governments within their countries. The total number of public websites in Norway and Denmark is significantly and therefore, one probability is to consider whether these websites are representative in regard to the research objectives presented. Notwithstanding this fact, we can argue that the websites included in this study represent a wide group of organisations in the public sector, and therefore, the findings aim to provide an overall contribution rather than probe into details, in terms of investigating differences and similarities among types of websites in the public sector.

Regarding data validity in the qualitative interviews, specific questions were asked in order to cross check the webmasters' explanations, and provide them with an opportunity to elaborate on their answers. Once the interviews were conducted, they were immediately transcribed using exactly the same words as those of the respondents and then sent via e-mail to the respondents. Each of them was given an opportunity to read through the interview (text document) after the transcription was completed, in order to ascertain to a feasible extent, the validity and reliability of the transcripts. The aim was verification to ensure accuracy and avoid errors and/or misunderstandings. No comments, however insignificant in character, were added to or deducted from the transcriptions. A generalisation of the findings could also be discussed, whilst referring to the conducted interviews. All the respondents were webmasters from website award winning organisations, and not from some randomly selected organisations. We could, therefore, further speculate whether such organisations have a different view of website quality, when compared to other organisations. Regarding the online survey conducted, it was clearly stated in the introduction letter (sent by e-mail) that the respondents should the webmaster (or a person in a similar position), however, there has been no opportunity to verify that this was actually done in every organisation. Nevertheless, we must assume that this was followed, but also realize that this is a weakness when we conduct data by using online surveys.

In order to sum up the discussion concerning the philosophical viewpoint taken in this thesis, Table 3 presents an overview of the four levels emphasised in the study, by drawing on the research dichotomies adopted from Fitzgerald and Howcroft (1998).

Ontological level

In general, this thesis adopts a realist approach by drawing on quantative data, conducted through an online survey questionnaire and analysed by using statistical tools and techniques. But, in addition, a relativist approach is also included by conducting qualitative open-ended interviews, analysed by taking a grounded theory approach. It is difficult to weigh the contributions, but generally speaking, the realist approach has been the dominant approach for this study

Epistemological level

One can argue that this thesis bears in general a positivistic view, although the qualitative interviews conducted support an interpretivist approach. For the purpose of this study I (as a researcher) primarily views myself as being an objectivist, although to a certain extent, I can also be viewed as an insider, which only serves to strengthen the contribution

Methodological level

This thesis combines both qualitative and quantitative empirical data. The qualitative approach can be characterised as exploratory, while the quantitative data included in this study is confirmatory. In relation to the dichotomy of induction and deduction, the qualitative approach is inductive, while the quantitative approach can be classified as deductive. The qualitative data was collected in a field setting, while the quantitative data was collected through an online survey questionnaire. Regarding the idiographic and nomothetic perspectives, this thesis emphasises both perspectives by using a both qualitative and quantitative data

Axiological level
This thesis is considered to have medium to high relevance to practice, and can aspire to guide forthcoming investments, development and quality improvements in public sector websites. The findings can also to some extent be seen as generalisable. With reference to the perspective of rigor (internal validity), the population and phenomena investigated possess validity, although some issues do arise in the course of the investigation

Table 3. Summary of the philosophical viewpoints in the thesis.

1.6 Structure of the Thesis

This Ph.D. thesis contains six different chapters, in addition to the four research papers involved in the present study (Appendix A-D). In order to provide an overview of the structure of the thesis, the content and purpose of each of the chapters is presented herewith:

Chapter 1 presents the background and motivation for writing this thesis and the research objectives that strive to be fulfilled. This is followed by a summary of the four research papers included in the thesis, in order to provide an overview of the papers and the methods by which each of them contributes in regard to the research objectives. Finally, the philosophical perspective behind the thesis is presented and discussed by drawing on the research dichotomies adopted from Fitzgerald and Howcroft (1998). As this thesis adopts mixed-methods, the research dichotomies divided into hard measures and soft measures have served as a guide for discussing the qualitative and quantitative empirical components included.

Chapter 2 presents the study context of this thesis by highlighting characteristics of the Scandinavian countries (Norway and Denmark), which served as the focus and, which are included as the main samples (empirical data) in the present study. Although there are many similarities between these countries, there were also some differences worth mentioning with regard to their respective government structures and geographies. Further, the roles and impact of public sector websites in these countries are presented and discussed, followed by an introduction to the role of webmasters and their function in public sector organisations. This chapter ends with a summary of the content presented and discussed.

Chapter 3 is the foundation and keystone of this thesis in the field of IS research. It begins with a brief introduction to the Scandinavian IS tradition, which is rooted in systems development. Next, relevant research studies concerning information systems are provided, followed by a presentation of studies regarding website quality. The aim of this chapter has been to identify relevant aspects in presentation of high quality websites. This thesis can be seen as cross disciplinary in the sense that the research covers different fields, including relevant literature in the fields of eGovernment and HCI. Finally, the research framework adopted from the IS success model of DeLone and McLean (2003) is presented by identifying the constructs of website quality and success emphasised in this thesis. This chapter wraps up with a summary of the content presented and discussed.

Chapter 4 presents the research approach taken in this thesis and presents an overview of the research phases and various activities carried out during the study. Subsequently, the research design is presented, and combines both qualitative and quantitative data. In this regard, details and reflections based upon data collection and analysis are provided. Finally, issues on the subjects of validity and reliability of the data are offered and discussed. Considerations and limitations regarding the

use of methodologies are also covered. The chapter concludes with a summary of the content presented and discussed.

Chapter 5 concerns findings derived from this study, followed by a discussion based upon prior research studies. This chapter starts by presenting a summary of the main findings from each of the four research papers included in the thesis, and subsequently, the findings derived from cross-papers analysis are provided and discussed, based on three topics identified in respect to the overall research question stated.

Chapter 6 cover the conclusion and contribution offered in the thesis. Furthermore, this chapter deals with recommendations for upcoming research opportunities and possible venues to investigate. This is followed by implications for practice and suggested actions grounded in the findings derived in the present thesis.

Appendix A to D present the four research papers included in the thesis. The titles of the four papers are as follows: (1) "Website quality in government: Exploring webmasters perception and explanation of website quality" (2) "Public websites and human-computer interaction: an empirical study of measurement of website quality and user satisfaction" (3) "Dressed for Success? Perception of Website Quality Among Webmasters in Government Bodies" and (4) "Perceptions of information system success in the public sector: Webmasters at the steering wheel?"

Appendix E provides the interview guide used during the qualitative interviews (in Norwegian) and Appendix F offers the questions and answer alternatives from the online survey conducted (in Norwegian).

CHAPTER 2. SETTING THE SCENE

2.1 Introduction

When studying websites we need to clarify the study context and set the agenda for what is to be studied and that which is not relevant enough to be included in the study. The Scandinavian countries namely Norway and Denmark are the focus of this thesis. These two countries possess many characteristics that are similar to other countries in Europe as well as outside Europe. However, there still exist differences and similarities which are worth mentioning, as they are relevant to the thesis. Consequently, this chapter begin with a presentation of some typical characteristics of Norway and Denmark, followed by a description of the role of public sector websites in these countries. We find that webmasters play an important role in development and quality improvements in websites. In order to paint an accurate picture of the role of these individuals in public sector organisations, this chapter also provides singular characteristics of the webmasters, who assume the main responsibility for updates and maintenance of websites in government bodies.

2.2 Characteristics of Scandinavian Countries

Scandinavian countries have many similarities, mostly in terms of a high level of education, Internet access among citizens and businesses, welfare, organisational structure, as well as political goals and strategies. Norway and Denmark could well appear as one homogeneous country, with a total population of about 10 million people (Norway 5 million; Denmark 5.6 million). However, geographically speaking there are major differences between the two countries. Denmark is the smallest and southernmost of the Scandinavian countries, but has the highest population density, while Norway has a larger area and a more scattered population. We also perceive that the local structure of governments is

different (Norway has 428 municipalities; Denmark 98), and state control is organised in different ways, although the standards of living, unemployment levels, access to social benefits and welfare, are a few of the subjects, which are very comparable.

In the public sector, central guidelines for quality indicators in websites have been implemented, and hundreds of websites are evaluated annually and ranked by quality. According to a report on quality assessment in Norway (done by The Agency for Public Management and eGovernment), the definition of website quality emphasises public information and online services meeting a predefined standard or level of quality that fulfils central user requirements and needs (Ølnes, 2007). Annual quality ranking of public websites in Norway and Denmark traces its roots back to the year 2001, and these evaluations still serve as a positive inspiration for quality improvements in many organisations. The implications of these evaluations, highlight the importance of standards and measurable aspects for quality assessment, when investigating success and failure in websites (Esteves and Joseph, 2008).

As stated, the quality criteria lunched by the governments are used as guidelines in website development and for quality improvements by many public organisations, in order to facilitate high quality online interactions between citizens and government bodies. These set of quality criteria (in Norway) were subject to several modifications early on during their initial implementation stages, but more so during the period from 2007 to 2011. An overall picture reveals that the majority of public websites displayed significantly higher quality in 2011 than in 2007. We also detected that larger municipalities scored higher than smaller municipalities in terms of quality (Difi, 2013). The purpose of these evaluations is obviously to provide powerful instruments that stimulate quality improvements

and keep discussions of continuous quality improvement on the Web alive. The quality assessments carried out by the governments in Norway and Denmark, undertake to provide details in order to improve trivial errors. Automated tests are also regularly utilised, especially when it comes to technical assessments, for instance, accessibility requirements.

Aims of eGovernment initiatives is also to ensure participation in a digital society by all citizens and businesses and as a consequence, we are able to observe that during the last decade, increasingly more online information and services are provided. Public websites have become a central key contributor in the dialogue between public sector organisations and citizens. In this regard, the Scandinavian countries are very ambitious and determined to be the best providers of online information and services, and consequently, the users are progressively becoming more demanding, regarding their expectations and requirements from websites. We also find that website awards, outside the public sector, have become a popular technique of highlighting best-practice examples on the Web. We additionally discuss whether such evaluations serve merely as "beauty contests" on the Web, and/or to what extent these awards provide constructive inputs for quality improvements. However, gaining more users should be the key aim in terms of creating user satisfaction and high quality interactions, independent of how appropriately the websites fulfil the quality criteria initiated by such evaluations (awards).

There are several reasons why Norway and Denmark have been selected and are the focus countries for this study. Firstly, these countries are highly ambitious in relation to offering public websites with a high level of quality. Their goal is to be recognised as international leaders in presenting content and digital services, and their citizens extensively use the Web for communication with public sector

organisations. In the public sector too, we observe that various conferences and workshops are held with participants, such as webmasters, in order to discuss and share knowledge with regard to the use of Web technologies, innovation initiatives, collaboration among public sector organisations etc. The overall aim is to prepare for future activities and accommodate strategies implemented by the central government, in order to focus on eGovernment goals in forthcoming investments and quality improvements. It has been beneficial as well as convenient to choose the Scandinavian countries (respectively Norway and Denmark), for research, due to practical considerations. I have been fortunate to gain considerable access to data; I understand and am accustomed to the language; is familiar with the cultures of the two countries; and, most importantly, I possess an in-depth and comprehensive knowledge of the use of public websites, particularly in Norway.

2.3 Public Websites in this Thesis

The focus of this thesis is success in websites, and not information systems in general. Therefore, the sample of public sector websites included in this study are from all levels of government, such as local, central, county, directorates and other public enterprises, and represent a rich diversity of websites. Although these various categories of websites present content and digital services in varying degrees, the common denominator between them is that they all make content readily available to the public. Thus, the intention of these public sector websites is to be accessible to all citizens, whilst acting as important contributors of digital communications between the governments and citizens. Public websites are therefore, collectively considered essential and principal contributors, in the provision of public online information and services. Due to growing investments in digital public services, this sector stands above many others, in relation to

challenges of preparation, which include usage by all citizens, as well as creation of enhanced user experiences among various target groups. We find that in public websites, there is an inhomogeneous and wide group of users, with different needs and requirements. With respect to people with special special needs and requirements, the central governments exert added pressure on public sector organisations. The question which then arises is: "Are accessibility requirements [Web Accessibility Initiative (WAI) principles] in websites found to be specifically and distinctly important in this sector, so as to include all citizens in a digital society, by permitting them to gain equal access to public information and services?" In this regard, a relevant question which can be asked is whether public websites differ from private websites and, in what ways the two are perceived to be different.

From my point of view, in many cases public sector and private sector websites coincide in part with and overlap each other. Many public websites generally do not differ when compared to other types of websites, in terms of matters such as design issues, technical features and the importance of quality in content and services. The main difference lies in the fact that public websites must adhere to policies and objectives set out by the central government. This implies that they must strive to meet the quality criteria set out by the government, whether the organisation internally agrees or disagrees with those requirements. Private organisations in most cases facilitate for success by focussing on aspects in their websites that these organisations acknowledge to be of importance to their online profitability. Although public organisations most believable enjoy freedom to expend their time and efforts on features they consider as being of vital importance, it can be argued that this does not occur to the same extent as in

private organisations, since public websites must additionally strive to meet the requirements launched by the central governments.

In order to give an example of websites included in this thesis, Figure 1 exemplifies three different examples of websites. The examples (to be viewed from left to right) are from various public organisations, with diverse target groups. Example 1 (on the left) aims to target potential students at a specific university/college in Norway (www.hib.no). Example 2 appeals to a wider audience, which has a common interest in terms of starting a new business in Denmark and require information and services pertinent to setting up a business (www.startvaekst.dk). Finally, example 3 caters to the inhabitants of a municipality in Norway or other citizens who are interested in activities and information in a particular geographical area (www.skedsmo.kommune.no). Print screens are taken in July 2013.

Figure 1. Examples of public sector websites.

Figure 1 is thus an illustration of three different examples of public websites in Norway and Denmark, presenting different types of information and services to

users. The common denominator in the examples above is that they all have to fulfil (to the best of their abilities) the quality criteria and technical standards obligated by their central governments, although the business purpose and aim of the websites is very different, as seen in terms of the information and services provided.

In terms of website quality, it can be argued that design, navigation structure and content organisation are key issues of success. In this regard, one example is the initiative undertaken by the central government in Norway by developing "LOS-struktur". The aim has been to strive for a more equal layout and design of websites in the public sector, by providing guidelines in order to increase the usability and retrieval of information. Moreover, for instance Norway promotes private agencies that specialise in designing public websites, by using uniform templates and design solutions that meet the quality criteria obligated by the central government. Therefore, we often notice that many websites in the public sector appear to be similar in terms of presentation, design and technical platform, with the main intention being that users can easily locate what they are looking for, besides being able to perform various tasks on the websites.

2.4 Introducing the Webmasters

We can make a distinction between public sector managers who influence the allocation of resources for Web projects, and the intermediaries who supervise the operational elements of implementation and quality improvements in websites, such as webmasters (or persons in similar positions). As stated in the introduction, webmasters are characterised as key figures in maintaining website quality and facilitation for high quality interactions. In prior research contributions, there are very few studies that have emphasised the role of webmasters in organisations. Therefore, this thesis aims to fill the gap by taking a closer look at this

perspective. The interpretation of the role of webmasters is fragmentary and segmented. In some organisations, the webmasters appear to exert a distinct and unique influence on the quality of websites, while in other organisations their influence is ambiguous, and in yet some other cases, the webmasters' influence on websites seems to be almost absent. Within organisations too, it is observed that various resources devoted to website quality are readily available - such as the number of employees dedicated to working on the website, technical assistance that is available beyond the webmaster's personal knowledge and money spent on development and quality improvements. For instance, municipalities with almost the same population can have different numbers of webmasters (responsible for the website) and priorities in relation to investments in website quality. The same applies to attention devoted in regards to aims and strategies for online information and services.

Moreover, the webmasters operate under various titles, such as Information Consultant, Service Consultant, and Web Manager. The multiplicity of titles raises several questions with reference to the role of webmasters in organisations, for instance, tasks they are expected to perform at work, to what extent and how webmasters influence the quality of a website, and their background and experience. To draw a parallel with a similar occupation: Usability experts contribute to the development of successful systems and specifically emphasise the users' needs and requirements during creation of a system (for example, a website). The principal aim is that the website works for the users (Rohn et al., 2002). To a certain extent, the definition of a webmaster carries many of the same responsibilities, although webmasters do not necessarily have identical expertise in terms of website usability and evaluation. However, the primary goal of the webmasters is to facilitate for positive user experiences. They can achieve this first

and foremost, by being in a close dialogue with users in order to understand their needs and requirements. They must also focus on quality aspects that are important to the users, by prioritising resources pertaining to website development and quality improvements. In turn, the users can provide valuable insights on how successfully the organisation is projected on the Web and offer unique inputs on future investments and prioritising resources.

In an attempt to draw a picture of a typical webmaster, this study reports on the background information from the online survey conducted among webmasters from public sector organisations in Norway and Denmark. Regarding the method of distribution with respect to gender, age, education, experience, etc., the aim was to identify characteristics that distinguish webmasters in public sector organisations. In this study, the findings show that most webmasters were employed in their current position, for five or more years. Therefore, it could be safely assumed that they possessed a comprehensive knowledge and understanding of their organisation and were therefore expected to possess skilled insight into various services and information offered to website users. The majority of webmasters were in the 36-55 age group, and there were very few or no webmasters, who were younger than 25 or older than 65 years.

It was observed that in the public sector in Scandinavia, employees in general were employed by the same organisation for long periods, with many employees changing positions within the same organisation. Furthermore, the webmasters were relatively evenly distributed in relation to gender (male/female), despite the fact that in both countries there was a slight preponderance of women holding this position. In addition to gender and age, we also ascertained that webmasters were relatively well-educated. In Norway, the findings revealed the following figures: No higher education, 16 people; Professional certification/training, 30; Bachelor's

degree or equivalent, 168; Master's degree, equivalent or higher, 76. However in Denmark, the figures were enumerated thus: No higher education, 6; Professional certification/training, 25; Bachelor's degree or equivalent, 48; Master's degree, equivalent or higher, 150.

In general, the webmasters in Denmark possessed a higher educational level than webmasters in Norway. On the subject of the type of education among the webmasters, 171 of the webmasters in Norway had degrees related to Information and Communication, and 72 webmasters had degrees in IT and Web Technology. The corresponding results in Denmark showed that 172 webmasters had degrees in Information and Communication and 82 webmasters had degrees in IT and Web Technology. A few of the webmasters were educated in both these fields. These overall findings revealed that webmasters in public sector organisations had knowledge, with regard to technical issues as well as design features, and presentation of information. However, generally webmasters were not expected to display in-depth knowledge of these areas, but rather a diverse work experience that enabled them to implement and accomplish the tasks they were in charge of within the organisation, whilst also contributing to and facilitating high quality interactions. Although such issues were dependent on many different concerns and required a different nature of knowledge, we can assume that webmasters were mainly in charge of daily quality improvements that were perceived more as temporary solutions or a quick-fix job, rather than expensive time-consuming projects that demanded abundant resources. Though webmasters in many organisations contributed in this regard, most webmasters were not expected to be in charge of accepting sole responsibility for changes and improvements made to the website.

Furthermore, a survey conducted in 2012 among webmasters in Norway investigated the criteria they considered vital with regard to success on the Web. The principle on top of the list was that users should complete tasks, quickly and effortlessly, when visiting the website and thus reach their aims. At the bottom of their list was the criterion that all user tasks were equally important and should therefore be prioritised equally, and that website quality changes and improvements should be decentralised, so that each department in an organisation would be able to determine its own website content (Rundberg, 2013).

2.5 Summary of the Chapter

Public sector websites are found to be important contributors in provision of online information and service above the citizens, and there are many similarities between the Scandinavian countries, respectively Norway and Denmark, which are the focus of this study. However, there are some differences with regard to government structure, localisation and geography. There was a considerable overlap in the roles and impacts of public sector websites, due to high ambitions, strategies and national goals of eGovernment. In addition, the quality of public sector websites was to a large extent measured by the same methods in both these countries, by aiming to include all the users (citizens) in a digital community. As for the role of webmasters, the results reveal that webmasters in Denmark in general possessed a higher level of education as compared to Norwegian webmasters, while other characteristics were almost similar for both the countries. Therefore, we can conclude that there were no major differences between webmasters responsible for public sector websites in the Scandinavian countries.

CHAPTER 3. THEORETICAL FRAMEWORK

3.1 Introduction

This Ph.D. thesis aims to contribute to the research field in IS, following in the long-standing tradition of Scandinavian countries. To set the agenda for studying website quality and success in public sector websites, literature in the field of eGovernment has also been an important contributor and served as a source of great inspiration. In addition, this thesis also draws on literature from the field of HCI, wherein user involvement and testing of website development and quality improvements is found to be particularly significant. This thesis can, therefore, be viewed as cross-disciplinary in the sense that it draws upon different research fields, although the present thesis is primarily anchored in the IS research field. By drawing on diverse literature, the aim has been to not merely compare the research fields, but rather to understand a topic that is a composite of various traditions with different focus and existing knowledge. In order to guide the research in this thesis, the IS success model from DeLone and McLean (2003) was adapted to the study context, and served as great inspiration for developing the research framework.

During the entire research process, a literature review was carried out in leading online databases (for example, Science Direct, Web of Science and JSTOR). Moreover, a literature review in journals related to the various communities of research relevant to this thesis was undertaken (for example, Information & Management, Government Information Quarterly and Interacting with Computers). This opportunity for identifying relevant research has been very helpful and a source of inspiration, in order to identify the research gap to be filled by writing this thesis, and concurrently, aiding the researcher to acquire in-depth knowledge of current research within the fields. Before delving further into the

theoretical framing of this thesis, by presenting related research in the three fields mentioned above, the next section deals with an overview of the Scandinavian IS tradition, which traces its roots back to the 1960s.

3.2 Scandinavian IS Tradition

Scandinavian IS research has a long tradition and key researchers, such as Kristen Nygaard, Jakob Nielsen, Niels Bjørn-Andersen and Lars Mathiassen, have provided valuable insights into development and use of information systems. Börje Langefors provided valuable insights on IS theory in Scandinavia, by analysing the requirements for information within an organisation, that could ultimately form the basis of information systems development (Löwgren and Stolterman, 2007). A historical perspective on the Scandinavian countries shows that projects were established as early as the 1970s, in order to increase our understanding of the use of technologies and interactions with technical devices such as computers (Bjerknes and Bratteteig, 1995). Methods for involving users during the design process, through all phases of the project, were found to be important and a key issue (Bødker and Sundblad, 2008). The awareness of user inclusion and participation in information systems development therefore traces its roots back to the 1960s and 1970s. Today, almost 50 years later, we continue to experience a significantly more user-centric focus, both within and outside the Scandinavian countries. In the public sector, user-centred development was given increasingly attention, especially during the last decade, by emphasising the citizens' needs and requirements from websites.

With regard to user involvement in systems development, participatory design is a widely used approach within literature (Kensing and Blomberg, 1998). Participatory design has its roots in the Scandinavian IS tradition and is a design methodology that involves users and their feedback (Bjerknes and Bratteteig,

1995). This is different from a user-centred approach, where designers focus on users, but still maintain primary control over the development process (Rogers et al., 2011), while participatory design positions designers alongside users in order to collaborate during the entire process (Kensing and Blomberg, 1998). Participatory design thus, provides the users an opportunity to participate in design activities in systems development, which probably tends to influence their work in an organisation by improving the knowledge on which the systems are built (Bjørn-Andersen and Hedberg, 1977).

The established practice in Scandinavian IS research projects reveals that traditionally in systems development, user involvement was emphasised as highly important (Bjerknes and Bratteteig, 1995), in order to create useful systems. In the late 1980s, Bansler (1989) identified three main traditions with reference to the history of Scandinavian IS research. The first tradition was the systems theoretical school, which viewed the use of IT in organisations from an economic viewpoint, perceived at aiming to increase efficiency and effectiveness by the use of IT. The second tradition is the socio-technical school, concerned with issues caused by neglect of human factors in systems design, and therefore, aiming to improve and stimulate user satisfaction and increase productivity by emphasising the users. The third tradition was the critical school focussing on the link between work place democracy and the use of IT. The aim was to strengthen the knowledge and position of users and unions versus managers and business owners (Mathiassen and Nielsen, 2008).

To encourage and disseminate Scandinavian research, journals such as the Scandinavian Journal of Information Systems, address issues in regard to development and use of information systems, associated with organisational and societal subjects. An important impact on encouragement of IS research in

Scandinavia during the years has also been the role of IRIS (Information Systems Research Seminar in Scandinavia). The seminar was initially launched in 1978 and is today, the oldest continuing IS conference in the world. Ph.D. students and senior researchers come together every year, to share their ideas, knowledge and experiences, and furthermore, to discuss upcoming research contributions within the Scandinavian countries. We also find other conferences and workshops that aim to stimulate research activities within the Scandinavian countries, such as SWEG (Scandinavian Workshop on eGovernment), NOKOBIT (Norsk konferanse for organisasjoners bruk av IT) and SCIS (Scandinavian Conference on Information Systems). This has also resulted in collaboration between researchers across countries.

3.3 Information Systems

Information Systems (IS) is an academic/professional discipline linking the business field and the well-defined field of Computer Science (CS). The field of IS has witnessed a visible shift during the years, moving from technological to managerial and organisational issues (Myers, 1997). The research field of IS, draws on the gap between investments in IT and the perceived outcomes (Reddick, 2006). Since the early 1980s, IS researchers have devoted increasing efforts towards identifying success factors and towards building empirically-based models for understanding what makes a system successful. Baskerville and Myers (2002) give a broad definition and believe that IS researchers can be leaders within "The domain defined by the development, use and application of information systems by individuals, organisations and society as a whole" (p. 11). The focus in IS research can, therefore, range from single usage and benefits to impacts concerning an entire organisation and society as a whole.

Investments in IS have also been at the core of many organisations for decades, with an increased focus on IS in many organisations over the last 10-20 years. Many organisations, both within the public and private sectors, experience immense pressure for adopting the use of information systems, in terms of investments as well as evaluation of benefits. We have witnessed over the last few decades that progress in the use of technologies creates more discerning users, and therefore, information systems are not only required to facilitate some organisational and management needs but, ideally, also to stimulate use and user satisfaction among various group of users. In order to address this concern, various research contributors have striven to provide a framework/model that identifies constructs of success and the relationships between the constructs.

The most cited model in the field of IS research is the success model of DeLone and McLean (1992). In 2003, an updated version of the model was published (DeLone and McLean, 2003), based on comments and feedback received during the previous decade. Although we find that this model is mainly used in the field of IS research, we do tend to find research contributions that have adapted the model into other research fields, for instance, the eGovernment field (Scott et al., 2009). With regard to the use of this model, we find that prior research contributions have emphasised the quality aspects identified by DeLone and McLean (2003), for example, information quality (McKinney et al., 2002; Lee et al., 2002; Seddon and Kiew, 1996); system quality (McKinney et al., 2002; Wang and Liao, 2008; Seddon and Kiew, 1996) and service quality (Barnes and Vidgen, 2003; Pitt et al., 1995, 1997; Teo et al., 2008).

Evaluation of success in information systems is carried out through various means, from different levels and perspectives, and ranges from the quality of a system, to the extent to which users are satisfied. Other measures include the effect of the use

of a system and what the system creates with regard to organisational impacts and user benefits. With reference to this, success is perceived from the views of various stakeholder groups, wherein the users, developers/designers and managers may adopt different methods to measure the extent to which a system is recognised as successful. In this regard, Petter et al. (2012) present the following explanation:

"Information systems success research evaluates the effective creation, distribution, and use of information via technology. As information technology has developed since the mid-1950s, information has become more voluminous, more ubiquitous, and more accessible by all. If we believe that information is power, this progress in information availability has changed the power dynamics of relationships between corporations and consumers, between buyers and suppliers, between small business and large business, and between citizens and their governments. Thus, the measurement of IS success has become ever more complex while, at its core, still simple." (p. 342).

Moreover, Jiang et al. (2002) stated that: "The success of information systems (ISs) is normally defined as a composite of such performance measures as cost, time, and savings. With few systems being completed on time and within budget, application developers and users have moved to other perspectives that reflect value to organizations" (p. 17). They found differences in perception of success between users and IS professionals and suggest that all stakeholder groups should be included in IS development and quality improvements.

In order to emphasis the citizens in relation to use of eGovernment services and the needs for standards in evaluations of public sector services, Lee et al. (2008) introduce a reference process model ("best practice") for citizen-oriented

assessment. Although evaluation of eGovernment services can be challenging, compared to other business domains such as e-Business, there are still some common denominators to be aware of. Furthermore, Sharif et al. (2010) contributes by modelling constructs for eGovernment decision making aiming to facilitate for success in information systems. Although there are numerous of contributions related to evaluations of eGovernment, Irani et al. (2008) conclude that such evaluations is a under developed area. In order to fill in a gap and improve our understanding of evaluations in a public sector setting, they focus on the evaluation cycle by emphasising political-, economic-, technical- and social issues.

We also witness that a growing number of organisations spend unlimited time and resources on website development, both within the public and private sectors, without consistently outlining a concrete plan and strategy for assessing the outcomes of these investments. Although we find that relevance, timeliness and accuracy of information are key contributors to success, measurement of success is becoming increasingly more demanding and complex, and in the future we need to go beyond this focus on developers, users, managers, and governments in order to evaluate success (Petter et al., 2012). Consequently, this thesis aims to contribute to this research area by investigating website quality and success in public sector websites, by identifying constructs of success that are found to be particularly important in the field, the relationships among these constructs and the role of user testing in this regard.

First and foremost, user satisfaction is regarded as a common measure in order to assess success (Kappelman and McLean, 1992; Doll and Torkzadeh, 1988; Seddon and Kiew, 1996; Reddick, 2006; Prybutok et al., 2008; Wang and Liao, 2008; Scott et al., 2009), irrespective of whether the system serves the employees

within an organisation, or a large number of external users. In the context of system and website development, users are normally referred to as those who are affected by the system, thus they are the end-users (for the purpose of this thesis, end-users are the citizens). If we ignore the users in the development process as well as the process of quality improvements, it produces contradictory results, such as poor user satisfaction and negative attitudes towards the use of a given system.

It has been confirmed that many information systems have failed because vital aspects have been overlooked along the way, such as identifying the users' needs and requirements, and issues related to a broad definition of usability (Nasrul et al., 2012). We notice that user involvement in systems development and quality improvements aims to focus on and identify problem areas that need to be improved in order to facilitate for success. Consequently, user involvement in design and development of computer-based systems is frequently cited as an approach to faciliate for success (Tait and Vessey, 1988), and has been associated with systems success for a comparatively long time (McGill and Klobas, 2008). As stated earlier, user involvement is considered decisive and important in the Scandinavian tradition and traces its roots back to the 1960s and 1970s.

In the 1980s, Ives and Olson (1984) provided an evaluation of existing measurements of user involvement and success, and concluded that the benefits have not been strongly confirmed. Althought it is nearly three decades since their results were published, it is interesting because the use of information systems has increased tremendously during the last few decades, new technologies have emerged, and we observe that users today are increasingly more demanding and experienced than in previous years. Consequently, we find that user involvement in systems development and improvements is perceived as highly important and

vital (Ives and Olson, 1984; Følstad et al., 2004; McGill and Klobas, 2008; Rogers et al., 2011), and viewed as a prerequisite for success. Although user-centred development is launched by the central government as a key contributor in order to fulfil national aims and goals in public sector websites, user involvement in research is to a large extent based on theory and therefore, there is a requirement for greater research based on empirical evidence that evaluates the effects on success (Ives and Olson, 1984).

If we delve deeper into the meaning of user involvement and testing in information systems development, we find that this concern refers to user participation during the complete development process (Barki and Hartwick, 1994), by including representatives of the target group that in the end shall use the system (Ives and Olson, 1984). Identifying potential users of a specific system is a prerequisite for identifying critical areas of concern (Rogers et al., 2011). Following up on the statements from Ives and Olson (1984), that user benefits have not been strongly demonstrated, Hunton and Beeler (1997) studied the relationship between the extent of user participation in IS development and success and detemined that user participation is effective in evaluating success. In connection with this, Goodhue (1995) stated that: "What is needed for user evaluations to be an effective measure of IS success is the identification of some specific user evaluation construct, defined within a theoretical perspective that can usefully link underlying systems to their relevant impacts." (p. 1827). Kappelman and McLean (1992) also claim that user involvement is an important contributor in systems development, when emphasising facilitation for success, which is done by taking into account typical user tasks and actual performance during system usage. Therefore, one approach to adopt in order to obtain success is to involve potential users as a part of the development process or in the process of continuous quality

improvement (Rogers et al., 2011; Kensing and Blomberg, 1998; Zhang et al., 2005).

3.3.1 Website Quality

Website quality is perceived as an important contributor for systems success (DeLone and McLean, 1992; DeLone and McLean, 2003). Every study assessing website quality examined by Kim and Stoel (2004), provided some empirical evidence that website quality is a multidimensional construct. Consequently, there is no clear definition of website quality, but rather many and varied definitions of how to assess the quality of websites. Ethier et al. (2006) proposed that users' perceptions of quality are one of four complementary categories of website quality, with the other three stated as website functionality, component-quality (information quality, system quality, service quality and attractiveness), and, finally, overall service quality. Ahn et al. (2007) explored measurement of website quality from a technology and service-focussed point of view, and discovered that website quality, divided into system quality, information quality and service quality, had a significant impact on perceived ease of use, playfulness, usefulness and consequent promotion of website usage. Bai et al. (2008) studied website quality by dividing the quality aspects into two main categories, namely functionality of the website and usability issues concerning the website.

In order to assess website quality from a user perception, Barnes and Vidgen (2005) developed the eQual approach. This instrument for evaluation is divided into five main categories, which are website design, information, trust, empathy and usability, and finally, measurement of how total quality level is perceived from a user's point of view. This is the "sum" of the user experience and captures all aspects that are perceived as important to the users. Moreover, Chung-Tzer Liu et al. (2009) concluded that appearance and adequacy of information are perceived

as important, when studying quality of Web portals. The adequacy of information was the most important aspect of service quality and most noteworthy for evaluating user satisfaction. Users expect to gain unique and exhaustive information and locate links to other useful websites when they access portals, and therefore it is important to provide an effective website with visible functions and links to relevant websites. van Iwaarden et al. (2004) identified the aspects of quality that were perceived to be the most significant for users in the use of websites, and established that fast access, easy navigation on the website, a complete review of the order before arriving at a final purchase decision, and a simple registration process are noteworthy characteristics to bear in mind. Although this study is focussed on the service sector, many of the same aspects apply to other business domains too, such as eGovernment.

Moreover, Aladwani et al. (2002) examined website quality from a user perspective. In their study, website quality was measured by technical adequacy, web content, and web appearance. From this, we deduct that usability issues are addressed in different ways. Focussing on the users' needs and requirements is perceived as critical (Rogers et al., 2011), and arrangement for high quality interactions are therefore, particularly important. De Wulf et al. (2006) developed and validated a process model of website success by identifying the role of pleasure among users. This is more concerned with the total user experience by use. Website evaluations (by focussing on content, organisation, and technology) were posited as affecting satisfaction, commitment, and trust toward the service provider. Pleasure was introduced as a variable mediating the relationship between website evaluation and website success.

Manifold design principles have also been promoted and used when re-designing websites. These are often associated with general design beliefs about users' views

of websites. Chang and Chen (2009) suggested focussing on the user interface design and stated that security positively affected user satisfaction and loyalty. Through an investigation of the role of design elements on a website, Zahedi and Song (2009) provide a list of design elements which could serve as inputs in order to focus on important factors for web designers and developers. Competitive price, responsive service, informal influence, ease of use, and made-for-the-medium content are factors which are perceived as specifically significant. Moreover, De Wulf et al. (2006) states that: "Website owners should understand the importance of creating websites that induce affective feelings of pleasure in the online shopper thereby contributing to user satisfaction, commitment, and trust in the site owner." (p. 443).

Consequently, we find that information presented by the website should be applicable, believable, sufficient and up to date. Other implications that designers should be aware of are the structure and the website layout. In addition, more attention could be paid to using multimedia tools in order to increase levels of pleasure, and personalisation that could play a major role to increase user interactivity. It is also essential to pay attention to technical aspects such as the content download time, which impact user interactivity.

We can infer that that webmasters have an great impact on website quality in facilitation for high quality interactions and user satisfaction (Liu and Arnett, 2000; Lazar et al., 2004). Derived from the literature review conducted in this thesis, we find that studies concerning usability issues have very apparently generated a long list of design guidelines and best practice examples. The application of these guidelines by Web practitioners has helped to make websites easier to use, improved users' experiences with websites, and reduced navigational confusion and led to enhanced satisfaction among users. In order to investigate the

webmasters' perceptions, Liu and Arnett (2000) used webmasters as a target group for a survey and identified four factors that are perceived as critical in websites according to the webmasters: information and service quality, system use, playfulness, and system design quality. The four factors identified are dominant aspects in users' interactions with websites, their motivations for use, actual use and the outcomes of various activities and interactions that take place. Moreover, Tan et al. (2009) investigated what web designers judge to be attributes of effective websites, reporting on factors that web practitioners consider in their design, but which have received little or no attention in prior research. New insights were provided by identifying quality aspects such as website identity, categorisation of information and presentation of information on the Web.

3.4 eGovernment

Investment in information systems has been at the core of public sector strategies for nearly two decades, and we find that the research field of eGovernment has received further attention during the last few years. The count of journals and conferences addressing issues concerning investments and use of such systems in a public sector setting is on the rise. During my participation in the International Conference on Information Systems (ICIS) eGovernment Workshop in St. Louis (USA) in 2010, I was witness to a discussion on definitions of the eGovernment research field. When experienced researchers had wound up their discussions, the conclusion reached was that eGovernment is nothing but the use of IT and systems in a public sector setting, and can be explained as follows (Esteves and Joseph, 2008):

"Electronic government (eGovernment) is the delivery of services to citizens via the Internet. The goal of eGovernment is to capture benefits of the electronic economy (e-economy). Although there is sparse information about the quality and

efficiency of eGovernment initiatives, an increasing number of governmental units are incorporating or expanding the use of information technologies (IT) into many of their activities." (p. 119).

Despite rising expectations fuelled by massive investments by numerous organisations, it often proves hard to identify and evaluate the intrinsic benefits in the public sector. According to Centento et al. (2005), emerging trends in the European countries recommend that current thinking on eGovernment, should focus on greater quality and efficiency in services provided by the public sector. In this regard, prior studies point out that the majority of actual government projects end in failure (Goldfinch, 2007), suggesting that the productivity paradox of IT (Brynjolfsson, 1993) appears to be more applicable in a public sector setting. We notice a high failure rate in eGovernment projects (Heeks, 2006), and discern that a greater number of problems are identified within the public sector. However, we also find studies that conclude with none statistical significance, when comparing IS development within public and private sector organisations (e.g. Krogstie, 2010). When a project in the public sector not succeeds, the visibility and consequences for the citizens can be larger.

Although, the criteria for success in a public sector setting are often vague, there is an increasing awareness of the need to include not only the user perspective, but also a range of public values in assessing the success (Scott et al., 2009). According to Irani et al. (2012): "While the most significant measure of successful e-government implementation is the adoption of services by individuals (or citizens) and institutions (businesses), the authors posit that this adoption is directly related to the three key performance indicators." (p. 303). These indicators concerns measures such as efficiency, accessibility and availability. In the public sector, benefits have traditionally been assessed by rather simple financial

measures, such as return on investment (ROI) and cost-benefit analysis, but additionally, they are assessed by (internal) efficiency, (external) effectiveness and democracy/openness (Flak et al., 2009). Moreover, Gupta and Jana (2003) distinguish between hard and soft measures, and argue that due to the interactions between organisations and users (citizens), a combination of hard measures (for example, cost benefit analysis, benchmarking) and soft measures (for example, qualitative intangible benefits) would be appropriate in addressing problems of evaluating eGovernment projects.

Maturity models have been discussed and refined over time, in order to classifying the degree of successful IS adoption (Andersen and Henriksen, 2006). Government organisations can for instance, create value by decreasing costs related to the use of public websites. Regarding this, public organisations are resolute about adopting IT for provision of digital services to citizens and businesses, in order to meet management expectations in delivering eGovernment services (Khayun et al., 2012). This clearly indicates the ambiguous use of IS in eGovernment bodies, to stimulate both user and organisational benefits. Moreover, by delivering online information and services in a user-centred instead of government-centric way, governments aim to create a more desirable connection with their citizens and thereby, build up citizens' trust in the government (Accenture, 2007; Datatilsynet, 2013; Regeringen, KL and Danske Regioner, 2011). In order to apply a citizen-centred approach, user involvement in development projects and quality improvements in websites is one recommended course of action. Through looking at value from a citizen's perspective, value in the public sector can be assessed through criteria such as the benefits related to the outcomes the government delivers and the cost-effectiveness the public sector

achieves (Accenture, 2007; Datatilsynet, 2013; Regeringen, KL and Danske Regioner, 2011).

In the public sector, we observe that quality of websites is essential for measurement of success and facilitation of user satisfaction (Choudrie et al., 2009; Panopoulou et al., 2008). In this regard, several identical quality aspects of websites in general, apply in a public sector setting, although, there are some quality issues that are considered of vital significance in eGovernment, such as fulfilling accessibility requirements, known as the WAI (Web Accessibility Initiative) principles (Lazar et al., 2004; Snaprud and Sawicka, 2007). Returning to the annual quality assessment and ranking of public sector websites, the use of criteria reveals that the quality of content, WAI-principles and usability issues are key contributors in website quality.

Furthermore, in public sector websites, there generally exists a wide and inhomogeneous group of users with varying beliefs and points of view. In order to grant all users an equal opportunity to participate in a digital society, various needs and requirements need to be taken into account in website development and continuous quality improvements. Lazar et al. (2004) conducted a study among 175 webmasters in order to investigate the webmasters' knowledge of this topic and the reasons for their actions to increase website accessibility. Furthermore, Latif and Masrek (2009) studied the webmasters' knowledge and practices pertaining to accessibility. They deduced that not a single government website passed the accessibility check (WC3 Priority I). Thus, we can conclude that compared to measurement of website quality in IS research, accessibility is a dominant aspect in eGovernment research.

Concerning investigation of user satisfaction in eGovernment studies, Irani et al. (2012) analysed contributions within the field from 2000-2012. They found that quantitative techniques and surveys was dominant compared to qualitative techniques (such as interviews) or mixed methods approaches. As a result of this, we found that prior studies in the field of eGovernment to a limited extent provide in-depth knowledge in relation to user performance and actual use of public information and services. This contribution gives us an idea of the most frequently measures on user satisfaction (design and methods applied) in a public sector setting and to what extent (level) we gain knowledge, that can help to move the sector forward and provide valuable input. In relation to quantitative methods that is most prevalent, this is generally more effective and less costly compared with qualitative methods.

According to Karkin and Janssen (2013) website assessment conducted within eGovernment environments does not always cover the aim of the website, and much focus are put on issues concerning content and quality, rather delivering of public values. In order to respond, the author examined public sector websites by taking a public value perspective. The findings show that the websites performed better in regards to measures as content and quality, compared to measures related to public values. Public values were investigated by indicators such as platforms for user engagement and online dialog between government and citizens. The following evaluation criteria was used in the website evaluation conducted, including both traditionally quality measures and aspects related to public values: Content, usability, quality, broken links, update range, visual elements, transaction, website layout, accessibility, citizen engagement, transparency, responsiveness, dialog and balancing of interest. Scott et al. (2009) takes a public value perspective by emphasising what the users find important in eGovernment

services and aspects of quality that force success. The aim of this contribution was to include the citizens' perspective and understand benefits in an eGovernment setting.

In eGovernment we also find that various types of information and services are provided above citizens and businesses. In this regard, online services can be classified as a five-stage maturity model, divided into the following levels: (1) information, (2) one-way interaction, i.e. downloadable forms, (3) two-way interaction, i.e. electronic forms, (4) transaction, i.e. full electronic case handling, and (5) targetisation/automation, i.e. pro-active and automated (Capgemini et al., 2010; Budinoski and Trajkovik, 2012). Within the Scandinavian countries with find a high level of maturity in provision of eGovernment services, and increasingly more services are available online. Digitalisation strategies launched in Norway and Denmark (e.g. Regeringen, KL and Danske Regioner, 2011) forms the uptake of new actions and use of technologies within the public sector. When focussing on the different levels of maturity in eGovernmnet services, a relevant discussion can cover the impacts of website quality in relation to use and adoption of online services. We can argue that; the more information and services provided on a specific website, the more important is user friendliness and access to information and services. A high degree of maturity is often associated with complex systems, that handle a lot of information at once and transactions are executed in different systems (e.g. databases). The third level (two-way interaction) and fourth level (transaction) has become a standard in many countries (European Journal of ePractice, 2012). Regarding level 5 (targetisation/automation) the Scandinavian countries perform well and are in the leading front worldwide (Capgemini, Rand Europe, Sogeti and DTI, 2010).

In regards to public sector websites, we can discuss how quality on the Web might affect eGovernment adoption and user satisfaction among the citizens. As we find that public sector websites to a large extent has monopoly on most information and services provided, quality in websites is of particular importance. In this regard, we might speculate how and to what extent website quality affects user adoption and satisfaction. What we already know is that public websites, in most cases, has a large and none homogeneous groups of users. Various quality aspects must, therefore, be covered. Hsu et al. (2012) investigated whether perceived playfulness and flow mediate the relationship between website quality, user satisfaction and purchase intention. This study can be linked to digital self-services provided by the public sector, where the users, e.g., have to perform tasks and fill in forms. The results show that playfulness and flow is affected by the website quality. The present study also found that quality in services is found to be more important than information quality and system quality, in regards to user satisfaction and purchase intention. Saha et al. (2010) found that quality in e-services is connected to efficiency, responsiveness and web assistance, and were more important than privacy. Use was also found to be positively related to satisfaction among the citizens. In measurement of user satisfaction within public sector websites, usability questionnaires are frequently used and the users are asked about their perception of website quality (Elling et al., 2012). The fact that questionnaires in most cases only to some extent give in depth knowledge about actual use and user satisfaction, compared to traditional usability testing, we get an overall impression of user friendliness and functions of a given website. In order to evaluate the quality in public websites (i.e. municipalities), Scott (2005) propose five aspects of a website: transparency, transactions, connectivity, personalization and usability. In addition, reports on the quality of 100 websites in the largest metropolitan area in the U.S. The findings show that, in general, there

is a positive relationship between city size and website quality. In this regard, we can speculate whether size matters in delivering of quality in websites, and the extent of resources that is located in website development and quality improvements.

Regarding users (citizens) satisfaction with websites and in relation to facilitation for use of public services, a report from Accenture (2012) states as following: "The majority of people responding to a new Accenture survey say they would use digital services if offered by the government, especially for routine transactions. And over half want to conduct all their government business digitally in the future. The biggest challenge for government is not catching up with the private sector – it's giving digital citizens what they want while using digital channels to improve public value" (p. 3). Consequently, we need to focus on the users' perception of quality in adoption of eGovernment services, and how we best can facilitate and implement information and online services. Moreover, Gauld et al. (2010) found that experienced users of IT are in general more positive to use services provided by the public sector, and that older users and less educated were associated with lower use and support of eGovernment services. Concerning income there was no significant impact in relation to eGovernment use and adoption, but the majority preferred to have a non-digital interaction with the government. Concerning this, Ozkan and Kanat (2011) found that "the constructs trust, perceived behavioral control and attitudes successfully explained the intention to use an e-Government service" (p. 503). Trust was measured by trust in Internet and trust in government, which also are found to be of importance in other studies (e.g. Bannister and Connolly, 2011). Comparing face-to-face interaction with the use of Web technologies, information and security issues are found to be important to the citizens. We can speculate that this is a larger concern among non-experienced

users, since they have less knowledge about the use of technologies and possible implications. In a Scandinavian context we can assume that there are, generally, many users with high IT knowledge and great Web experience.

3.5 Human-Computer Interaction

When investigating website quality, we witness that involvement of users in the development process and in quality improvements is perceived to be a prerequisite for success (Tait and Vessey, 1988; McGill and Klobas, 2008). Therefore, the body of knowledge in the research field of HCI is viewed as a contributor, in connection with the interactions that take place between the user and the website. An interdisciplinary body of research literature suggests the importance of HCI and its complexity (Gerlach and Kuo, 1991) and can be linked to the IS research field. The last 40 years have witnessed a dramatic growth in research focussing on subjects in the field of HCI, and increasing attention conferred by researchers to this field, as measured by the progress during the 1980s, with reference to the number of published journals, text books and papers presented at various conferences (Shackel, 2009). In addition, we have observed a number of HCI studies published in the two top-tier MIS (Management Information Systems) journals over the years (Zhang and Li, 2004), therefore, leading us to conclude that the field of HCI plays an important role in IS research. The field of HCI can be defined as follows:

HCI is the study, planning and design of the interaction between people (users) and computers. It is often regarded as the intersection of computer science, behavioural sciences, design and several other fields of study (Rogers et al., 2011). We design for human use and must, therefore, make sure that users are involved from the beginning of the development process (Cato, 2001). Furthermore, HCI involves the design, implementation and assessment of interactive systems with

regard to user tasks (Dix et al., 2004). Designing of information systems in general and websites in particular, has received prominent attention in HCI literature. Usability is perceived as an important contributor in this regard (Frandsen-Thorlacius et al., 2009).

Definitions of usability and user experiences indicate broad characteristics of a system or a website, but they are not detailed enough to evaluate whether the system is usable or not, as perceived from a user's point of view. We also detect other definitions of usability attesting to the fact that usability is a broad term that needs to be clarified in the context of each individual study. The following example can be given (Boivie et al., 2006): "Usability is a multi-faceted aspect of a system in use. Usability cannot be seen as a separate quality that is put on by means of, for instance, an aesthetically appealing interface or by means of usability evaluations." (p. 602).

Despite the fact that there exists a substantial volume of contributions on topics such as website design, use and usability in general, it is argued that these studies do not significantly contribute to the development process, as perceived from a technological perspective (Chu et al., 2007), but rather contribute with regard to issues relevant to design and development of user interfaces. Moreover, in the field of HCI, we observe various methods for user involvement and testing based on development and quality improvements. According to Rogers et al. (2011), usability testing concerns measurement of typical users' performances on typical tasks, but testing can also include user satisfaction questionnaires and qualitative interviews with representative users'. Testing, development and quality improvements are therefore approached through various means, by using different kinds of methods, through a variety of practices and levels of user involvement. In this regard, we witness a range from simple to more sophisticated methods.

However, regardless of the method used, the overall aims and goals remain the same, and these are, to explicitly create systems that users perceive as valuable, functional and easy to use, while simultaneously aiming to facilitate efficiency and productivity in system usage.

Each of the approaches involves different type of methods, such as observing users in a real user setting; questioning individual users in order to get their subjective opinions; focus group interviews with numerous users at each interview; examining and questioning experts who possess in-depth knowledge and vast experience with design and development; traditional user testing and questionnaires, such as online surveys (Rogers et al., 2011; Kuniavsky, 2003). Each of these methods reveals various types of user problems, and in many cases, it is perceived that combining a few methods helps identify different critical issues that cannot be determined and recognised by using one single method. Therefore ideally, different methods should be applied in development and continuous quality improvements, by including a wide range of users with different requirements and needs from websites. But, analysis and evaluations of usability are challenging and require knowledge and experience (Følstad et al., 2012). These should also reflect how discoveries made during the course of the analysis are implemented in the design to an optimal advantage, thereby increasing the degree of usability.

According to Frandsen-Thorlacius et al. (2009) knowledge with reference to cultural usability is also proven to carry meaningful significance, and the users' nationalities and ethnicities should be taken into consideration for usability evaluations. In their research for instance, they ascertained that users from China are more concerned with issues regarding visual appearance, satisfaction and fun, compared to Danish users, who place greater emphasis on issues such as

efficiency and effectiveness. The roles played by culture and ethnicity serve to contribute an explanation for these findings. In connection with the role of culture and ethnicity, public sector websites in the Scandinavian countries serve, to a large extent, a population that can be expected to share a similar background, with respect to cultural issues. However, it is vital to be aware of the high immigration rates in both Norway and Denmark, which could, in turn, lead to cultural usability being an issue in a public sector setting in Scandinavia.

In regard to facilitation for usability, prior research established such concerns are a central part of the system and software development process. Bygstad et al. (2008) investigated current practices in usability testing in software development in the Norwegian software industry. They found that the industry perceived that development methods and usability are both suitably integrated during the process, which, according to this paper, is in contrast to findings in previous research studies. Boivie et al. (2006) reported on the role of a usability designer in investigation and whether the role of the designer was successful with respect to changes in the system development process. They concluded that further research was necessary in order to better understand how to integrate usability and users requirements during the development process.

To facilitate comprehension of the problem of bad usability by public authorities, Cajander et al. (2006) reported on qualitative interviews held with managers. The findings revealed that usability was interpreted differently by these managers and that efficiency and economy were constituent factors of usability. The managers stated that deadlines and a short-term focus for projects were a few reasons of bad usability. By taking into account findings of prior research studies, the motivation for emphasising the role of user testing in website development and quality

improvements is a relevant contribution towards facilitation of superior quality interactions and enhanced user experiences on the Web.

3.6 Anchoring the Thesis in the Research Fields

The sections above (Sections 3.3-3.5) present the research fields applied in this thesis. As stated earlier, the intention of this study is not to compare the fields, but rather draw on existing knowledge in the literature. Each of these three research fields has made the following contributions:

This research is anchored in the IS field, since websites are perceived as categories of information systems in the context of this study. By successfully drawing upon existing literature in this field, constructs of website success are identified, which are considered to be particularly important. Website quality is perceived to be a prerequisite for success, and success in systems is generally measured by user satisfaction. User involvement and testing in development and quality improvements are ascertained as key contributors in this process. In order to guide the research conducted in this thesis, the research framework is inspired by the IS success model of DeLone and McLean (2003). This model is widely used in IS research (the research framework is presented in Section 3.7), but it is observed that this model is scarcely utilised in eGovernment environments. Prior research contributions in the IS field, which are crucial to this thesis, concern website quality and success, and the role of user involvement and testing in IS development and quality improvements. The users' needs and requirements are largely emphasised in this field, with regard to successful development, implementation and use of various types of systems, such as websites.

The eGovernment research field emphasises studies concerning projects that aim to create an improved connection between the public sector and citizens, increased

efficiency and effectiveness within the sector and development of internal/external systems. In pursuance of achieving this aim, governments devise ambitious plans, and through the ever-expanding use of digital communication between public organisations and citizens, highlight user-centred development as a key to success. For this thesis, prior research in the field has been valuable for designing the research framework, when adopting the IS success model of DeLone and McLean (2003) into a public sector setting. Due to the fact that the public sector claims a monopoly on most information and services provided, it must be ensured that all individuals (users) have equal access and opportunities to participate in public websites. Prior contributions in the research field, which are decisive to this thesis, concern the role of public websites in a digital society and measurement of website quality and success in eGovernment environments.

The research field of HCI is connected with the interactions that occur between users and websites. In development and quality improvements of websites, user involvement is deemed a prerequisite for success. One approach in order to assess the quality level is user testing, in addition to approaches which examine to what extent users can perform tasks with ease and locate relevant information. From the HCI field, we conclude that various types of methods are applied, such as usability testing, interviews, online surveys etc. Through user inclusion in website development and quality improvements, we must take into account their needs and requirements, in order to facilitate for superior quality interactions. Compared to IS literature, in the HCI field, diverse website quality aspects, which are considered important, are extensively linked to design principles and guidelines for good design. Knowledge of these areas is therefore, vitally significant in order to understand quality and success in websites, and facilitation for superior quality interactions between public sector websites and citizens.

3.7 Overall Research Framework in This Thesis

The present thesis draws on the IS success model of DeLone and McLean (2003). The purpose is not to validate or develop the model, but rather to use the model as a guide for research and inspiration to investigate the topic of interest.

The original DeLone and McLean IS success model was first published in 1992 and provided a comprehensive framework for measuring success based upon the performance of information systems. This model was based on theoretical and empirical IS research conducted by numerous researchers in the 1970s and 1980s, and consists of three components of success: the creation of a system, the use of a system and the consequences related to this system use. Based on a total of 180 articles which was organised according to the use of taxonomy, DeLone and McLean provided in 1992 a framework for how to approach a relatively complex phenomenon, as IS success is. The model contains six constructs (variables): system quality, information quality, use, user satisfaction, individual impact and organizational impact. System quality concerns technical success and information quality concerns semantic success. Effectiveness success was measured by use, user satisfaction, individual impact and organizational impact. Individual impact concerns the effect of information on the behavior of the user, while organizational impact concern the effect of information on organisational performance (DeLone and McLean, 1992). The IS success model also indicates the directions of the relationships between the six variables and the aim of the model was to establish an understanding of measurement of IS success.

Regarding referencing and use of the original model published in 1992, DeLone and McLean (2003) states that: "Although many of the cited articles tended to justify their empirical measurement of IS success by citing the D&M IS Success Model, some of them failed to heed our cautions. Some researchers have used the

model to support their chosen success variable rather than to inform the development of a more comprehensive success construct." (p. 12). This shows that the model was a much needed contribution, but also that it must be refined and adapted to the individual study context. Although there are many studies that have tested and validated the model, there are also many studies that have challenged, criticised and/or extended the model (DeLone and McLean, 2003). We can speculate on the reason for the many responses on this model. One reason might be that the model was awaited in IS research and a gap was therefore fulfilled, by providing a set of success variables and the relationships between them. Previously, success was measured in different ways, because of the lack of existing research. With such a framework for measurement of success, guidelines and variables were reviewed and identified. This model has also made studies within IS research more comparable, in regards to the use of variables and how each of them perform in various research contexts.

Success in information systems is a relatively vague concept and can also be approached from various perspectives. In the original model from 1992, success was mainly related to individual- and organisational impacts, caused by the quality of a system and the information provided, and system use and satisfaction among the users. In regards to the responses, one of the comments was that the model was difficult to apply. Concerning this, the authors clearly stated that the model must be adapted and evaluated in relation to use, type of system evaluated and the study (research) context. Although the model in many ways is relatively rigid and illustrates some clear relationships, the variables are still flexible in the sense that they can be interpreted (operationalised) within the individual study. In this regard, we also find systems that are developed for internal use in an organisation (e.g. a billing system), while other systems are made for external users outside the

organisation (e.g. digital self-services provided on the Web). Moreover, in some organisations success can be measured by economic performance (e.g. in e-Business websites), while in other organisations efficiency and effectiveness (e.g. the public sector), is more appropriate measures. Although the DeLone and McLean model provides guidelines (variables) that are important to assess, it is still scope for modifications.

Ten years after the first model was published in 1992, DeLone and McLean presented an updated framework in 2003. The updated model has, as earlier stated, served as inspiration for investigating the topic of interest in the present thesis. Consequently, the model has formed the basis for how to approach website quality and success in public sector organisations. The IS success model of DeLone and McLean from 2003 covers constructs of success that are perceived as important in the IS field and is based on the original model (1992) and responses to this. We find that numerous studies in IS research refer to the DeLone and McLean IS success model (e.g. Wang and Liao, 2008; Scott et al., 2009; Seddon, 1997; Skok et al., 2001), resulting in this model being the most cited model for measurement of success within the research literature. A citation search in 2002 yielded 285 peer-reviewed articles in journals and proceedings that have referenced the model during the period from 1993 to the summer of 2002 (DeLone and McLean, 2003). This witness a need for a structured way of measuring IS success and constructs (variables) that need to be identified.

The updated model (2003) covers the following constructs of success: (1) information quality which captures the content issue of a system; (2) system quality which captures aspects that measure the desired characteristics of a system; (3) service quality which captures the service quality delivered by the service provider; (4) use and intention to use; (5) user satisfaction which refers to the

users' opinions about the system and should include the entire user experience and (6) net benefits which capture the balance between positive and negative impacts of an information system (DeLone and McLean, 2003). The IS success model is therefore, interpreted as follows: A system is evaluated in terms of information quality, system quality and service quality; these characteristics affect the use or intention to use and user satisfaction. As a result of using the system, certain benefits are achieved. The net benefits will (positively or negatively) influence user satisfaction and further use of the information system. Usage measures everything from a visit to a system, to navigation within the system and information retrieval. User satisfaction continues to be an important means of measuring the users' opinions and experiences of the system usage. The IS success model does not exhibit positive or negative signs for success dimensions in a causal sense, but in a process sense. However, from the model, we distinctly perceive that causality is driven in the same direction as the process. Numerous research contributions have supported the left-hand side of the model (information quality, system quality, service quality, use, intention to use and user satisfaction), while there has been consensus on the relations linked to the right-hand side of the model, concerning net benefits (Wu and Wang, 2006). One implication is that the model does not provide clear measures with regard to net benefits, as compared to measurements of quality in information systems. In several studies, the topic of net benefits is almost entirely examined by taking a user's perspective (user benefits), rather than by investigating organisational impacts of performance and success.

Concerning this thesis, the IS success model is used with a view to understand and operationalise constructs of website success and the relationships between each of them in the context of public sector websites. Website quality is measured by

perceptions of information quality, system quality and service quality. User satisfaction is measured by perceptions of user satisfaction, and finally, net benefits are measured by perceptions of user benefits. The constructs of success, intention to use and use, are omitted in the context of this study. Therefore, not all parts (constructs) of the model are emphasised, but comparatively adjusted the model to the context of this study. In measurement of website success in eGovernment environments, we ascertained that user satisfaction is perceived as a key contributor to success, and therefore, user satisfaction is the fundamental focus of this research, along with the quality of websites. The feedback loops from the model are either not included in the overall research framework of this thesis. In the model, the feedback loops specifically stated how net benefits impact use and intention to use and user satisfaction. Referring to this point, we can debate whether it is unbiased to exclude certain constructs when adopting a research model. The purpose of this thesis is not to test or validate the IS success model, but rather to use the model as a guide for research. In this regard, exclusion of these constructs of success is not considered to cause any critical problems or to have any theoretical implications. In fact, one can argue that this exclusion is to be viewed as a strength, in terms of being inspired by drawing on an existing model and bring it into a new study context.

Comparing the IS success model published in 2003 with the original model (1992), we find that empirical contributions over the past decade, has influenced the way of thinking in measurement of success. Concerning the quality of information systems, the model was extended in 2003 by introducing a new construct (variable) of success. Consequently, service quality is in the updated model included as a part of IS success and concerns delivery of services in regards to use of IS (e.g. response time and empathy towards the users). When comparing

the two models we also find that measurement of benefits/performance of an information system is measured by one variable in the updated model (instead of two variables, as in the original model). In the updated model, individual impact and organizational impact are combined into one variable, namely net benefits. In regards to this change, the model is more flexible and adaptable, while on the other hand, the model (variable) became also more general and abstract. More precisely, the model become less specific in terms of how to actually measure the benefits (e.g. what is benefits? and for whom?). In reponse to this, the authors clearly states that net benefits need to be defined in the individual study context, and can be considered from an individual-, organisational- and/or national level (DeLone and McLean, 2003). DeLone and McLean proposed that net benefits are the most important success measures of a system and capture the balance of positive and negative impacts (benefits).

Figure 2 presents the overall framework in the present thesis. The following constructs (variables) of success are emphasised: information quality, system quality, service quality, user satisfaction and net benefits.
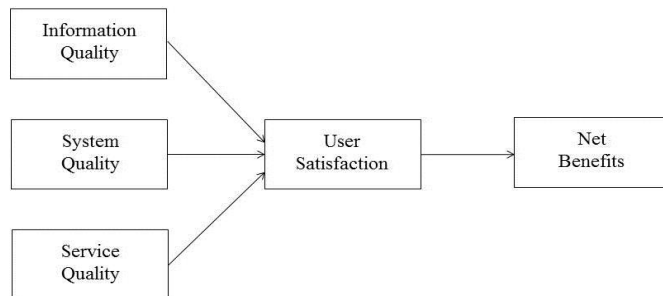
Figure 2. Overall research framework.

Information quality captures updated information, current information, relevant information, clear and understandable information, trustable information, adapted information and information at the right level of detail (McKinney et al., 2002; Lee et al., 2002; Seddon and Kiew, 1996). System quality captures ease to use, intuitive and clear menu structure, appropriate visual design, download time, accessibility requirements, secure use, integration with internal systems (applications), integration with external systems (applications), use of updated technology (McKinney et al., 2002; Wang and Liao, 2008; Seddon and Kiew, 1996).

Service quality captures benefits in solving users' problems, short response time for general inquiries, short response time to users with specific problems, service that meets users' expectations, empathy for users and trust in services (Barnes and Vidgen, 2003; Pitt et al., 1995, 1997; Teo et al., 2008). User satisfaction captures to what extent the users are found to be satisfied (Seddon and Kiew, 1996). Net benefits captures better information and services to the users, more effective and enhanced communication with the organisation, access to information and services at all times, cost savings, time savings (Reddick, 2006; Prybutok et al., 2008; Wang and Liao, 2008; Scott et al., 2009).

Each of the constructs included in the research framework represent manifold underlying dimensions. In order to adjust them to an eGovernment context, operationalisation of the constructs is influenced by interviews conducted with experienced webmasters in public sector organisations. The aim of the interviews was to ensure the validity and the method by which they have been divided into sub-dimensions in the online survey conducted (see Appendix F). In order to dig more into website quality aspects (beyond what is presented in Section 3.3.1), we

can discuss the underlying aspects of information quality, system quality and service quality.

With regard to information quality we find that the content issues are found to be important in information systems. Within the research literature various framework and questionnaires suggest operationalisation of information quality into a numerous dimensions. Information quality in the present thesis concerns aspects such as; to what extent the information is updated, relevant, trustable etc. We find that many of the same aspects are emphasised in prior research contributions (e.g. Seddon and Kiew, 1996; McKinney et al., 2002; Lee et al., 2002). In regards to frameworks concerning measurement of information quality, Price and Shanks (2005) found that most quality framework is limited to consistency and/or coverage, except from InfoQual. This framework offers to a large extent a consistent theoretical basis for how to assess the quality of information. According to Price and Shanks (2005): "Only InfoQual provides a consistent theoretical basis for all of the development steps – with the single exception of the derivation of subjective quality criteria which is intrinsically dependent on information consumer judgements and thus requires empirical feedback (or industrial experience) to ensure relevance." (p. 98). The focus in this thesis has not been to investigate one quality aspect by drawing on a specific framework, but rather explore information quality (system quality and service quality) as quality aspects in a wider context (i.e. IS success). However, when comparing information quality in the present thesis with prior studies investigating this subject, along with other constructs in success, we find an overlap in the use of measures.

Regarding service quality we also find that various frameworks and instruments have been reviewed (e.g. SERVQUAL, see Nyeck et al., 2002). In this regard,

satisfaction among the users is found to be of particular importance in provision of eGovernment services. Central in this are continual usage of the services provided and in measurement of success or failure (Alwneh et al., 2013). In order to assess the quality of eGovernment services, based on prior research contributions, Papadomichelaki and Mentzas (2012) developed and validated a framework (e-GovQual) to use in measurement of user satisfaction with public sector websites. The instrument consists of the six dimensions, which includes (1) ease of use (navigation, personalization and technical efficiency), (2) trust (privacy and security), (3) functionality of the interaction environment (support in completing forms), (4) reliability, (5) content and appearance of information and (6) citizen support (interactivity). Concerning adoption of eGovernment services, Lee et al. (2011) investigated why some business are more than others willing to adopt applications to perform transactions with the government. They found that the willingness to adopt services increased when the businesses perceived the services to be of high quality. In this regard, trust in relation to the technology itself did not have any visible influence on the users' willingness to adopt services for business purposes. In regards to user adoption, Venkatesh et al. (2012) identified four main attributes for designing eGovernment services. These attributes covered issues such as usability, computer resource requirement, technical support and security. Based on a survey conducted by the present authors, the findings revealed that the four key attributes have an impact on users (citizens) intensions, subsequent use and user satisfaction. Service quality, along with information quality and system quality, can consequently be evaluated alone or as a part of website quality in provision of eGovernment services.

In addition to focussing on the constructs of website success by drawing on the DeLone and McLean model, user involvement in the present thesis is introduced

as an extraneous variable. User involvement concerns user participation during the development process (Ives and Olson 1984), and is elaborated upon in this thesis by identifying various methods applied to user testing (Rogers et al., 2011). Special attention is therefore devoted to user testing, which is also viewed as a separate contribution and was one of the comments DeLone and McLean highlighted in the paper published in 2003.

From an IS and HCI point of view, we may argue that user involvement and testing in system development is perceived to be a prerequisite for success (Kensing and Blomberg, 1998; Zhang et al., 2005; Rogers et al., 2011). Moreover, we find that prior research contributions in the Scandinavian countries have laid emphasis on issues concerning facilitation for user satisfaction in system development, through inclusion of real users (e.g. Bjerknes and Bratteteig, 1995; Bygstad et al., 2008; Boivie et al., 2006). With reference to HCI and the users' interest in public sector websites, the frequency of user testing conducted and methods applied are emphasised. The aim of introducing an extraneous variable is to investigate the role of user testing in website quality. Although this is not considered as integral to quality and success, it may influence the constructs of success (DeLone and McLean, 2003).

Since the DeLone and McLean model is used as a framework in order to guide the research, it is important to notice that the model is used differently in relation to the analysis performed, respectively in Paper 3 (Appendix C) and Paper 4 (Appendix D). More precisely, constructs in website success is not entirely consistent, explained as follows:

Regarding Paper 3, in this paper descriptive analyses are performed and constructs of website quality (information quality, system quality and service quality) are

largely consistent with the model from DeLone and McLean. Therefore, it is considered that the implications in relation to the findings in this paper and the conclusion made do not need any further explanations and/or discussions (beyond what has already been documented). Regarding Paper 4, in this paper correlation analysis (Pearson) is performed, which requires that all constructs must have more than just one item (measure). The fact that user satisfaction was included as a part of the investigation in this paper, which focused on website success and not merely website quality, required some changes compared to Paper 3. In the online survey questionnaire conducted, user satisfaction was measured with only one item (question), and therefore, some of the items of service quality (short response time for general inquires, short response time for users with specific problems and services that meets the user's expectations) were in this paper linked to the construct of user satisfaction (this is also evidenced in Paper 4).

In relation to the implications of findings and conclusions made, one can argue that the model is used somewhat differently in this study (analysis performed in Paper 3 versus Paper 4). In defense of this, tests are conducted in regards to reliability of the constructs (Cronbach's α), as evidenced in Paper 4. In relation to the overall conclusion of the study objectives (overall research question) addressed in the present Ph.D. thesis, this is not considered to be of any great issue and/or having any significant consequences. However, this is important to be aware of and take into account in regards to the overall research framework presented and in relation to the findings and discussion presented in Chapter 5 and Chapter 6.

In addition to the constructs in the overall research framework, user testing is emphasised with regard to how and to what extent the users' requirements and needs are taken care of in public sector websites. The online survey questionnaire

conducted among webmasters, investigated frequency of user testing and methods applied, inspired by Rogers et al. (2011). With regard to methods applied for user testing, the following methods were included as alternatives in the questionnaire: user testing where users solve realistic tasks; online customer satisfaction survey (s); user satisfaction survey (s) by phone, in person or by mail; focus groups/interviews with users and eye-tracking. In order to investigate the frequency of testing conducted, the following intervals of time were applied: Never; according to what I know; it is more than two years ago; once or twice over the past two years; once during the past year and several times over the past year. This survey has been checked in its entirety with experienced webmasters in various public organisations, conducive to ensuring readability, design, quality of the questions and the use of measurement scale.

3.8 Summary of the Chapter

This chapter presents the theoretical framework by anchoring the thesis in the research fields. As the data collected in this study lays emphasis on government bodies in Norway and Denmark, a summary of the Scandinavian IS tradition is provided, in order to give a brief introduction to IS research within these countries. It is established that the Scandinavian countries have long-standing traditions of focussing on the users' needs and requirements in systems development and several researchers contribute valuable insights on the subject. Moreover, this chapter focusses on the IS research field in general and emphasises measurement of website quality, by highlighting aspects found to be of particular importance. The data collected in this research focusses on government bodies and therefore, the research field of eGovernment is reviewed, in order to set the agenda for studying public sector websites. With reference to websites, users' interests are found to be of vital significance. In order to understand the importance of

emphasising issues concerning usability and user testing, a fundamental knowledge of HCI is integrated into the thesis. The overall research framework in this thesis is inspired by the widely used IS success model of DeLone and McLean, and the model has successfully guided the research by identifying important constructs of success. The aim of this study is not to test or validate the model, but rather to adjust the model to the context of this research, by drawing on constructs of success that are established to be important. Moreover, the model has not been rigorously and rigidly used and therefore, not all parts of the model are included in this thesis. In fact, the study merely emphasises the constructs of information quality, system quality, service quality, user satisfaction and net benefits. In addition, methods applied in user testing and frequency of testing is emphasised, in order to understand the role of testing in a public sector setting.

CHAPTER 4. RESEARCH APPROACH

4.1 Introduction

This chapter begins by presenting the research phases carried out in regards to the present Ph.D. study. Various activities have been completed due to collection, concerning both qualitative and quantitative empirical components. Subsequently, the research design is provided, as well as this chapter provides a discussion with regards to the use of methods applied in the present thesis. Consequently, an overall approach and reflections are offered with reference to data collection and analysis carried out during the research process. The individual papers included in this thesis (Paper 1-Paper 4) are provided in the Appendix A-D.

4.2 Research Phases

Several activities were executed during the research study. A total of four research papers were written and published, in addition to the present thesis. To begin with, Table 4 presents a brief overview of phases, time periods, activities completed and the method by which the outcomes of the activities are documented. In the case of this thesis, the research process is not very straightforward from the beginning to the end. Although the process progressed through various planned phases during this entire period and various data were collected at different stages, a continuous evolution of the research was evident during the entire process. Although the overall purpose of the Ph.D. study was stated at the beginning of this study, and has guided the research from the very beginning, the direction of the research has simultaneously advanced based on the findings made during the process as well as choices made along the way.

Phase	Period	Activities	Documentation
1-4	2007-2013	Literature review	List of references
2	2007, 2009	Qualitative interviews held with webmasters	Transcribed interviews and sound recording (MP3-files)
3	2009-2011	Collection of data regarding quality assessment in government	Excel-sheets and summary reports
4	2010	Quantitative online survey among webmasters within governments	Excel-sheets produced by SurveyMonkey® and SPSS files

Table 4. Overview of the research phases and activities carried out.

Between the activities listed in Table 4, other activities were also conducted during the research process; Participation in Ph.D. courses (totaling 30 ECTS) and participation in various conferences/workshops (paper presentations and discussions). In addition, several meetings are held with organisations, in both private and public sector, in order to understand the topic of interest from an organisational point of view. This has been an important supplement to the theoretical anchor and framework. Although the outcomes of these activities are not included in the empirical data the present thesis draws on, the activities has still served as great inspiration during the process, and contributed to in-depth knowledge regarding the research objectives that strives to be fulfilled.

As stated earlier, this Ph.D. thesis is paper-based and not a monograph. A prerequisite for this has therefore been to write papers that fit together and consequently, form the basis of investigating the research topic in the context of this study. The papers were written during the research process, bearing in mind a visible thread that in the end, could tie these papers together, for the purpose of this thesis. Although each of the papers acts as an independent research contribution, by focussing on different topics in regard to website quality and success, this thesis aims to offer additional insights by providing the accumulated findings, to answering the overall research question addressed.

Reflections relevant to the research phases can be summarised in relation to the various activities carried out during the process. A literature review (Phase 1- Phase 4) was conducted in order to obtain updates on current research trends as well as previous contributions on the topic. During the complete process, access to relevant databases and journals was readily available and this proved to be very beneficial. The first empirical data was collected in the very beginning of the study (Phase 2). Eight qualitative interviews were held with webmasters in various organisations (documented in Paper 1 and Section 4.4.1). The purpose was to gain insights into explanations of website quality. Furthermore, the IS success model of DeLone and McLean served as a guide for research, in order to identify measurable constructs of website success, investigated in this thesis (documented in Paper 3 and Paper 4 and Section 4.4.2). The model was adapted to the context of this study, and based on this, an online survey questionnaire was developed. The questionnaire was distributed to respondents (i.e. webmasters) in public sector organisations in Norway and Denmark (Phase 4). In addition to the first-hand data collected, second-hand data available to the public, regarding quality assessment of public sector websites (retrieved from www.norge.no/kvalitet and

www.bedstpaanettet.dk), was collected and analysed in Phase 3 (documented in Paper 2).

4.3 Research Design

The fundamental purpose of this study was to gain knowledge through the use of various data sources, thereby aiming to strengthen the contributions, by combining both qualitative and quantitative empirical components (data). By taking this approach, it can therefore prove challenging to frame the research within a clear philosophical tradition (Greene, 2007). Although the research question addressed in this thesis could certainly be answered by using one single method, combining different methods has given me the opportunity to understand perceptions of website quality and success from various viewpoints, by collecting both qualitative and quantitative data.

The reason for using this approach was not merely to overcome the weaknesses in one of the methods or to provide stronger evidence through corroboration of findings, but rather, to gain insights from various empirical components, which hold diverse types of data that assist in increasing the understanding of this topic. Moreover, the purpose was not solely to compare the data or favour one method over the other, but rather to appreciate the value in the different types of data, and methods of data collection and types of analysis that were conducted. The combining of different methods has, therefore, proved valuable and positive in: 1) Helping to understand this topic through explanations and my personal interpretations of the findings, based on qualitative interviews held with webmasters in various organisations, and 2) Examining relationships between variables (constructs of website success) and descriptive data, based on a quantitative survey conducted in public sector organisations and second-hand data

available to the public, provided by the central governments in Norway and Denmark. Selecting this approach has rendered a unique opportunity to investigate the research objectives that strives to be fulfilled by this thesis, by combining diverse data sources.

The research question addressed in the present thesis begins with the question, "What is ...." and is, therefore, explorative in nature. A qualitative and descriptive approach was favoured to investigate explanations and perceptions of website quality in public sector websites. The aim was to gain insights on the methods by which government bodies explain, perceive and assess quality and success in websites. Based on the DeLone and McLean IS success model from 2003, a quantitative approach was selected to investigate the relationships among the various constructs of success and to comprehend how each of these constructs perform, which was vital to understand the role and impacts of these constructs in website quality and success. In addition, user testing in website quality development and improvements is emphasised. Consequently, the overall aim of this thesis was to contribute to a broad understanding, rather than attempt an in-depth and exhaustive examination of a concrete and specific phenomenon. In order to summarise the research design of this study, Table 5 provides an overview of the data collected and analysis carried out in each of the four papers presented in Table 1.

Paper	Type of data	Data collected	Analysis performed	Covered in
1	Qualitative data	Open-ended interviews held with webmasters (N=8) in website award winning organisations in Norway	Grounded theory approach by using "open", "axial" and "selective" coding	Section 4.4.1
2	Quantitative and qualitative data	Methods applied in quality assessment of public websites in Norway and Denmark and scores on ranking of website quality versus user satisfaction (N=296)	Qualitative analysis of the assessment approach and Pearson correlation analysis on impacts of website quality on user satisfaction	Section 4.4.3
3	Quantitative data	Online survey questionnaire among webmasters (N=519) in order to explore perceptions of website quality within the public sector	Descriptive analyses with regard to information quality, system quality and service quality	Section 4.4.2

| 4 | Quantitative data | Online survey questionnaire among webmasters (N=541) to investigate constructs of websites success and the impacts of user testing | Descriptive analysis and Pearson correlation analysis to explore the relationships among constructs of success, and the impacts of frequency on user testing | Section 4.4.2 |

Table 5. Summarising the data collected and analysis performed.

Details regarding the empirical components of the thesis are provided below, in addition to issues concerning validity and reliability.

4.4 Empirical Components of the Thesis

Sections 4.4.1-4.4.3 deals with the empirical data included in this thesis and overall reflections concerning data collection and analysis performed. More insights and details are provided in Paper 1-Paper 4 (see Appendix A-D). Consequently, the sections below aims to give a brief introduction and overview of the empirical components of the thesis

4.4.1 Qualitative Interviews

The central question in qualitative research is to apply exploration of relevant phenomena in the context of the study. According to Creswell (2009): "Qualitative research is a means for exploring and understanding the meanings individuals or groups ascribe to a social or human problem." (p. 4). The need for a researcher to examine relevant issues favors interviewing as a research method (Lazar et al.

2010), and to understand explanations of website quality in this study, eight qualitative interviews with webmasters in public sector organisations were conducted between 2007 and 2009. The interviews involved eight face-to-face meetings and each interview lasted for about an hour and a half or even two hours. All the respondents were located in or around Oslo (Norway), and therefore, the issue of time was not a subject of concern in this case. Open-ended interviews were conducted in order to establish, to a feasible extent, a situation or a conversational setting in which the webmasters could explain how, from their point of view, they would identify website quality aspects. An interview guide containing 15 open-ended questions was utilised with the purpose of guiding the conversations. Thus, the webmasters' explanations of website quality were not restricted by using a set of pre-defined categories, thereby rendering it possible for the webmasters to be open-minded and convey meaningful explanations.

The interviews presented opportunities to clarify vague concepts and confusing issues, through personal interactions between me, as a researcher, and the respondents. Since the webmasters were able to follow the questions put to them and in fact, appeared to definitely relate to the subject matter, there arose no requirements to elaborate on the questions. The webmasters were approachable and receptive during the interviews. I strove to establish a comfortable interview setting, which further encouraged trust in sharing information and knowledge. Confidentiality was the chief component emphasised as important by all the participants, and I emphatically guaranteed their anonymity during the interviews. All the respondents participated voluntarily in the interviews. The webmasters' identities were not published in the research paper (Paper 1), although the paper was firmly grounded on the findings of these qualitative interviews.

The participants were selected based upon their role and function in the organisation and I exercised complete control over the situation. The aim was to strive for a comfortable interview setting, which would enable the participants to provide in-depth and exhaustive explanations in response to the questions put forth. Before the actual commencement of the interviews, the respondents were briefed about the background and the purpose of the interviews. During the interview, if respondents were unable to follow the questions and were uncertain how to proceed, their doubts were immediately clarified. In actuality, none of the respondents expressed any concerns about the questions, although the questions were relatively open and there was room for interpretation. However, this was also the intention since website quality is an undefined term which can be approached and explained from different angles.

Once the interviews were completed, they were transcribed and sent via e-mail to the respondents. This aim was to clarify any misunderstandings or errors that had occurred during transcription. Some of the respondents did make further comments by adding a few minor and insignificant remarks. Primarily, this was not related to any errors in transcription, but rather additional information that the respondents wished to contribute to the survey. To ensure that the coding was done correctly and accurately, and to ensure thorough consistency throughout the analysis, collaboration was established in the research team. This was a safe method to ensure a common understanding of what was investigated and also the means by which the data were specifically dealt with in the analysis process. The tool utilised for this activity was the software NVivo. Making use of this tool enabled sharing of files via e-mail; in spite of two different locations in terms of the countries (one was located in Norway and one in Denmark).

In relation to the analysis of the data a grounded theory approach was applied by using "open", "axial" and "selective" coding. Utilising a software tool proved to be extremely time efficient and beneficial for the analysis of qualitative data (Kvale, 1997). In this case, the software not only contributed to the opportunity for collaboration, but also helped to code the data, organise the data and perform various type of analysis. Other alternatives for analysis of qualitative data were Post-it notes (by using pen and paper), but Post-it notes would not present similar opportunities to collaborate during the coding process and for the analysis, since the researchers were located in different countries. Face-to-face meetings (within the research team) were also arranged to discuss the data and the resulting analysis to be performed on the qualitative data.

Conducting the interviews for this study was advantageous, in that it presented an opportunity to focus directly on the topic of interest (website quality) and helped to attain valuable insights that provided perceived causal inferences and productive explanations (Yin, 2009). An additional advantage of the qualitative data obtained by this method, during the course of this research, is related to the possibility of gaining valuable insights and exhaustive and in-depth knowledge of website quality, in the quest to understand the topic from a practitioner's point of view. There is a lack of such knowledge in prior research studies identified, and by taking this approach; the aim was to close a perceptual gap between users and service providers (webmasters). Response bias, with regard to badly framed questions and the influence exerted by the researcher on the respondents, could, according to Yin (2009) be cited as some of the limitations of the interviews. Further limitations could be mentioned, such as conducting interviews, which in itself is an elaborate and time-consuming process, and analysing the quantitative data, which is the subject matter of qualitative research.

In view of the sample selection of webmasters, one implication could be that the interviewed webmasters represent elite websites, namely, websites that received national awards. It would definitely have augmented the value of the study if webmasters from other backgrounds were interviewed. It would also have unquestionably enhanced the analysis, if we (the research team) had included an added round of interviews and follow-up questions, on distinct issues relevant to website quality, such as investigating the degree to which webmasters are permitted to explore their freedom to design, or whether they are merely expected to perform the job assigned to them. This could be something to explore in upcoming research contributions. In regards to the use of respondents (webmasters in award winning organisations), it is also important to be aware of that the use of evaluation criteria in these awards not necessarily reflect and measure quality in a good way. The webmasters might also focus on other quality aspects compared to the awards, which are more critical perceived from a user's point of view. We can also speculate whether these aspects (suggested by the webmasters) are covered in the website awards. Additionally, we must be aware that each of the awards has its own focus and the evaluations (use of quality criteria and methods applied during the evaluation process) are largely affected by this.

4.4.2 Online Survey Questionnaire

In addition to qualitative data, this study also draws on findings conducted in an online survey questionnaire. According to Creswell (2009): "Quantitative research is a means for testing objective theories by examining the relationship among variables." (p. 4). Surveys present a powerful opportunity to collect data from numerous respondents instantaneously (Lazar et al., 2010). Drawing on prior contributions and inspired by the DeLone and McLean IS success model, the questionnaire for this study was developed, tested and administered in public

sector organisations. When studying quality and success of websites, views can elicited from different personnel in an organisation, and this study opted to accept a webmaster's perspective. Webmasters (or persons in similar positions) are acquainted with, and therefore knowledgeable about the organisation's website, with reference to technical aspects as well as design issues and content quality.

For development of survey questionnaires, various types of measurement scales were utilised. Hair et al. (2010) distinguish between two types of scales; nonmetric (qualitative) and metric (quantitative) data. Nonmetric data includes nominal and ordinal scales (Constant sum method, rank order and sorting), and metric data includes interval and ratio level scales (Likert-type, numerical, semantic differential and graphic-ratings). The design of the survey instrument in this study drew on the operationalisation of the DeLone and McLean IS success model, adjusted to an eGovernment context. Each construct was operationalised with a set of questions to be answered by the respondents. The respondents in the survey questionnaire were exposed to: a Likert-type scale with Likert items, with the following alternatives to each of the questions: very low degree, low, medium, high, very high degree. In addition, they were provided the opportunity to write their personal comments and observations in an open text field, in order to expand on their statements and furnish supplementary information.

A pilot test of the survey questionnaire was conducted in June 2010 among the finalists of the European eGovernment Award held in November 2009. The aim was to test the questionnaire in order to investigate investments in website quality and benefits achievements. Since all the 52 finalists could presumably be viewed as winners of the award, as they had all made considerable investments in website/service improvements, this specific population was of particular interest. Even though the most important issue in this phase of the survey was to obtain

feedback in order to improve the questionnaire, it was also very educative and enlightening to investigate the extent to which the finalists invested resources in website improvements; the degree to which they were acquainted with their users and, finally, the methods by which they evaluated the outcome of the investments made in website improvements. The pilot survey contained a total of 26 questions, divided mainly into six categories. Each of the questions had a variety of sub-questions. Most of the questions had alternative answers, while open-ended questions were also applicable for some of the categories. The respondents could therefore contribute with their comments and interpretations of the questions, which was very essential in order to improve the questions (questionnaire). No remarkable comments were made.

With reference to the distribution of the final survey, e-mail addresses of the respondents were acquired by actually visiting each website. All of the respondents had participated in a web award contest arranged by the governments in Norway and Denmark in 2009. The survey was distributed (N=1.237) in the second week of November 2010 and all entries had to be submitted by December 2010. The respondents received an e-mail with an introductory letter that informed them about the purpose of the study, and a link (URL) to the online questionnaire. A fortnight later, a second e-mail was circulated as a reminder to all of the respondents. Those who had participated in time were thanked for their participation, and those who had not answered the questionnaire were encouraged to complete the survey within a week. The survey was closed after four weeks, with 541 suitable responses, representing a response rate of 44 percent. In prior studies, research revealed that financial incentives impacted the rate of response (Frick et al., 2001). During this investigation, it was incapable of using financial incentives, as any form of private compensation to public officials is prohibited

under Norwegian and Danish law. To strive for a higher response rate, respondents were offered a report (summary of the survey) as compensation. This served to generate a positive effect with regard to the number of respondents who participated in the survey. A summary report was mailed out to the respondents during the spring of 2011. In relation to the analysis of the data, descriptive analyses were performed with regard to information quality, system quality and service quality (Paper 3). In addition, Pearson correlation analysis was conducted to explore the relationships among constructs of website success, and the impacts of frequency on user testing (Paper 4). Tools applied during the analysis are Microsoft Excel and Statistical Package for the Social Sciences (SPSS).

There are several advantages of using online surveys which are worth mentioning, such as the fact that data can be collected relatively quickly, and it is possible to reach numerous respondents immediately, within a short period of time (Bourque and Fielder, 1995). Most believable, the respondents also enjoy the opportunity to remain anonymous and they can answer the questionnaire as and when they find it suitable and convenient to their needs and requirements (within a given time period).

Regarding the online survey conducted in this study, time and effort was spent in order to follow up on reminders. The reason for this was that the tool used in this study (Survey Monkey®) did not permit sending out online surveys to respondents who had not been approved in advance. Therefore, the survey was distributed via my personal mail account (the work e-mail address), wherein a link to the survey questionnaire was included. As I had no opportunity to determine the respondents who had answered the survey and the respondents who had not, the reminder mail was accordingly addressed to all respondents. I thanked those who had already participated in the survey and addressed a friendly reminder to those who had not.

With regard to this survey, there was no guarantee that everyone who responded understood the questions and could relate to them, although it was possible to respond "not applicable" on each question, if the question was defined as irrelevant by the respondents. To ensure that the questions put forth were understandable and relevant to public websites, two face-to-face meetings with experienced webmasters were held before distribution. At these meetings, the questionnaire as a whole was reviewed, and the webmasters received the opportunity to comment on each question, and the use of the measurement scale in the survey. The comments that were provided were primarily related to the formulation of questions and the meanings of questions. The meetings with the webmasters did not lead to major changes or modifications in the questionnaire, other than a few additional questions which were included in the survey. This feedback imparted confidence to me in relation to the fact that the questions were easy to understand, relevant and meaningful.

In terms of the individuals who ultimately responded to the survey, it was not entirely feasible to ensure that the questionnaire was answered by the webmasters themselves (or persons in similar positions), even though this was emphatically stated in the e-mail. However, this is a challenge which has to be continually considered when conducting such surveys, wherein the researcher can exercise no control over who actually and ultimately fills out the questionnaire. This is an especially significant issue in relation to online survey questionnaires, where the respondents in most cases are based in another location, separate from the researcher.

A further disadvantage of online surveys is that there is no opportunity to pose follow-up questions or clarify questions the respondents may comprehend as ambiguous. Despite the fact that it was relatively easy to collect, collate and

compile the quantitative data, considerable time was devoted to design the study, develop the questions and conduct pilot tests.

4.4.3 Secondary Data

This study also relies on second-hand data collected from various sources, especially government reports and documents. In order to investigate measurement of website quality (use of quality criteria and methods applied) and user satisfaction in public sector websites, the following websites were of particular significance: www.norge.no/kvalitet and www.bedstpaanettet.dk. Data regarding website quality and user satisfaction was manually collected from the websites, and analysed both qualitatively and quantitatively. To employ second-hand data for research purposes is risky and unsafe, for there is no control exercised over data collection, as compared to carrying out one's personal data collection. In such instances, the researcher must be acquainted with and knowledgeable about the individual who collected the data, in addition to possessing awareness about the process employed for data collection. The data included in this study was collected on behalf of the public sector in Norway and Denmark. Therefore, the data collection conducted, the process, use of methods, the criteria employed and the purpose were all clearly stated. This imparted confidence and assurance about the reliability of the data, which could then be used in a research context. Another argument for utilising government data was that such data is publicly available and free of cost. The data are extremely significant for the public sector and many organisations employ the data as a guideline and inspiration related to investments in website quality improvements. In this study, the data are systematised and organised to facilitate investigation of the relationships between website quality and user satisfaction, and the tools applied during the analysis are Microsoft Excel and Statistical Package for the

Social Sciences (SPSS). Qualitative analysis of the evaluation process (use of website quality criteria and methods applied) was accomplished. In addition, Pearson correlation analysis on impacts of website quality on user satisfaction was performed (Paper 2).

There are a few observations with reference to the use of secondary data in the study, which was collected by the central government and made available to the public on the Web. In relation to the procedures that were followed corresponding to the premises for the collection of data, and the actual implementation and processing of the data, there were no qualms in utilising these procedures. We can also, as best, put our trust in governments in terms of conducting data collection in an appropriate, reliable and trustworthy manner, under optimum conditions of knowledge and with the most excellent facilities at their command. Therefore, the assumption was that these data were dependable in terms of accuracy and transparency. For this reason, in this study, there arises no genuine concern regarding the actual data collection conducted by the central government, as this study examines and discusses the use of methods as a part of the research objectives. Although it may be appropriate to question the method by which the data is actually processed afterwards. For this study, the data were transferred for statistical analysis and then, rechecked and verified to assure accuracy and ensure that the results that were applied in the analysis were consistent with those that were available on the Web.

4.5 Summary of the Chapter

This chapter covered the research approach adopted in this thesis and the method by which the research was conducted and analysed. The research process included various activities carried out and mixed-methods were applied in the research design. The qualitative part included eight interviews held with webmasters in

website award winning organisations and the overall aim was to investigate how webmasters explain website quality. A grounded theory approach was accepted during the analysis. Moreover, a large scale online survey questionnaire was conducted among webmasters in public sector organisations, to investigate perceptions of website quality and success. Statistical analysis which involved both descriptive and more advanced techniques was conducted. In addition, this thesis utilised secondary data available to the public (collected from government websites in Norway and Denmark).

CHAPTER 5. FINDINGS AND DISCUSSION

5.1 Introduction

This Ph.D. thesis consists of four different research papers along with the present thesis. In this chapter, the findings from each of the papers are presented and discussed by taking a cross-paper analysis approach. Firstly, a summary of each of the four paper provided by presenting the main findings, followed by the structure of the cross-paper analysis carried out. Then, the findings regarding the three main topic identified are provided in Section 5.3. These topics are developed by having the overall research question and sub-questions in mind, and in order to fulfil the research objectives addressed in this thesis.

5.2 Summary of Findings in Papers 1-4

In order to attempt to answer the overall research question addressed by the thesis: *What is website quality and success in public sector websites?* Four sub-questions were developed (presented in Section 1.3). Table 6 presents an overview by summing up the main findings in each of the four papers.

Paper	Main findings
Paper 1	Explanation of website quality concerns issues such as:
	- User-friendliness of websites in general and usability issues that cover a broad definition of use
	- Content quality in regards to correct, relevant and trustworthy information
	- Accessibility requirements based upon WAI-principles and standards
	- Overall service quality in regards to online information and digital services
Paper 2	Assessment of website quality and user satisfaction:
	- Website quality covers highly technical issues
	- Users are replaced by experts for quality assessment purposes
	- No positive significant correlation between the quality of websites and user satisfaction
	- More focus should be put on actual use and user performances
Paper 3	Perceptions of website quality:
	- In general, website quality is perceived to be of a great quality in the public sector
	- Potential improvements regarding usability issues, system integration and use of technologies
	- Empathy towards website users and their needs and requirements

Paper 4	User testing and constructs of success:
	- Low extent of user testing conducted in relation to website quality improvements
	- No advanced or sophisticated methods applied for testing
	- Frequency of user testing positively affects constructs of website success

Table 6. Main findings in Papers 1-4.

Before offering the cross-paper analysis carried out in this thesis, each of the papers is presented:

Paper 1: Hanne Sørum, Kim Normann Andersen and Torkil Clemmensen, "Website quality in government: Exploring webmasters perception and explanation of website quality", Transforming Government: People, Process and Policy, 7(3), 2013, pp. 322-341

Research question addressed: What is a webmaster's explanation of website quality?

Regarding Paper 1, the aim of this paper was investigation of the webmasters' perceptions and explanations of website quality and it offered the opportunity to understand how practitioners (i.e. webmasters) facilitate website quality, grounded in their perceptions and explanations of aspects of quality, which they considered to be of importance. The findings appeared to be consistent with other studies of webmasters' views of website quality, although a key contribution of this study was a more detailed and comprehensive list of quality aspects within websites. An

analysis of webmasters' explanations of website quality revealed 15 different explanations or aspects of website quality. The keywords to describe website quality were predominantly related to user-friendliness, effective website usage, content-related issues and accessibility (WAI-principles). Moreover, the findings revealed that usability was an important dimension of a broader concept of website quality. In this regard, system quality was important to the webmasters, but there were completely different aspects of system quality that were important in different types of websites. Moreover, information quality was explicitly mentioned by the webmasters as being significant. The eight webmasters stated that information should be easily accessible and locatable, and therefore, it was imperative not only for users to discover what they were looking for, but also to understand that information as well as accept that information to be beneficial and trustworthy.

Comparing the DeLone and McLean model with the grounded theory model of webmasters' explanations of website quality, consisting of 15 website quality aspects across different categories of websites, findings show an overlap between the three DeLone and McLean quality dimensions in the model. The webmasters explained and enumerated upon information quality, system quality and service quality with varying levels of detail and comprehensiveness; all three aspects of the DeLone and McLean model thoroughly investigated each webmaster's explanation of what was relevant and important in order to offer a high quality website to the public. We can speculate that this explanation was independent of the business domain or users in professions of commerce and trade. Furthermore, compared to the DeLone and McLean model, the webmasters tended to focus their explanations on system quality.

Research question addressed: Are website users more satisfied with high-quality websites than low-quality websites?

Regarding Paper 2, the aim of this paper was to investigate measurement of website quality in government bodies, and the manner in which the quality of websites impacts perceptions of user satisfaction. With respect to the use of quality criteria and the evaluation process in yearly rankings of public sector websites, the findings proved that the use of criteria in such evaluations were largely very technical, mainly driven by standardised objective criteria, connected to technical subjects and aspects linked to system quality. Design issues, traditional usability testing and user experiences as criteria were basically omitted from these evaluations. Users were replaced by experts (consultants), who aimed to take care of the users' interests through the use of quality criteria. In addition, these findings proved that user involvement was not generally a part of the evaluation process, and to the extent that it was part of the process, not very sophisticated methods were applied for testing. Most of the criteria related to system quality aspects, which were easy and uncomplicated to measure in an objective way, and did not necessarily reflect aspects of websites, proved to be related to by users. Although the content of a website was emphasised in the evaluation process and perceived as important, concerns regarding whether the information presented was accurate and whether that information was relevant to the users, were assessed to a much lower degree.

Moreover, it was noticed that on the basis of the annual evaluations performed, user involvement was included in the evaluation process to a lower extent, although it was perceived to be of great significance for user satisfaction. Applying a HCI perspective on the evaluation process and the use of quality criteria, the findings revealed that there existed a huge potential for future improvements. Given the methods by which quality assessments were conducted within these evaluations, in relation to both the use of quality criteria and methods of evaluation, findings show that users were not necessarily more satisfied with high-quality websites, as compared to low-quality websites. Accordingly, no positive correlation between website quality and actual satisfaction of users was proved in the present study. This was a surprising and interesting as well as thought-provoking conclusion, for the main reason that these criteria were frequently established as essential quality indicators in public sector organisations. Yet, in another sense, the conclusion was not so surprising, considering that the evaluation process undertaken in the light of the webmasters' personal explanations of website quality, was to a higher degree geared toward content, design issues and user friendliness.

Paper 3: Hanne Sørum, "Dressed for Success? Perception of Website Quality Among Webmasters in Government Bodies", Proceedings of NOKOBIT (Norsk konferanse for organisasjoners bruk av IT), 2012, pp. 63-75

Research question addressed: What is a webmaster's perception of website quality within government bodies?

The aim of Paper 3 was investigating perceptions of website quality in government bodies through a webmaster's perspective. The findings proved that

the degree to which different dimensions of website quality scored with reference to information quality, system quality and service quality, varied. In addition, the results indicated that the public sector generally perceived that websites in government bodies displayed a relatively high level of quality with regard to information quality, system quality and service quality. Taking into account information quality, it was established that trustworthy information scored highly in both countries and was related to the extent to which users relied on the information presented. In addition, the webmasters themselves constantly endeavoured to present updated, current and relevant information to the users. Furthermore, in both countries it was affirmed that information adapted to the users' needs and the level of details presented in the information, were insubstantial and weak.

The pattern also revealed that, in general, quality dimensions regarding information (content) quality were perceived to be superior to aspects concerning system and service quality, except for issues of trust and security. The overall findings disclosed that there was substantial potential for improvements in system quality with reference to usability, accessibility, and use and integration of web technologies. However, the findings also showed that public websites were perceived to be secure to use, which was an important factor, in conducting online transactions and handling of personal information. For public websites, accessibility requirements were also of particular significance, in order to ensure that all participants (users) in the digital community possessed equal access to online information and services. Thus, it was an unexpected finding to note that the webmasters perceived that their websites did not perform suitably with respect to accessibility requirements. An obvious implication of this point could be that

requirements related to accessibility (WAI-principles) were primarily dependent on the use of (website) technologies.

In order to ensure efficiency and effectiveness of website usage, usefulness and ease of use were very significant factors. This study measured issues pertaining to usability by the simplicity and ease with which users could locate information and services on the website and the extent to which the menu structure was considered to be lucid and comprehensible by the users. The findings demonstrated that there was room for improvement and more attention should be devoted to the issue of development and quality improvements in websites. On the subject of service quality, users reiterated the fact that the public sector delivered services that were reliable and dependable. Trust was noteworthy in facilitating high quality interactions between governments and citizens. Apropos to service quality, the findings revealed that organisations responded relatively quickly, to both specific questions and general inquiries by users. In addition, organisations were as a rule, helpful and genuinely attempted to solve the users' problems. The same held true for empathy and trust which were considered as effectively powerful aspects in delivering service quality. In furtherance of delivering quality associated with online services, it is imperative to continually meet users' needs and requirements, and the findings also indicated that users' expectations were largely fulfilled by organisations.

Paper 4: Hanne Sørum, Rony Medaglia, Kim Normann Andersen, Murray Scott and William H. DeLone, "Perceptions of information system success in the public Sector: Webmasters at the steering wheel?", Transforming Government: People, Process and Policy, 6(3), 2012, 239-257

Research questions addressed: (1) What are the relationships between

constructs of IS success in the public sector, as perceived by webmaster intermediaries? and (2) How does user testing affect these relationships?

The aim of Paper 4 was to investigate the extent of user involvement (testing) in website quality improvements and the relationships among constructs of success. The findings affirmed that over 50 percent of the organisations had not conducted any form of user testing, based upon the respondents' answers. Therefore, this clearly demonstrated that many organisations had little or no knowledge of their website users' satisfaction levels, except through feedback received by mail or through other channels of communication. Less than 20 percent of the organisations responded by confirming that they had not conducted and accomplished any user testing for over two years, while about 10 percent of the organisations answered that they had conducted user testing merely once or twice during the past two years. These results revealed that about 80 percent of the organisations had not performed any testing during the last year. On the other hand, less than 20 percent claimed that they tested a bare minimum, i.e. one test during the last year (whereas, some of the respondents had conducted tests more often than that).

Likewise, the results confirmed that the most frequently-used method in eGovernment environments involved online user satisfaction surveys. Compared to traditional usability testing, where typical users resolved tasks in real user settings, online surveys were considered to be a fast and economical method of collecting data and were in many cases very time-effective. Online surveys succeeded in reaching out a large number of respondents in a short period of time and the results could be accessed easily and immediately. However, it was necessary to be aware of some critical issues with respect to online surveys. The

second method used in a majority of instances was user testing with representative users solving realistic tasks. Focus groups and interviews were applied to a lesser extent among the respondents in this study. Acquiring user feedback through telephonic interviews and in person (face-to-face), was applied in some cases, while determining what the user looked at or eye-tracking occurred only in a very few cases. There is potential to increase user involvement, while aiming for website success and website quality improvements, in a public sector setting, both in terms of frequency and methods applied.

Moreover, the findings revealed that little or no user testing resulted in a perception of weaker correlation between constructs of IS quality (information quality, system quality and service quality) and user satisfaction. This finding suggested that the less webmasters knew about their users (by performing user testing), the less they tended to see a relationship between IS quality and user satisfaction. These findings also seemed to suggest that webmasters who performed little or no user testing conveniently assumed that citizen users were satisfied, while webmasters who were evidently more knowledgeable about the user experience enjoyed an improved perception of levels of success. This interpretation implied that webmasters who did not conduct user testing were poor judges of user satisfaction and user benefits.

5.3 Structure of Cross-Paper Analysis

In order to present and discuss the findings derived from the cross-paper analysis, the overall research question and the four sub-questions, presented in Section 1.3, were further divided into three main topics relevant to the study objectives. The sub-questions addressed were investigated and answered in Paper 1-Paper 4. Therefore, a cross-paper analysis was performed and is discussed in this section.

However, the four sub-questions served as a foundation for development of the three topics presented, as outlined below:

(1) Website quality in public sector websites (Section 5.4). The aim was to investigate explanations and measurements of quality in public sector websites, and draw on findings provided in Paper 1 and Paper 2. (2) Constructs of website quality and success (Section 5.5). The aim was to investigate the mode by which each of the constructs of website success perform and interact, and draw on findings provided in Paper 2, Paper 3 and Paper 4. (3) User testing in public sector websites (Section 5.6). The aim was to investigate the method and extent to which user testing was performed and methods applied in public sector websites, and draw on findings provided in Paper 2, Paper 3 and Paper 4. Figure 3 presents the structure for presentation of findings and discussion in the cross-paper analysis.
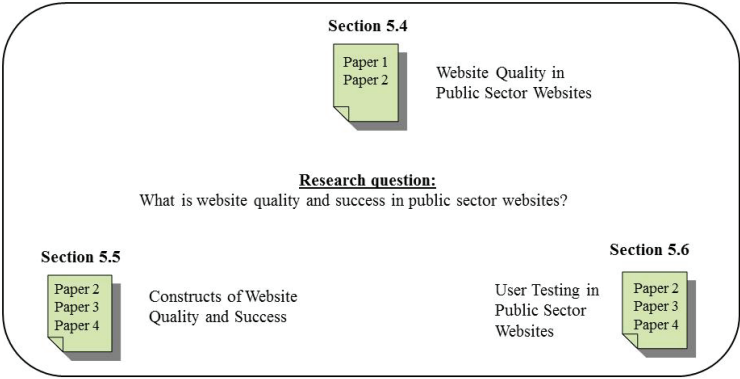
Figure 3. Presentation of findings and discussion.

Sections 5.4-5.6 provide discussions of findings across the four papers, and address the three main topics identified in order to fulfil the research objectives of this thesis.

5.4 Website Quality in Public Sector Websites

The aim of this section was to investigate explanations and measurements of quality in public sector websites and draw on findings in Paper 1 and Paper 2.

The use of websites has become a focal point of the dialogue and interactions that take place between the public sector and citizens (Panagiotopoulos et al., 2012; Choudrie et al., 2009), resulting in progressively greater attention and deliberations on research concerning user-centred issues. In the Scandinavian countries we can notice that the central governments were very ambitions and determined to be the best providers of online information and services. Although they aimed to be international leaders in terms of innovation, digital self-services, technical standards and user-centred development (Accenture, 2007; Departementene, 2012; Meyer, 2005), prior studies concluded that public sector organisations profited more than the users by providing increasingly more information and services on the Web (Capgemini, 2004) and in fact, there was significant potential for improvements in responsiveness in online communication (Andersen et al., 2011). However, we concluded that the public sector in the Scandinavian countries was at the forefront to facilitate for high quality interactions.

As stated in national goals and strategies (Meyer, 2005; Difi, 2013; Accenture, 2007), central governments in the Scandinavia countries exerted considerable pressure on government organisations, with the intention of presenting public websites of superior and distinctive quality. Therefore, website quality was particularly significant in eGovernment, and all individuals (citizens) in a digital society possessed equal opportunities to participate in online communication. Everyone should have equal access to information and services provided by the public sector, independent of requirements and needs of website usage. In view of

the fact that public websites mainly served an inhomogeneous audience, facilitation for quality in websites needed to emphasise the interests of a wide group of users.

Paper 2 ascertained that one of the initiatives launched by the central governments, in order to increase the quality level of websites, was yearly evaluations and rankings of hundreds of public websites. With respect to this point, the use of quality criteria for public sector websites and assessment methods applied were noteworthy. The results from these evaluations were made available to the public online, and the best websites proved to be a source of inspiration in the sector and were highlighted as best-practice examples. With respect to the use of quality criteria in such evaluations, Paper 2 also revealed that the use of criteria was largely very technical and mainly driven by standardised objective measures. The use of quality criteria in such evaluations was grounded in technicalities such as the users having flexibility and ease to alter the text size on the website, download time, search functions of the website and correct HTML-coding. Barely sufficient focus was devoted to design features and the actual quality of content and services provided to the citizens.

Although website content and traditional usability issues were emphasised, these assumed lesser importance, when compared to issues concerning the relevance and latest techniques and styles of content presented on the websites. Typical content issues require in-depth analysis and were primarily omitted in this context. For instance, in the assessment process organised by the central governments, content quality was measured by determining whether the website provided contact information and other types of formal information regarding the organisation. Less emphasis was placed upon whether the actual content provided was relevant and with detailed descriptions, when citizens applied for public services and/or

searched for information with regard to those services. Consequently, it was firmly established that in Paper 2 the use of quality criteria was related to high-level design principles and technical features, rather than criteria concerning in-depth knowledge requiring a comprehensive test process.

In order to include all the citizens in a digital society, accessibility (WAI-principles) were considered to be particularly significant and meaningful, especially in public sector websites (Departementene, 2012; Snaprud and Sawicka, 2007). Accessibility requirements represented a consequential and influential part (almost 1/3) of the quality criteria employed in such evaluations. In this regard, governments displayed outstanding empathy towards users with various disabilities, for example, users with colour blindness, visually impaired users or those with a hearing loss. As demonstrated in Paper 2, the governments attempted to assist disadvantaged users, by emphasising methods such as enabling them to mark text for reading; providing an adequate amount of contrasts in the website design (for e.g. in colors and font sizes), which visibly separated the content; and facilitation for use of screen readers.

Thus, there were numerous considerations for development and quality improvements of public websites aiming to satisfy an inhomogeneous group of users, and these ranged from perception of quality with detailed features, such as correct coding and accessibility requirements, to aspects covering the overall user satisfaction among citizens. Accordingly, the findings in Paper 2 also revealed that additional empathy should be granted to actual users in real user settings, by taking into account subjective matters, which required a thorough knowledge about an extensive group of representative users. These findings were compelling as they disclosed the contributions and impacts of yearly quality assessments of

public websites, wherein the quality criteria act as guidelines in development and quality improvements in public sector organisations.

With reference to the use of website quality criteria in such evaluations, a relevant discussion could centre on the concrete ability and capacity of these quality criteria to actually meet the users' (citizens') requirements and needs from websites. In addition, it could also be examined by what means these criteria acted as contributors for future investments and prioritisation of resources in maintenance of public sector websites. Though several important quality aspects, emphasised in previous studies were covered by these evaluations, for example, content quality (Ahn et al., 2007; Barnes and Vidgen, 2005; Chung-Tzer Liu et al., 2009), usability issues in websites (Choudrie et al., 2009; Scott, 2005; Venkatesh et al., 2012), and accessibility requirements (Snaprud and Sawicka, 2007), there appeared to be a potential for improvements. However, it could be argued that ideally more comprehensive and exhaustive knowledge would enable an in-depth understanding of the ways in which citizens actually deal with public websites, in regard to different types of online information and digital services.

Consequently, the evaluation process could categorically be focussed more on real use and ease of use, rather than firm tangible measures, which users were not proven to relate to in the same manner. Of course, numerous reasons were cited in defence of these criteria being relatively trivial and conveniently measurable, besides the fact that these evaluations were, to some extent, subject to automatic reviews. In view of the fact that it could prove relatively time consuming and expensive to conduct traditional user testing with experts (e.g. usability consultants), such alternatives demonstrated a probable capacity for being considered an added value, although they undoubtedly, could not replace the value of traditional testing. By virtue of the fact that hundreds of websites were subject

to yearly evaluations during a relatively short time period, it was a reasonable assumption that efficiency and resources were key issues in the evaluation process. Taking into account the use of quality criteria applied in these evaluations, in order to maintain a high level of quality in public websites, it was argued that user testing organised by the organisation itself should acquire more importance. To further pursue this topic, Section 5.6 covers the extent of user testing conducted in public sector organisations and discusses the extent to which detailed attention is paid to users' requirements and needs.

A further approach when investigating explanations and measurements of quality in websites was to favour the organisational perspective, as organisations serve as service providers to users. Hence, in contrast to the use of quality criteria in yearly rankings and quality assessments of public sector websites, meaningful emphasis was placed on the role of webmasters. The webmasters were accepted as pivotal figures in development and quality improvements of websites (Liu and Arnett, 2000; Lazar et al., 2004), and were viewed as the persons in an organisation with detailed knowledge of the website. Since webmasters were in charge of website activities and performance, they were in frequent contact with website users, and received comments and suggestions for quality improvements. In connection with this point, Paper 1 investigated the webmasters' explanations of website quality, in order to get insights from a practitioner's perspective.

The webmasters' explanations of website quality laid emphasis on and particularly underlined issues regarding usability, content quality, service quality and accessibility requirements (WAI-principles). When compared to previous studies these explanations covered varied aspects deemed to be important (e.g. Barnes and Vidgen, 2005; DeLone and McLean, 2003; Snaprud and Sawicka, 2007; Venkatesh et al., 2012). On a general level, these findings were also consistent

with requirements obligated by the central government, although those criteria were found to be largely technical and emphasised objective measures (Paper 2), compared to traditional usability testing, which was connected to user performance in a real user setting (Rogers et al., 2011; Toftøy-Andersen and Wold, 2011).

Repeated keywords in studies of website quality (Paper 1) also comprised overall user-friendliness, effective website usage, information-related issues and design features. These findings were therefore apparently in line with literature on aspects of websites believed to be important for users, and ranged from visual appearances to technical standards and features. It was crucial for governments to deliver information and services the users could rely upon, in order to build up trust among the citizens. Trust in public information and services are also emphasised in prior research studies (e.g. Bannister and Connolly, 2011; Ozkan and Kanat, 2011; Papadomichelaki and Mentzas, 2012). Barnes and Vidgen (2005) stressed upon information quality and security in online transaction and services, while ease of use, usability and applicability of websites and accessibility requirements were additional important contributors to ensure participation in a digital society (Snaprud and Sawicka, 2007; Kuzma, 2010; Lazar et al., 2004; Choudrie et al., 2009; Karkin and Janssen, 2013).

The fact that public sector websites, to a varying extent were complex and packed with information and services was another matter which required consideration and speculation on the role of website quality among various type of organisations, and the manner in which the concept of quality differs in websites. Although transformation of public websites was generally guided by a rather heterogeneous set of quality indicators, awareness about some common denominators was essential. Bearing in mind the website quality criteria obligated

by the central governments (Paper 2), which were considered mandatory in public sector websites as well as the webmasters' explanations of website quality, the findings in this study specify recommendations that are critical as guidelines, in order to move the sector forward. An ongoing discussion on whether a variance of quality standards stimulates improvements and innovations in eGovernment environments, could lead to a substantial difference in digital services provided towards the users. This process would be immensely benefitted by constant practice and research to strive towards a more heterogeneous perception of facilitating high quality interactions and user satisfaction in online information and services offered.

When analysing the webmasters' explanations of website quality against the use of quality criteria launched by the governments, it was noticed that the webmasters' explanations were more focussed on actual usage and aspects of quality proven to be related to by users. This conveyed the meaning that explanations of website quality were largely related to subjective measures regarding the users' interactions with a website and task performance, such as the extent to which users considered the website easy to use, in terms of ease of locating relevant information, simplicity of website design, service quality that met the users' expectations and response time. Consequently, the topics of trust in information and services, accessibility and secure use were presumed to be vital quality aspects of websites with reference to the information and services provided, while technical issues were believed to be fundamental to system quality in websites.

Comparing the DeLone and McLean model (2003) with the grounded theory model of webmasters' explanations of website quality, there was an overlap between the three DeLone and McLean quality dimensions. The webmasters explained information quality, system quality and service quality with varying

levels of detail and completeness; all three aspects of the DeLone and McLean model entered each webmaster's explanation of what was relevant and important to be categorised as a high quality website. The webmasters tended to focus their explanations on system quality, emphasising issues concerning usability of websites. Consequently, it was accepted that website quality in the public sector was primarily related to a user-centred approach, by taking into account the citizens' requirements and needs, and user satisfaction played an essential role in determining website quality.

Although the central governments claimed that quality improvements in government bodies, grounded in the use of quality criteria in ranking of public websites, aimed to increase user satisfaction, the potential for improvements was also present with regard to the use of criteria and methods applied in these evaluations. Website quality was mainly related to issues that the organisations (i.e. webmasters), were unable to improve or modify on a regular basis. Nonetheless, the webmasters could effortlessly and easily modify and publish content, compared to making improvements on design features, dealing with technical issues and accessibility requirements. The webmasters explanations also underscored technical requirements as important, which is in accordance with prior studies, for example (Ahn et al., 2007; Aladwani and Palvia, 2002), along with a sharp understanding and appreciation of issues connected with actual user experiences and user interactions with websites. Design, structure and navigation were found to be key elements in these explanations (Paper 1). The quality of websites could, therefore, not be defined by a single term or definition, but rather as a construct that encompassed a broad range of features. This is in line with previous research contributions, e.g. (Boivie et al., 2006; Kim and Stoel, 2004),

and what the findings showed in regards to the webmasters explanation of website quality versus use of quality criteria launched by the central governments.

5.5 Constructs of Website Quality and Success

The aim of this section was to investigate how each of the constructs of website success perform and interact and draw on findings from Paper 2, Paper 3 and Paper 4.

Success in websites is approached from different levels and perspectives, and various constructs are emphasised in this regard. The research framework in the present thesis tackled this issue by focussing mainly on five constructs, namely information quality, system quality, service quality, user satisfaction and net benefits. In the field of information systems (IS), user satisfaction is the most common measure of success, (Doll and Torkzadeh, 1988; Seddon and Kiew, 1996; Wang and Liao, 2008) and website quality is a decisive and chief contributor to website success (DeLone and McLean, 2003). In Section 5.4, the findings reported on measurement and explanations of website quality in public sector organisations, and established that various quality aspects were emphasised, ranging from technical and objective criteria to measures concerning actual user performance with regard to provision of online information and digital services.

In order to further investigate website quality in public sector websites, Paper 3 investigated the webmasters' perceptions of quality in websites, with respect to information quality, system quality and service quality. An online survey questionnaire was conducted among public sector webmasters, responsible for websites participating in the yearly quality assessment organised by the central governments in Norway and Denmark. The findings proved that webmasters perceived that generally, public websites holds a high level of quality. Many of the

aspects that were deemed remarkable and significant were in line with the webmasters' explanations of website quality (Paper 1) and the quality criteria used as guidelines in public sector organisations (Paper 2). However, the findings in Paper 3 indicated substantial opportunities for improvements by pointing to topics that were required to be addressed, concerning usability issues, accessibility requirements and the use of updated technologies.

Paper 3 addressed information quality and we deduced that public websites presented trustworthy and reliable information, closely followed by other features of information quality such as relevant information, current information and updated information. The findings also explained very clearly that perceptions of information quality were higher than those of system quality and service quality. As webmasters assumed the responsibility of updating and maintaining website content on a daily basis, (Furu, 2006), we speculated that information quality was the feature that webmasters could influence to a great extent, and therefore they were convinced that information quality was the answer to a website's success. Prior research (e.g. Nielsen, 1993; Chung-Tzer Liu et al., 2009; Price and Shanks, 2005) suggested that content quality was an important subject matter in website success. Webmasters could effortlessly and smoothly modify and publish content, compared to making improvements on design features, and dealing with highly technical issues and accessibility requirements.

With respect to system quality in Paper 3, public sector websites were perceived to be secure to use, in terms of handling of information and services. Security of online information and services was regarded to be significant from a webmasters point of view, in order to ensure a trustworthy dialogue with government bodies, through website interactions and digital channels. Security were also found to be of high importance from the users' point of view and governments aims to

facilitate for that (Accenture, 2007), in order to ensure a trustworthy dialogue with the government through website interactions (Ministry of Modernisation 2005; European Union 2012). Although we ascertained that websites aimed to increase and therefore, encouraged efficiency and effectiveness, the findings also indicated room for improvements with regard to system integration and accessibility requirements. When addressing system quality in websites, usability issues such as efficiency and effectiveness were accepted as key contributors to website quality and website usage. The findings suggested that increased attention should be devoted to easy and uncomplicated usage of websites and user friendliness of digital self-services provided by websites.

Although we ascertained that websites aimed to increase and therefore, encouraged efficiency and effectiveness (Departementene, 2012), both from an organisational and users' perspective, the findings indicated room for improvements with regard to system integration and accessibility requirements. In order to offer all individuals an opportunity to participate in a digital society, and also to ensure user participation, it is exigent to emphasise system integration and accessibility in public sector organisations (Pasinetti, 2009; Kuzma, 2010; Snaprud and Sawicka, 2007). Issues concerning usability were exceptionally important (Choudrie et al., 2009; Kuzma, 2010; Gil-Garcia and Pardo, 2005), in order increase usage and stimulate high quality interactions and user satisfaction, and were in prior research highlighted as one of the main drivers of system success (van Iwaarden et al., 2004; Choudrie et al., 2009; DeLone and McLean, 2003).

Paper 3 also focused on the topic of quality in online services and noted that trust and helpfulness were vital issues of quality. In this regard, public organisations were inclined to be service-minded and displayed empathy towards users, thus

ensuring that the public placed trust and had absolute confidence in public information and services provided by the governments. Feedback and response time were decisive contributors of government online services, and key elements in the digital communication between website users and government bodies. As a result, we can conclude that the public sector performed relatively skillfully and accurately whilst striving to provide quality in services, through minimal response time and empathy towards users, although previous studies found that responsiveness towards users revealed a potential for improvements (Andersen et al., 2011). Though service quality could be approached from different levels and perspectives, organisations consistently strived to be accessible to users (citizens), in order to provide help and assistance and solve users' problems.

Furthermore, regarding perception of website quality among public sector webmasters in Norway and Denmark, Denmark scored significantly higher, with respect to information quality, system quality and service quality. Taking into account the fact that Norway and Denmark are relatively homogeneous countries, there were minor differences between those who held positions as webmasters in the public sector. With almost the same quality criteria and methods applied in quality assessments organised by the central governments in both countries (as demonstrated in Paper 2), we could only speculate on the reasons why websites in Denmark displayed a higher level of quality, without accurately pinpointing one obvious reason. However, one explanation could be that we had talked about relatively minor differences in the findings, although there was an interesting finding that was worth noting, in upcoming research related to quality of websites in the Scandinavian countries.

Given the means by which website quality evaluations of public sector websites were conducted in relation to the use of quality criteria and methods applied for

these evaluations, the findings in Paper 2 also determined that citizens were not necessarily more satisfied with high-quality websites as compared to low-quality websites. Consequently, there was no positive correlation between the quality of public sector websites and actual user satisfaction among the citizens. Since the use of quality criteria obligated by the governments were often found to be important indicators of website quality, we could speculate on the lack of correlation. As stated in Paper 2, one interpretation of these findings could be that there was a significant disparity between what the users in public websites found important and the governments' use of quality criteria for such evaluations. What was important for the users could be linked to a broad definition of usability issues (Boivie et al., 2006), which affected how quickly and effortlessly the users located information and performed different tasks, for e.g. applied for various services and other similar tasks that comprised the total user experience with a specific website (Barnes and Vidgen, 2003).

Considering the evaluation process undertaken in the light of the webmasters' explanations of website quality (Paper 1), which were to a higher degree geared toward content, user performance, design issues and ease of use, rather than technical aspects concerning issues the users were not proven to relate to in terms of task performance, the findings in Paper 2 were after all not unpredictable. Although website quality was considered to be a prerequisite for success, we accepted that there were no indications that this was consistent in an eGovernment context, when measuring quality in public websites and actual user satisfaction among the citizens. This could therefore lead to a discussion on the use of quality criteria in such evaluations and ranking of public sector websites, and furthermore, methods applied for measurement of citizens' satisfaction.

In this regard, the disparity between website quality and user satisfaction was an interesting finding because almost all organisations endeavoured to fulfil quality criteria, and therefore a range of unexplored concerns would require to be addressed in future research contributions. In order to accomplish a superior and more comprehensive assessment process, increasingly extensive and all-inclusive evaluations could also be considered in the coming years, which would in turn lead to augmented and advanced clarity with regard to perceptions of website quality. A discussion which was also covered in Paper 2, concerned whether there was a mismatch between the use of quality criteria and the users' expectations and requirements from public websites. The criteria clearly differed from traditional usability testing grounded in the literature (e.g. Rogers et al., 2011; Leventhal and Barnes, 2008; Heim, 2007; Hornbæk and Stage, 2006). Inclusion of real users during the evaluation process (and not merely evaluations by experts), in addition to less standardised and objective measures, could provide added value and insights.

Paper 4 investigated the relationships among constructs of website success (information quality, system quality, service quality, user satisfaction and net benefits) as perceived by webmasters who were the intermediaries for this task. In general, there was a positive correlation between the constructs of success. Further investigation revealed that the strongest correlation in regard to website quality and user satisfaction was the relationship between service quality and user satisfaction, followed by information quality and then system quality. Concerning net benefits, the study established the strongest correlation between information quality and user benefits (measured as net benefits), followed by system quality and service quality. Finally, the study also validated a positive correlation between user satisfaction and net benefits. The correlation results (Paper 4) provide

significant associations among constructs of success and support the efficacy of the DeLone and McLean IS success model within eGovernment environments. However, a statistical validation of the model in a public sector could be addressed in forthcoming research contributions (the purpose of the present study was not to validation the model, but rather to use the model in order to identify constructs of success).

Moreover, this thesis sought to emphasise an individual level by measuring user benefits, such as time savings, cost savings and continuous and constant accessibility to information and services. Prior research studies, e.g. Flak et al. (2009) attempted to understand benefits achievement by focussing on organisational efficiency and effectiveness, while measures connected with protecting citizens' rights and level of economic security guaranteed by the government, were also considered important (Scott et al., 2009).

5.6 User Testing in Public Sector Websites

The aim of this section is to investigate how and to what extent user testing is performed and methods applied in public sector websites and it draws on findings from Paper 2, Paper 3 and Paper 4.

User involvement and testing was advocated as one of the main vehicles of IS success (Ives and Olson, 1984; Barki and Hartwick, 1994). Therefore, users' requirements and needs had to be acknowledged and considered the manner in which these interests affected quality aspects such as content issues, system quality and interface design. Additionally, user involvement and testing aimed to uncover user experiences in a real user setting, and included actual usage and reflections perceived from a user's point of view (Rogers et al., 2011; McCracken and Wolfe, 2004). In Paper 2, it was noticed that experts (such as usability

consultants and specialists) generally replaced users in yearly quality assessments of public sector websites within the Scandinavian countries. In spite of this switching of users, the results should be identical if the evaluations were repeated by another evaluator, in light of the fact that the evaluations were based on standardised and objective criteria.

Therefore, it was argued that the actual users' perceptions of the quality of public websites were primarily omitted by such evaluations. Although quality assessments aimed to stimulate and foster user satisfaction and website quality improvements in the sector, methods applied did not favour user performances in a real user setting, compared to traditional usability testing which largely involved real users during the process (Rogers et al., 2011; Toftøy-Andersen and Wold, 2011). Consequently, the quality improvements that could be carried out based on the findings with regard to the methods applied, could be linked to technical issues and high-level website design principles. Paper 2 suggested that inclusion of real users in real-user settings in the assessment process could motivate and move forward the understanding of quality in websites and user satisfaction.

When examining how and to what extent user testing was conducted in public sector organisations, findings in Paper 4 showed that the range of user testing denoted a potentiality for improvements and enhancements, in regard to frequency of testing and methods applied for testing. The findings (Paper 4) explicitly illustrated that more than half of the organisations included in this study had not performed user testing at anytime, less than 20 percent of the organisations responded by confirming that they had not conducted and accomplished any user testing for more than two years, while about 10 percent of the organisations answered that they had conducted user testing simply once or twice during the past two years. These results revealed that about 80 percent of the organisations had

not undertaken any user testing during the last year. On the other hand, less than 20 percent claimed that they tested a bare minimum, i.e. one test during the last year (whilst some of the respondents had conducted tests more often than that). Consequently, organisations in the public sector by and large, possessed little or no knowledge of the satisfactions levels of their website users. An interesting finding therefore was the weak knowledge about citizens' satisfaction with usage of public sector websites. Paper 3 determined that the aim of governments was a user centred focus by meeting citizens' expectations and needs from websites; therefore, the low level of user testing conducted by the public sector was an unexpected and unpredicted finding.

In public sector organisations, we found (Paper 4) that the most frequently-used method for user testing involved online user satisfaction surveys and other comparatively less sophisticated methods (in contrast to for instance extensive traditional usability testing, e.g. Rogers et al., 2011). Compared to such usability testing in which typical users resolved tasks in real user settings, online surveys were a fast and economical method of collecting and collating data and were often believed to be very time-effective (Bourque and Fielder, 1995). This would explain why online surveys were an extensively prevalent method. However, a distinct deficiency of this method was that it incorporated a bare minimum of particulars and knowledge regarding the users' satisfaction levels, as compared to other methods applied in user testing. An in-depth knowledge and extensive comprehension of how users navigated websites, the manner in which they perceived content, and the extent to which users perceived websites as easy to navigate, were required, to ensure that users' interests and needs were provided for in websites (Toftøy-Andersen and Wold, 2011). It was difficult to address many of these concerns, without including the users and observing them when they

performed actual user tasks. Thus, we can conclude that there was potential to increase user involvement in website quality improvements in a public sector setting, both in terms of frequency of testing and the methods applied for testing (Paper 4).

Frequency of user testing and methods applied in government bodies were characterised as issues to be addressed and acted upon in future quality improvements. We also noted that users were largely excluded from the evaluation process during the annual quality assessment of public websites, and were replaced by experts (consultants) who through the use of quality criteria aimed to take care of users' interests and needs and requirements. These findings (Paper 2) showed that user involvement was not generally a part of the evaluation process, and ideally should be expanded to ensure that users' expectations, and not merely government perceptions of website quality, were fulfilled. This was perceived as a consistent trend for many years (since the evaluation process began in 2001), with the exception of 2009, when Denmark accepted and acknowledged the role played by users and involved actual users, as part of the assessment process. The findings in Paper 2 also indicated that usability issues were generally tested through relatively simple methods, such as assessment of menu navigation and checking whether link names were understandable and relevant. Actual usage and realistic user tasks were not included in such evaluations. These methods could support additional insights on website development and quality improvements.

As shown in Paper 4, marginal or no user testing resulted in a perception of weaker correlation between constructs of website quality (such as information quality, system quality, and service quality) and user satisfaction. The less the webmasters were acquainted with their users (by performing user testing), the less they were inclined to observe a correlation between quality in websites and user

satisfaction. Consequently, absence of user testing results in a perception of weaker correlation between constructs of IS quality and user satisfaction. These findings could be considered as a genuine attempt to fill the research gap in IS research on the subject of investigating constructs of website success in the public sector, and particularly the role of user testing in the design, implementation and testing of websites. These findings could also pave the way forward for subsequent discussions regarding the requirement of future research action in this area, with a view to investigating the necessity for user feedback in developing an institutional understanding of quality and success in eGovernment.

Moreover, these findings indicated that user testing was a vital contributor to website quality and success, and though user testing did not necessarily contribute to user satisfaction, organisations presumed that in some small measure, such activities tended to increase perceptions of quality and success of websites. An important implication of this would be that webmasters who performed user testing were scrupulous and principled and sincerely envisioned that the users would be satisfied after testing. Thus testing appeared to have a positive effect on website quality, which in turn, would be a compelling force to motivate organisations to spend recurrently on quality improvements.

The fact that the majority of webmasters did not perform any sort of user testing (Paper 4), should also trigger a reflection on the obligation on the part of these important intermediaries to enhance their feedback channels. It is paradoxical that, there is a growing rhetoric on the need for developing, refining, and using rich measures of website success, such as user satisfaction, while, the data clearly affirms that the effectiveness of the crucial end-user part of website investment is expected to be assessed by webmasters' perceptions. The role of user testing in evaluation of success cannot be ignored; especially considering the fact that user

empowerment in the design, implementation and evaluation of public websites, matches a window of opportunity in the ongoing growth of interactivity in websites. For example, the emergence and spread of Web 2.0 tools calls for an increased focus on the role of users in understanding success factors, and ultimately, maximising the benefits of website investments in public sector organisations.

CHAPTER 6. CONCLUSION AND CONTRIBUTION

6.1 Introduction

The present Ph.D. thesis strives to fulfil the research objectives concerning a quest for a more comprehensive understanding of website quality and success in the public sector. With reference to the increasing use of websites in the dialogue between government bodies and citizens, and the fact that increasingly more information and services are provided online, we should aspire towards a more homogeneous view for facilitation and evaluation of public websites. Grounded in the research objectives, this thesis aims to add to the body of knowledge by taking an unusual approach (by emphasising the service providers') towards studying a highly relevant topic, extensively discussed by practitioners, IS research communities and in the field of eGovernment. In addition to imparting a theoretical contribution, recommendations for further research are provided. The thesis also offers practical implications, aiming to present beneficial inputs and suggestions for future investments and prioritisation of resources in website development and quality improvements.

Returning to the overall research question addressed: *What is website quality and success in public sector websites?* In order to provide an answer to the research question, four sub-questions are developed: (1) What is a webmaster's explanation of website quality? (2) Are website users more satisfied with high-quality websites than low-quality websites? (3) What is the webmaster's perception of website quality within government bodies? and lastly (4) To what extent is user testing performed in the public sector and how does user testing affect website success? Each of these sub-questions are answered and discussed in the previous chapter (Chapter 5).

The present thesis draws on both qualitative and quantitative data collected during the research process. A grounded theory approach is applied in order to investigate explanations of website quality. Statistical analysis is used to investigate perceptions of quality and success in public sector websites. The webmasters perspectives are emphasised, as they are found to be key figures in website development and quality improvements. Website quality criteria launched by the central governments, which to a large extent serves as guidelines in public sector organisations, are also reviewed and discussed. These criteria aim to minimise a gap between the governments and the citizens for provision of online information and digital services in the Scandinavian countries.

Norway and Denmark are relatively homogeneous countries, concerning education, welfare and population. Although there are many similarities, we also find some differences regarding e.g. infrastructure and government structure. When comparing these countries with other European countries, ambitions for digitalisation of the public sector are largely at the same level, and much effort are put on fulfilling national aims and strategies launched by the central governments. Although this thesis points to many issues and concerns that most likely are also relevant outside Scandinavia, we cannot immediately generalise the empirical findings offered. Anyhow, this was not the intention when conducting the present research and the cases are, therefore, not chosen for this purpose.

The high level of online information and services provided to the citizens (which is significantly higher compared to many other countries) gives the Scandinavian countries a unique position in being role models. On a general European level – we can discuss the importance of facilitation for high quality interactions between citizens and public sector, issues concerning increased use of websites in communication and the impacts of national aims and strategies. In addition, we

also find some common strategies and goals for digitalisation of the public sector, which are not limited to Scandinavia. Most European countries have to deal with many of the same challenges in terms of policies, pressure and goals announced by the central governments. New insights provided may therefore also be of interest outside the Scandinavia countries.

In light of research concerning facilitation for website quality and success, this thesis contributes additional insights and offers the opportunity to understand how government organisations perceive and facilitate quality in public sector websites, with explanations and perceptions of constructs of success and the extent of user involvement and testing. This research can be seen as cross-disciplinary for the reason that it draws on different academic fields (IS, eGovernment and HCI). The present thesis emphasises public sector websites and the field of eGovernment has assumed special importance. Bearing in mind the research objectives addressed, the main empirical findings were summarized within the respective chapter (Chapter 5). The aim of the present chapter is, therefore, to synthesize the findings. The following concluding remarks can be made:

The thesis conclude that quality in public sector websites is predominantly related to technical aspects, usability issues, content and service quality. Website quality can therefore be viewed as a twofold concept, focussing on both technical issues and user-centric aspects, with reference to task performance, and perceptions of information quality, system quality and service quality. Website quality criteria obligated by the central governments primarily focus on technical issues and standardised measures, while organisations basically tend to safeguard their own interests and secure themselves on matters concerning user centred issues, which arise in regards to users' behaviour and actual use in a real user setting. Adherence to these criteria for public sector websites is, therefore, important in order conform

to national policies of eGovernment. Although these are concluded as being highly technical in nature and not entirely consistent with the webmasters explanations, they play a significant role in the need of being aware of an inhomogeneous group of users (citizens) with various requirements and skills.

Moreover, this thesis conclude that the methods applied during the quality assessment process (organised by the central governments) to a large extent represent typical expert evaluations, and are not, applicable to actual use in real user settings (elicits reflection on these evaluations and the use methods applied). Examination is also recommended to inspect the means by which the use of quality criteria and methods can advantageously serve as guidelines in forthcoming development and quality improvements of websites. Because public organisations have less freedom in website development and improvements compared to most private organisations, we conclude that involvement of users and testing is particularly important in a public sector setting. Although yearly website quality assessment put a pressure on public organisations, and in a positive way pay attention to the importance of quality in interactions, we need to take into account what the evaluations do not cover.

In this regard, the needs and expectations within various user groups are not necessarily covered in the quality criteria. Priority of the quality aspects should, therefore, ideally be weighed by the individual organisations, which know their users best. Although success or failure on the Web is to a large extent related to these criteria and the winners are announced as good-practice examples – the users' interests must always be the primary concern. The present thesis concludes that the users' interests should to a larger extent be captured by these evaluations, which can be explained by the low degree of user involvement concerning actual task performance and handling of information/services. The fact that the findings

in this thesis also revealed a negative correlation between website quality and user satisfaction in a public sector context, we should in turn, motivate and stimulate actions aimed at reconsidering the use of quality criteria. Hence, a broader perspective which considers the strengths and weaknesses of such evaluations is indispensable. We should not simply endeavour to strive for enhanced user experiences, user satisfaction and benefits achievements, by only focussing on these evaluations and criteria launched.

The evidence also proved that organisations that conducted testing tended to see a higher positive correlation among constructs of website success. Active attention and diligent deliberation should, therefore, be given to the importance of user involvement in creation of high quality interactions on the Web. Users should be granted favourable opportunities to contribute valuable insights that could aid the development and progress of the public sector, besides helping to guide forthcoming investments and assessments of quality and success. Such opportunities could also lead the way forward by reducing the gap between the users' perceptions of success in websites and quality indicators obligated by the central governments. Consequently, user testing in website development and quality improvements displays potential for improvements, and increased attention should be directed toward the remarkable benefits of such actions. The present thesis also conclude by stating that users should be increasingly involved and play a more dominant role in the future. Organisations should expand their feedback channels in order to satisfy an expanding base of more demanding users and their comprehension of new technologies and services. The fact that the majority of public sector organisations do not conduct any type of user testing, reflection is necessary of these important intermediaries to enhance their feedback channels.

User empowerment in the design, implementation, and evaluation of information systems presents a window of opportunity originating in the on-going growth of Web interactivity and the use of technologies in public sector websites. Although many organisations still have a way to go on the path to website success, we do come across excellent examples of websites that aspire to succeed and facilitate interactivity through initiatives such as interactive online dialogue with the citizens (e.g. Web chat), forums, user generated content, Facebook, Twitter integration and mobile apps. These services are not investigated in the present thesis, but can be examined in-depth, in order to facilitate for increasingly demanding users and the acceptance of new technologies and innovations.

We conclude that website quality is a multidimensional construct, consisting of various aspects rather than a single and homogeneous explanation. However, issues covering usability in a broad sense is the main driver in order to force user satisfaction and success on the Web, in relation to efficiency and effectiveness measures that can provide benefits for both the citizens and public sector organisations. When emphasising the public sector, requirements in regards to accessibility are found to be of particular importance, and the awareness of user involvement needs to be more emphasised within public sector organisations. We can also expect that public websites goes through a continuous shift, due to increasingly more demanding website users, implementation of new services and technologies. More focus must be given to website development and maintenance, priority of resources concerning the website and the opportunity to build a great brand by providing high quality websites.

Along with the conclusion, some limitations need to be pointed out. Firstly, this thesis investigated websites in public sector by taking a broad, rather than a narrow approach. The present research does not separate between different types

of public websites (e.g. municipalities, directorates, educational institutions etc.) and the needs of various user groups (e.g. young people, elderly, highly educated etc.). Moreover, the website user interface is given great attention and not the technology behind. The primary focus is what the users actually have to deal with when they search for information and/or perform various tasks. Secondly, the present thesis does not aim to investigate similarities and differences between website quality in Norway and Denmark, but rather use the two countries as one sample. Thirdly, methodological issues could also be raised, in regards to explanation and perception of website quality and success. One cannot guarantee that the webmasters view of a website is representative for the entire organisations (and the website users), although they are assumed to have the best knowledge regarding user satisfaction. These limitations are addressed in suggestions for further research (Section 6.3).

To provide the contribution of the present thesis, Section 6.2 presents the theoretical contribution, Section 6.3 concerns further research opportunities and Section 6.4 deals with implications for practice.

6.2 Theoretical Contribution

Review of prior research reveals a lack of theoretical and empirical grounded studies emphasising the Scandinavian countries. In respond to this, the present thesis adds to the body of knowledge by providing at least four theoretical contributions: (1) an empirical study concerning website quality and success in Scandinavia, (2) the use of the DeLone and McLean IS success model in an eGovernment setting, (3) emphasising an organisational (i.e. webmaster) perspective on quality and success in websites, and (4) the extend and impacts of user testing in the public sector. Each of the contributions provided is hereby explained.

Firstly, this thesis offers a study that draws on empirical data collected in public sector organisations. Website quality and success were investigated by conducting a comprehensive online survey among public sector employees (i.e. webmasters). In addition, qualitative interviews were held with website award winning organisations, represented by the webmasters. Public sector websites are a relevant and a well-discussed phenomenon within the research literature, and the present thesis contributes with additional insights in this regard. Empathy is put on the Scandinavian countries, which has long traditions for user centric focus in system development, particularly in a research context.

Secondly, the research framework in this thesis draws on the IS success model from DeLone and McLean (2003), which is widely used in the research literature. In this research, the IS success model serves as a constant source of inspiration for investigating public sector websites. Most research studies adopting the DeLone and McLean model investigate the relationships among the constructs of success and/or validate the model. For this thesis, the model is adopted and adjusted to the context of the present thesis, by focussing on a selection of variables considered to be particularly significant in public websites. The contribution of this thesis is the application of the DeLone and McLean model in eGovernment environments (focussing on public sector websites, rather than information systems in general). Placing a classic IS success model into a new research context is, in itself perceived as a contribution. Although there were earlier studies that utilised this model in a public sector setting, none of those studies had used the model by adopting an approach similar to the approach of this thesis. Over ten years after the updated model was published (in 2003), this thesis confirms that the model still be can used, by adapting the constructs of success to the study context.

Thirdly, this thesis also offers a theoretical contribution in the unit of the analysis. Serving as intermediaries in website development and quality improvements, the webmasters are identified as key contributors, as they are mainly responsible for all functional aspects of the website. By taking this approach, this thesis attempts to decrease the perceptual gap between website users and service providers, for facilitation of enhanced user experiences and benefits. The contribution is related to its method of addressing the research objectives, by focussing on Scandinavian websites represented by the webmasters.

Fourthly, the present thesis investigate the role of user involvement on the constructs and relationships of website success, and explore the means through which frequency of testing and methods applied for user testing influence perceptions of success. Facing the fact that user testing is found to be a vital contributor to user satisfaction, it is particularly compelling to focus on the frequency and methods applied in public organisations. In this context, the contribution of this thesis has investigated the extent to which testing is carried out and methods favoured by the public sector organisations. Additionally, how the level of testing affects the constructs of website success.

6.3 Further Research

This thesis takes a relatively broad approach to the research objectives that strive to be fulfilled. Future research contributions would benefit advantageously and gain in-depth knowledge by focussing on the following suggested research streams:

Firstly, in order to close the perceived research gap and minimise variances in perceptions of website quality between different stakeholder groups, additional research should focus on the means by which various quality aspects affect actual

use between different user groups. Hence, future research contributions could stress the significance of addressing citizens' requirements among different groups of website users. This research could also be linked to user groups versus types of websites, by investigating what are characteristics with users that visit a certain type of website.

Secondly, this research can also be viewed as a contribution that investigate the relationship between user testing and constructs of website success in a public sector setting. This requires continued and intensive investigation. To achieve this, qualitative methods, such as interviews and focus groups with users and webmasters, would be a recommended approach for future research studies. Moreover, an additional research stream to pursue would be how best user testing could be seamlessly incorporated and integrated in continuous website quality improvements, along within current organisational resources and strategies. Based on the findings from this thesis can future studies take a narrower and more insightful perspective.

The third suggested stream of further research would be to focus on extending statistical analysis and supplementing the study with longitudinal data. Using the DeLone and McLean model with data from a single survey clearly entails additional research on the relationships among the constructs of success and the feedback loops in the model, for example, longitudinal data from webmasters. Research that allows for a more explicit use of exogenous and endogenous data would also be welcomed. Moreover, the findings in the present thesis could also be compared with data conducted with reals users as respondents and the findings could be compared with studies, e.g. emphasising an organisational perspective.

The fourth area for future research could further explore certain unique features of public organisations, and their impact upon perceptions of success. It is necessary to understand the extent to which organisation size, degree of centralisation, government type (local, central, municipal), and government capacity factors (such as technical, financial and political), impact the perceptions of success in the public sector. A research study investigating these concepts would draw on the exploratory framework, and would further extend knowledge in this area by drawing comparisons among different types of public organisations.

With reference to impacts of user involvement and testing on perceptions of website quality and user satisfaction, this study found a positive correlation among constructs of website success. The fifth areas could focus on the strengths and weaknesses of the various methods applied (such as interviews, online survey questionnaire and usability testing) and how these different methods could contribute to various aspects of website quality within different type of organisations.

6.4 Implications for Practice

This thesis also offers some practical implications that possibly could be advantageous for prospective facilitation and evaluation of websites in public sector organisations. In this regard, the importance of IS research to practitioners is stated in previous studies, which underlined dimensions of relevance such as interesting, applicable, current and accessible (Benbasat and Zmud, 1999). Most research studies have a clear theoretical anchor and contribution, but do not consistently clarify the practical implications of the study. However, this thesis puts forth a practical contribution, in the sense that the knowledge, in addition, can be useful for practitioners.

Hereby follows implications for practice, by focussing on three groups with responsibilities in regards to website development and quality improvements. The following perspectives are emphasised in the present thesis; eGovernment policy makers, eGovernment project managers and webmasters/technical staff. The findings can assist decision-makers by providing deeper insights into constructs underlying website quality, their nature and relationships.

Recommendations to eGovernment policy makers:

The fact that website quality is considered to be very important, we need to learn and reflect on strategies, goals and pressure put on public organisations. In this regard, increased attention must be devoted to the citizens' requirements and needs in websites, as a core group of users. Since public websites cater to a large and inhomogeneous audience, users' expectations of online information and services should be the target focus. Future investments and quality improvements should deliberate attention toward the subject of inclusion of all citizens in the digital society, rather than take the citizens as one homogenous group of users. During the last decade users with special accessibility requirements are emphasised, but in forthcoming investments, we should also take into account expectations among experienced users, young people, mobile users etc. Facilitation for increased use and interactions across different user groups will, most likely, be important in the coming years.

Moreover, by taking into account the governments' strategies and goals in regards to provision of high quality websites, we should also focus on more than mere technical and objective requirements. Issues relevant to actual user performance and handling of typical tasks at a website must inevitably be emphasised in quality improvements and development. The fact that website quality criteria serves as

important guideline in the public sector, witness about the responsibility that the governments holds in this regard. Therefore, increased attention should be paid to the use of quality criteria and methods applied in such evaluations. The use of criteria and methods focus on many important aspects in websites, but we also find room for improvements, in regards to attention given to actual use and task performance. The importance and impacts of user testing should also be highlighted and made more visible. Various actions need to be taken and annual evaluations may in this context advantageously have a minor technical and objective approach. Concerning this, an idea could be to include usability testing as a criterion in the yearly quality assessment of websites. One approach could be to evaluate to what extent public organisations have included users within the last year(s). In order to conduct data, a self-evaluation questionnaire could be used. Points (scores) could be given in relation to the frequency of testing conducted, methods applied and how and to what extent the results were analysed, applied and incorporated in the website. We should take seriously the fact that user testing is performed to a low extent and consider initiatives that turn this trend.

Recommendations to eGovernment project managers:

From a management perspective, it is imperative to comprehend clearly the cost of investments in website quality, both in terms of money, as well as other resources within the organisation. Organisations must determine their priorities and foster mutual understanding between different levels and positions of employees. The continuing success of a superior websites requires a long-term perspective and through a perpetual process of development, clear goals must be identified in relation to user satisfaction, actual use and achievement of organisational and user benefits.

In this regard, project managers must facilitate and priorities user testing and other related activities. In order to provide efficient and effective websites, they should also clearly state objectives and strategies in relation to the website. Although we find it important to focus on and strive to fulfill the quality criteria launched by the central governments, the main focus should, nevertheless be given to the actual user's requirement and needs. This will necessarily vary and must be identified within the organisation.

The webmasters should be given sufficient resources to carry out various activities, such as exchange of knowledge, skills and experiences. For webmasters in large organisations, the website should be the primary and not secondary task, incorporated in daily routines and as a part of the organisations longtime priority. Additionally, it is important to be aware that the website is the organisations face publically (on the Web), and can therefore be seen as a contributor in building a great reputation among the citizens.

Recommendations to webmasters and technical staff:

From a webmaster's point of view, the findings in this thesis can be utilised in prioritisation of resources disbursed on quality improvements, and thus, pave the way for determining the quality aspects that need to be emphasised in continuous development. In most cases, maintenance and updates of websites is not a temporary solution or quick-fix repair job, but rather an evolutionary process that requires in-depth knowledge and insights on how to optimally create enhanced user experiences. Webmasters are of particular importance for this role, as they are entrusted with the daily responsibility of contact with users. Knowledge gained from this thesis can, therefore, predominantly be utilised to understand the quality aspects of websites that it is fundamental to focus on. In addition, the webmasters

also need to strive for a common understanding in the organisation, in regards to investments in user testing. Although much of this responsibility and priority of resources is captured by the management level, there is still a certain influence the webmaster have in this regard.

Additionally, over the last years we have witnessed an intensive and noticeable technically development, which most likely, will increase in the coming years. Being in the forefront in use of technologies and priority of resources – will surly has a major impact on how the quality of public sector websites is experienced. This requires increasingly more of a webmaster in terms of knowledge concerning technological capabilities and user expectations. Collaboration with management and across departments is, therefore, regarded as an important contributor to this.

REFERENCES

Accenture (2007), "Leadership in Customer Service: Delivering on the Promise", available at: http://nstore.accenture.com/acn_com/PDF/2007LCSReport_DeliveringPromiseFinal.pdf (Accessed date: 01.05.2012)

Accenture (2012), "Build It and They Will Come? The Accenture Digital Citizen Pulse Survey and the Future of Government Operations", available at: http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture-Digital-Citizen-FullSurvey.pdf (Accessed date: 10.12.2013)

Ahn, T., Ryu, S. and Han, I. (2007), "The impact of Web quality and playfulness on user acceptance of online retailing", Information & Management, Vol. 44 No. 3, pp. 263-275.

Aladwani, A. and Palvia, P. (2002), "Developing and validating an instrument for measuring user-perceived web quality", Information & Management, Vol. 39 No. 6, pp. 467-476.

Alawneh, A., Al-Refai, H. and Bathia, K. (2013), "Measuring user satisfaction from e-Government services: Lessons from Jordan", Government Information Quarterly, Vol. 30 No. 3, pp. 277-288.

Andersen, K. N., Medaglia, R., Vatrapu, R., Henriksen, H. Z. and Gauld, R. (2011), "The forgotten promise of e-government maturity: Assessing responsiveness in the digital public sector", Government Information Quarterly, Vol. 28 No. 4, pp. 439-445.

Andersen, K. V. and Henriksen, H. Z. (2006), "EGovernment maturity models: Extension of the Layne and Lee model", Government Information Quarterly, Vol. 23 No. 2, pp. 236-248.

Bai, B., Law, R. and Wen, I. (2008), "The impact of website quality on customer satisfaction and purchase intentions: Evidence from Chinese online visitors", International Journal of Hospitality Management, Vol. 27 No. 3, pp. 391-402.

Bannister, F. and Connolly, R. (2011), "Trust and transformational government: A proposed framework for research", Government Information Quarterly, Vol. 28 No. 2, pp. 137- 147.

Bansler, J. (1989), "Systems Development Research in Scandinavia: Three Theoretical Schools", Scandinavian Journal of Information Systems, Vol. 1 No. 1, pp. 3-20.

Barki, H. and Hartwick, J. (1994), "Measuring User Participation, User Involvement, and User Attitude", MIS Quarterly, Vol. 18 No. 1, pp. 59-82.

Barnes, S. and Vidgen, R. (2003), "Measuring web site quality improvements: a case study of the forum on strategic management knowledge exchange", Industrial Management & Data Systems Vol. 103 No. 5, pp. 297-309.

Barnes, S. and Vidgen, R. (2005), "Data triangulation in action: using comment analysis to refine web quality metrics", In Proceedings of the European Conference on Information Systems (ECIS), Regensburg, Germany.

Baskerville, R. L. and Myers, M. D. (2002), "Information Systems as a Reference Discipline", MIS Quarterly, Vol. 26 No. 1, pp. 1-14.

Benbasat, I. and Zmud, R. W. (1999), "Empirical research in information systems: The practice of relevance", MIS Quarterly, Vol. 23 No. 1, pp. 3-16.

Bjerknes, G. and Bratteteig, T. (1995), "User Participation and Democracy: A Discussion of Scandinavian Research on System Development", Scandinavian Journal of Information Systems, Vol. 7 No. 1, pp. 73-98.

Bjørn-Andersen, N. and Hedberg, B. (1977), "Designing information systems in an organizational perspective", Studies in the Management Sciences Prescriptive Models of Organizations, Vol. 5, pp. 125-142.

Boivie, I., Gulliksen, J. and Göransson, B. (2006), "The lonesome cowboy: A study of the usability designer role in system development", Interacting With Computers, Vol. 18 No. 4, pp. 601-634.

Bourque, L. B. and Fielder, E. P. (1995). How to conduct self-administered and mail surveys, SAGE Publications Inc., London, England.

Brynjolfsson, E. (1993), "The productivity paradox of information technology", Communications of the ACM, Vol. 36 No. 12, pp. 66-77.

Budinoski, K. and Trajkovik, V. (2012), "Incorporating Social Network Services

in eGovernment Solutions: A Case Study", available at:
http://www.epractice.eu/files/Journal_Volume%2016-
Interactive_Final_7.pdf (Accessed date: 03.12.2013)

Bygstad, B., Ghinea, G. and Brevik, E. (2008), "Software development methods
and usability: Perspectives from a survey in the software industry in
Norway", Interacting with Computers, Vol. 20 No. 3, pp. 375-385.

Bødker, S. and Sundblad, Y. (2008), "Usability and interaction design - new
challenges for the Scandinavian tradition", Behaviour & Information
Technology, Vol. 27 No. 4, pp. 293-300.

Cajander, Å., Gulliksen, J. and Boivie, I. (2006), "Management Perspectives on
Usability in a Public Authority - A Case Study", In Proceedings of the
Nordic conference on Human-computer interaction (NordiCHI), Oslo,
Norway.

Capgemini (2004), "Does e-Government Pay Off?, available at:
http://www.eupan.eu (Accessed date: 12.02.2013)

Capgemini, Rand Europe, Sogeti and DTI (2010), "Digitizing Public Services in
Europe: Putting ambition into action", available at:
http://www.capgemini.com/resource-file-
access/resource/pdf/Digitizing_Public_Services_in_Europe__Putting_Ambi
tion_into_Action.pdf (Accessed date: 03.12.2013)

Cato, J. (2001). User-Centered Web Design, Pearson Education Limited,

London, England.

Centento, C., van Bavel, R. and Burgelman, J.-C. (2005), "A Prospective View of e-Government in the European Union", The Electronic Journal of e-Government, Vol. 3 No. 2, pp. 59-66.

Chang, H. H. and Chen, S. W. (2009), "Consumer perception of interface quality, security, and loyalty in electronic commerce", Information & Management, Vol. 46 No. 7, pp. 411-417.

Chang, I.-C., Li, Y.-C., Hung, W.-F. and Hwang, H.-G. (2005), "An empirical study on the impact of quality antecedents on tax payers`acceptance of Internet tax-filing systems", Government Information Quarterly, Vol. 22 No. 3, pp. 389-410.

Choudrie, J., Wisal, J. and Ghinea, G. (2009), "Evaluating the usability of developing countries' e-government sites: a user perspective", Electronic Government, an International Journal, Vol. 6 No. 3, pp. 265-281.

Chu, S.-C., Leung, L. C., Hui, Y. V. and Cheung, W. (2007), "Evolution of e-commerce Web sites: A conceptual framework and a logitudinal study", Information & Management, Vol. 44 No. 2, pp. 154-164.

Chung-Tzer Liu, C.-T., Dub, T. C. and Hsiao-Hao, T. (2009), "A study of the service quality of general portals", Information & Management, Vol. 46 No. 1, pp. 52-56.

Clemmensen, T. and Katre, D. (2012). Adapting e-gov Usability Evaluation to
   Cultural Contexts. In: Buie, E. & Murray, D. (eds.) Usability in Government
   Systems. Morgan Kaufmann, USA.

Creswell, J. W. (2009). Research design: Qualitative, quantitative, and mixed
   methods approaches, SAGE Publications Inc., London, England.

Datatilsynet (2013), "Strategi for godt personvern i digitaliseringen av offentlig
   sektor", available at:
   http://www.datatilsynet.no/Global/04_planer_rapporter/Strategi%20for%20
   et%20godt%20personvern%20i%20digitaliseringen%20av%20offentlig%20
   sektor.pdf (Accessed date: 03.12.2013)

De Wulf, K., Schillewaert, N., Muylle, S. and Rangarajan, D. (2006), "The role
   of pleasure in web site success", Information & Management, Vol. 43 No. 4,
   pp. 434-446.

DeLone, W. and McLean, E. (2003), "The DeLone and McLean Model of
   Information Systems Success: A Ten-Year Update", Journal of Management
   Information Systems, Vol. 19 No. 4, pp. 9-30.

DeLone, W. H. and McLean, E. R. (1992), "Information Systems Success: The
   Quest for the Dependent Variable", Information Systems Research, Vol. 3
   No. 1, pp. 60-95.

Departementene (2012), "På nett med innbyggerne Regjeringens

digitaliseringsprogram", available at:
http://www.regjeringen.no/upload/FAD/Kampanje/DAN/
Regjeringensdigitaliseringsprogram/digit_prg.pdf (Accessed date:
04.03.2013)

Difi (2013), "Kvalitet på nett frå 2007 til 2011", available at:
http://www.difi.no/filearchive/ difi-rapport-2013_4-kvalitet-paa-nett-2007-
2011_1.pdf (Accessed date: 01.06.2013)

Dix, A., Finlay, J., Abowd, G. D. and Beale, R. (2004). Human Computer-
Interaction, Pearson Education Limited, Essex, England.

Doll, W. J. and Torkzadeh, G. (1988), "The measurement of end user computing
satisfaction", MIS Quarterly, Vol. 12 No. 2, pp. 258-274.

Elling, S., Lentz, L. and de Jong, M. (2007), "Website Evaluation Questionnaire:
Development of a Research-Based Tool for Evaluating Informational
Websites", In Proceedings of the International Conference on Database and
Expert Systems Applications (DEXA/EGOV), Regensburg, Germany.

Elling, S., Lentz, L., De Jong, M. and Van Den Bergh, H. (2012), "Measuring
the quality of governmental websites in a controlled versus an online
setting with the 'WebsiteEvaluation Questionnaire", Government
Information Quarterly, Vol. 29 No. 3, pp. 383-393.

Esteves, J. and Joseph, R. C. (2008), "A comprehensive framework for the

assessment of eGovernment projects", Government Information Quarterly, Vol. 25 No. 1, pp. 118-132.

Éthier, J., Hadaya, P., Talbot, J. and Cadieux, J. (2006), "B2C web site quality and emotions during online shopping episodes: an empirical study", Information & Management, Vol. 43 No. 5, pp. 627-639.

Fitzgerald, B. and Howcroft, D. (1998), "Towards dissolution of the IS research debate: From polarisation to polarity ", Journal of Information Technology Theory and Applicaion, Vol. 13 No. 4, pp. 313-326.

Flak, L. S., Dertz, W., Jansen, A., Krogstie, J., Spjelkavik, I. and Ølnes, S. (2009), "What is the value of eGovernment - and how can we actually realize it?", Transforming Government: People, Process and Policy, Vol. 3 No. 3, pp. 220-226.

Frandsen-Thorlacius, O., Hornbæk, K., Hertzum, M. and Clemmensen, T. (2009), "Non-Universal Usability? A Survey of How Usability is Understood by Chinese and Danish Users", In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI), Boston, USA.

Frick, A., Bächtiger, M.-T. and Reips, U.-D. (2001). Financial incentives, personal information and drop-out in online studies, Pabst Science Publishers, Lengerich, Germany.

Fuglerud, K. S., Reinertsen, A., Fritsch, L. and Dale, Ø. (2009), "Universell

utforming av IKT-baserte løsninger for registrering og autentisering",
available at: http://www.karde.no/UU-autentisering-sluttrapport.pdf
(Accessed date: 04.04.2013)

Furu, N. (2006), "Nettredaktørundersøkelsen", available at:
http://www.nettredaktor.no (Accessed date: 17.04.2009)

Følstad, A., Jørgensen, H. D. and Krogstie, J. (2004), "User Involvement in
eGovernment Development Projects", In Proceedings of the Nordic
Conference on Human-Computer Interaction (NordiCHI), Tampere,
Finland.

Følstad, A., Law, E. L.-C. and Hornbæk, K. (2012), "Analysis in Practical
Usability Evaluation: A Survey Study", In Proceedings of the Conference
on Human Factors in Computing Systems (CHI), Texas, USA.

Gauld, R., Goldfinch, S. and Horsburgh, S. (2010), "Do they want it? Do they
use it? The 'Demand-Side' of eGovernment in Australia and New Zealand",
Government Information Quarterly, Vol. 27 No. 2, pp. 177-186.

Gerlach, J. H. and Kuo, F.-Y. (1991), "Understanding Human-Computer
Interaction for Information Systems Design", MIS Quarterly, Vol. 15 No. 4,
pp. 527-549.

Gil-Garcia, J. R. and Pardo, T. A. (2005), "E-government success factors:
Mapping practical tools to theoretical foundations", Government
Information Quarterly, Vol. 22 No. 2, pp. 187-216.

Goldfinch, S. (2007), "Pessimism, computer failure, and information systems development in the public sector", Public Administration Review, Vol. 67 No. 5, pp. 917-929.

Goodhue, D. L. (1995), "Understanding User Evaluations of Information Systems", Management Science, Vol. 41 No. 12, pp. 1827-1844.

Gupta, M. P. and Jana, D. (2003), "E-government evaluation: A framework and case study", Government Information Quarterly, Vol. 20 No. 4, pp. 365-387.

Hair, J. F., Black, W. C., Babin, B. J. and Anderson, R. E. (2010). Multivariate Data Analysis, Prentice Hall, New Jersey, USA.

Heeks, R. (2006), "Benchmarking eGovernment: Improving the National and International Measurement, Evaluation and Comparison of eGovernment", available at: http://www.sed.manchester.ac.uk/idpm/publications/wp/igov/index.htm (Accessed date: 03.10.2012).

Heim, S. (2007). The Resonant Interface: HCI Foundations for Interaction Design, Pearson Education Inc., London, England.

Hornbæk, K. and Stage, J. (2006), "The Interplay Between Usability Evaluation and User Interaction Design", International Journal of Human-Computer Interaction, Vol. 21 No. 2, pp. 117-123.

Hsu, C.-L., Chang, K.-C. and Chen, M.-C. (2012), "The impact of website quality on customer satisfaction and purchase intention: perceived playfulness and perceived flow as mediators", Information Systems and e-Business Management, Vol. 10 No. 4, pp. 549-570.

Hunton, J. E. and Beeler, J. D. (1997), "Effects of User Participation in Systems Development: A Longitudinal Field Experiment", MIS Quarterly, Vol. 21 No. 4, pp. 359-388.

Irani, Z., Love, P.E.D. and Jones, S. (2008), "Learning lessons from evaluating eGovernment: Reflective case experiences that support transformational government", Journal of Strategic Information Systems, Vol. 17 No. 2, pp. 155-164.

Irani, Z., Weerakkody, V., Kamal, M., Hindi, N.M., Osman, I. H., Anouze, A., El-Haddadeh, R., Lee, H., Osmani, M. and Al-Ayoubi, B. (2012), "An Analysis of Methodologies Utilised in e-Government Research: A User Satisfaction Perspective", Journal of Enterprise Information Management, Vol. 25 No. 3, pp. 298-313.

Ives, B. and Olson, M. H. (1984), "User Involvement and MIS Success: A Review of Research", Management Science, Vol. 30 No. 5, pp. 586-603.

Jiang, J. J., Klein, G. and Discenza, R. (2002), "Perception differences of software success: provider and user views of system metrics", The Journal of Systems and Software, Vol. 63 No. 1, pp. 17-27.

Karkin, N. and Janssen, M. (2014), "Evaluating websites from a public value perspective: A review of Turkish local government websites", International Journal of Information Management, In Press.

Kappelman, L. A. and McLean, E. R. (1992), "Promoting Information System Success: The Respective Roles of User Participation and User Involvement", Journal of Information Technology Management, Vol. 3 No. 1, pp. 1-12.

Kensing, F. and Blomberg, J. (1998), "Participatory Design: Issues and Concerns", Computer Supported Cooperative Work, Vol. 7, pp. 167-185.

Khayun, V., Ractham, P. and Firpo, D. (2012), "Assessing e-excise success with DeLone and McLean's model", Journal of Computer Information Systems, Vol. 52 No. 3, pp. 31-40.

Kim, S. and Stoel, L. (2004), "Dimensional hierarchy of retail website quality", Information & Management, Vol. 41 No. 5, pp. 619-633.

Krogstie, J. (2010), "Information systems development and maintenance in Norway: Comparing privat and public sector", In Proceedings of Norsk konferanse for organisasjoners bruk av informasjonsteknologi (NOKOBIT), Gjøvik, Norway.

Kuniavsky, M. (2003). Observing the User Experience: A Practitioner's Guide to User Research, Morgan Kaufmann Publishers, San Francisco, USA.

Kuzma, J. M. (2010), "Accessibility design issues with UK e-government sites", Government Information Quarterly, Vol. 27 No. 2, pp. 141-146.

Kvale, S. (1997). Det kvalitative forskningsintervju, Ad Notam Gyldendal AS, Oslo, Norway.

Latif, M. H. A. and Masrek, M. N. (2009), "Accessibility of Malaysian E-Government Websites", In Proceedings of the IBIMA International, Kuala Lumpur, Malaysia.

Lazar, J., Dudley-Sponaugle, A. and Greenidge, K.-D. (2004), "Improving web accessibility: a study of webmaster perceptions", Computers in Human Behavior, Vol. 20 No. 2, pp. 269-288.

Lazar, J., Feng, J. H. and Hochheiser, H. (2010). Research Methods In Human-Computer Interaction, John Wiley & Sons Ltd., West Sussex, England.

Lee, H., Irani, Z., Osman, I. H., Balci, A., Ozkan, S. and Medeni, T. D. (2008), "Research note: Toward a reference process model for citizen-oriented evaluation of e-Government services", Transforming Government: People, Process and Policy, Vol. 2 No. 4, pp. 297-310.

Lee, J., Kim, H. J. and Ahn, M. J. (2011), "The willingness of e-Government service adoption by business users: The role of offline service quality and trust in technology", Government Information Quarterly, Vol. 28 No. 2, pp. 222-230.

Lee, Y. and Kozar, K. (2006), "Investigating the effect of website quality on e-business success: an analytic hierarchy process (AHP) approach", Decision Support Systems, Vol. 42 No. 3, pp. 1383-1401.

Lee, Y., Strong, D., Kahn, B. and Wang, R. (2002), "AIMQ: a methodology for information quality assessment", Information & Management, Vol. 40 No. 2, pp. 133-146.

Leventhal, L. and Barnes, J. (2008). Usability engineering: process, products, and examples, Pearson Education Inc., New Jersey, USA.

Lindgaard, G., Fernandes, G., Dudek, C. and Browñ, J. (2006), "Attention web designers: You have 50 milliseconds to make a good first impression!", Behaviour & Information Technology, Vol. 25 No. 2, pp. 115-126.

Lindgaard, G. and Millard, N. (2002), "The Business Value of HCI: How can we do better?", In Proceedings of Extended Abstracts on Human Factors in Computing Systems (CHI EA), Minnesota, USA.

Liu, C. and Arnett, K. P. (2000), "Exploring the factors associated with Web site success in the context of electronic commerce", Information & Management, Vol. 38 No. 1, pp. 23-33.

Löwgren, J. and Stolterman, E. (2007). Thoughtful Interaction Design: A Design Perspective on Information Technology, The MIT Press, USA.

Mathiassen, L. and Nielsen, P. A. (2008), "Engaged Scholarship in IS

Research", Scandinavian Journal of Information Systems, Vol. 20 No. 2, pp. 3-20.

McCracken, D. D. and Wolfe, R. J. (2004). User-Centered Website Development: A Human-Computer Interaction Approach, Pearson Prentice Hall Inc., New Jersey, USA.

McGill, T. and Klobas, J. (2008), "User developed application success: sources and effects of involvement", Behaviour & Information Technology, Vol. 27 No. 5, pp. 407-422.

McKinney, V., Yoon, K. and Zahedi, F. (2002), "The Measurement of Web-Customer Satisfaction: An Expectation and Disconfirmation Approach", Information Systems Research, Vol. 13 No. 3, pp. 296-315.

Meyer, M. A. (2005), "eNorway 2009 – the digital leap", available at: http://www.regjeringen.no/upload/FAD/Vedlegg/IKT-politikk/eNorway_2009.pdf (Accessed date: 03.10.2011)

Myers, M. D. (1997), "Qualitative Research in Information Systems", MIS Quarterly, Vol. 21 No. 2, pp. 241-242.

Nasrul, M. A., Nor, K. M., Masrom, M. and Syarief, A. (2012), "Website Fit: An Overview", Procedia - Social and Behavioral Sciences, Vol. 40, pp. 315-325.

Nielsen, J. (1993). Usability Engineering, MA: Academic Press, Boston, USA.

Nyeck, S., Morales, M., Ladhari, R. and Pons, F. (2002), "10 years of service
quality measurement: reviewing the use of the SERVQUAL instrument",
Cuadernos de Diffusion, Vol. 7 No. 3, pp. 101-107.

Nygaard, K. and Håndlykken, P. (1981), "The systems development process - Its
setting, some problems and needs for methods", In: Hunke, H, (ed.),
Software Engineering Environment, North-Holland, Amsterdam, pp. 157-
172.

Ozkan, S. and Kanat, I. E. (2011), "e-Government adoption model based on
theory of planned behavior: Empirical validation", Government Information
Quarterly, Vol. 28 No. 4, pp. 503-513.

Panagiotopoulos, P., Al-Debei, M. M., Fitzgerald, G. and Elliman, T. (2012), "A
business model perspective for ICTs in public engagement", Government
Information Quarterly, Vol. 29 No. 2, pp. 192-202.

Panopoulou, E., Tambouris, E. and Tarabanis, K. (2008), "A framework for
evaluating web sites of public authorities", Aslib Proceedings, Vol. 60 No.
5, pp. 517-546.

Papadomichelaki, X. and Mentzas, G. (2012), "e-GovQual: A multiple-item
scale for assessing e-government service quality", Government Information
Quarterly, Vol. 29 No. 1, pp. 98-109.

Pasinetti, C. (2009), "Accessibility, Usability, and Functionality in T-

government Services", In: Pagani, M. (ed.), Encyclopedia of Multimedia Technology and Networking 2nd Edition, IPG Idea Publishing Group Inc., PA, USA.

Petter, S., DeLone, W. and McLean, E. (2008), "Measuring information systems success: models, dimensions, measures, and interrelationships", European Journal of Information Systems, Vol. 17 No. 3, pp. 236-263.

Petter, S., DeLone, W. and McLean, E. R. (2012), "The Past, Present, and Future of "IS Success", Journal of the Association for Information Systems, Vol. 13 No. 5, pp. 341-362.

Pitt, L. F., Watson, R. and Kavan, C. B. (1995), "Service Quality: A Measure of IS Effectiveness", MIS Quarterly, Vol. 19 No. 2, pp. 173-187.

Pitt, L. F., Watson, R. and Kavan, C. B. (1997), "Measuring Information Systems Service Quality: Concerns for a Complete Canvas", MIS Quarterly, Vol. 21 No. 2, pp. 209-221.

Price, R. and Shanks, G. (2005), "A semiotic information quality framework: Development and comparative analysis", Journal of Information Technology, Vol. 20 No. 2, pp. 88-102.

Prybutok, V. R., Zhang, X. and Ryan, S. D. (2008), "Evaluating leadership, IT quality, and net benefits in an e-government environment", Information & Management, Vol. 45 No. 3, pp. 143-152.

Reddick, C. G. (2006), "Information resource managers and E-government effectiveness: A survey of Texas state agencies", Government Information Quarterly, Vol. 23 No. 2, pp. 249-266.

Regeringen, KL and Danske Regioner (2011), "Den Digitale Vej Til Fremtidens Velfærd, Den Fællesoffentlige Digitaliseringsstrategi 2011-2015", available at: http://www.digst.dk/Digitaliseringsstrategi/~/media/Files/Digitaliseringsstrategi/Digitale_vej_til_fremtidens_velf%C3%A6rd.pdf (Accessed date: 03.12.2013)

Rogers, Y., Sharp, H. and Preece, J. (2011). Interaction Design: Beyond Human-Computer Interaction, Wiley, New York, USA.

Rohn, J. A., Spool, J. M., Ektare, M., Koyani, S., Muller, M. and Redish, J. (2002), "Usability in Practice: Alternatives to Formative Evaluations-Evolution and Revolution", In Proceeding of Extended Abstracts on Human Factors in Computing Systems (CHI EA), Minneapolis, Minnesota, USA.

Rundberg, A. (2013), "Webfolkets største utfordring er organisasjonen", available at: http://iallenkelhet.no/2013/03/11/webfolkets-storste-utfordring-er-organisasjonen (Accessed date: 04.06.2013)

Saha, P., Nath, A. K. and Salehi-Sangari, E. (2010), "Success of Government E-Service Delivery: Does Satisfaction Matter? " In Proceedings of the International Conference on Database and Expert Systems Applications (DEXA/EGOV), Bilbao, Spain.

Scott, M., DeLone, W. and Golden, W. (2009), "Understanding Net Benefits: A Citizen-Based Perspective on eGovernment Success", In Proceedings of the International Conference on Information Systems (ICIS), Phoenix, USA.

Scott, J. K. (2005), "Assessing the Quality of Municipal Government Web Sites", State & Local Government Review, Vol. 37 No. 2, pp. 151-165.

Seddon, P. B. (1997), "A Respecification and Extension of the DeLone and McLean Model of IS Success", Information Systems Research, Vol. 8 No. 3, pp. 240-253.

Seddon, P. B. and Kiew, M. Y. (1996), "A partial test and development of the DeLone and McLean model of IS success", Australasian Journal of Information Systems, Vol. 4 No. 1, pp. 90-109.

Shackel, B. (2009), "Human-computer interaction - Whence and whither?", Interacting with Computers, Vol. 21 No. 5-6, pp. 353-366.

Sharif, A. M., Irani, Z. and Weerakkody, V. (2010), "Evaluating and modelling constructs for e-government decision making", Journal of the Operational Research Society, Vol. 61 No. 6, pp. 929-952.

Skok, W., Kophamel, A. and Richardson, I. (2001), "Diagnosing information systems success: importance-performance maps in the health club industry", Information & Management, Vol. 38 No. 7, pp. 409-419.

Snaprud, M. and Sawicka, A. (2007), "Large Scale Web Accessibility

Evaluation – A European Perspective", In Proceedings of the International Conference on Human-Computer Interaction (HCI International), Beijing, China.

Sørum, H., Medaglia, R. and Andersen, K. N. (2009), "Assessment of Website Quality: Scandinavian Web Awards Right on Track?", In Proceedings of the International Conference on Database and Expert Systems Applications (DEXA/EGOV), Bilbao, Spain.

Tait, P. and Vessey, I. (1988), "The Effect of User Involvement on System Success: A Contingency Approach ", MIS Quarterly, Vol. 12 No. 1, pp. 91-108.

Tan, F. B., Tung, L. L. and Xu, Y. (2009), "A Study Of Web-Designers' Criteria For Effective Business-To-Consumer (B2c) Websites Using The Repertory Grid Technique", Journal of Electronic Commerce Research, Vol. 10 No. 3, pp. 155-177.

Teo, T., Srivastava, S. and Jiang, L. (2008), "Trust and Electronic Government Success: An Empirical Study", Journal of Management Information Systems, Vol. 25 No. 3, pp. 99-131.

Toftøy-Andersen, E. and Wold, J. G. (2011). Praktisk brukertesting, Cappelen Damm akademisk, Oslo, Norway.

van Iwaarden, J., van der Wiele, T., Ball, L. and Millen, R. (2004), "Perceptions

about the quality of web sites: a survey amongst students at Northeastern University and Erasmus University", Information & Management, Vol. 41 No. 8, pp. 947-959.

Venkatesh, V., Chan, F. K. Y. and Thong, J. Y. L. (2012), "Designing e-government services: Key service attributes and citizens' preference structures", Journal of Operations Management, Vol. 30 No 1-2, pp. 116-133.

Verdegem, P. and Verleye, G. (2009), "User-centered E-Government in practice: A comprehensive model for measuring user satisfaction", Government Information Quarterly, Vol. 26 No. 3, pp. 487-497.

Wang, Y.-S. and Liao, Y.-W. (2008), "Assessing eGovernment systems success: A validation of the DeLone and McLean model of information systems success", Government Information Quarterly, Vol. 25 No. 4, pp. 717-733.

Wu, J.-H. and Wang, Y.-M. (2006), "Measuring KMS success: A respecification of the DeLone and McLean's model", Information & Management, Vol. 43 No. 6, pp. 728-739.

Yin, R. K. (2009). Case Study Research: Design and Methods, Sage Publications, Inc.

Zahedi, F. and Song, J. (2009), "Do web sites change customers`beliefs? A study of prior-posterior beliefs in e-commerce", Information & Management, Vol. 46 No. 2, pp. 125-137.

Zhang, P., Benbasat, I., Carey, J., Davis, F., Galletta, D. and Strong, D. (2005), "Human-Computer Interaction research in the MIS discipline", Communications of the Association for Information Systems, Vol. 9 No. 20, pp. 334-355.

Zhang, P. and Li, N. (2004), "An assessment of human-computer interaction research in management information systems: topics and methods", Computers in Human Behavior, Vol. 20 No. 2, pp. 125-147.

Ølnes, S. (2007), "Accessibility of Norwegian Public Web Sites", In Proceedings of Norsk konferanse for organisasjoners bruk av informasjonsteknologi (NOKOBIT), Oslo, Norway.

APPENDIX A: PAPER 1

Website quality in government:

Exploring the webmaster's perception and explanation of website quality

Authors: Hanne Sørum, Kim Normann Andersen and Torkil Clemmensen

Abstract

Purpose – The objective of this paper is to investigate how webmasters within government bodies explain quality of websites. Despite the central position for advancing the communication, bridging usability tests and design, there are surprisingly few studies on how webmasters perceive, experience and explain website quality or design issues.

Design/methodology/approach – The authors' unit of analysis is webmasters from Norwegian web-award-winning organizations. Eight webmasters from four types of websites were interviewed. The websites were purposefully sampled, using the strategy of maximal variation sampling to maximize difference between the four types of websites.

Findings – The findings reveal that issues concerning usability are found to be an important dimension of website quality. The authors' analysis of how webmasters explain website quality reveals substantial variance in explanation of website quality. Repeated keywords of website quality are mainly related to user-

friendliness, effective website usage, content-related issues and accessibility (WAI-principles).

Research limitations/implications – This study includes webmasters from award-winning websites. In upcoming research contributions, it would add to the richness of the study if webmasters from non-award-winning websites were included. Measurement of website quality and success is widely addressed within the research literature. This paper offers the opportunity to understand how practitioners (i.e. webmasters) facilitate for website quality, grounded in their perception and explanations of which quality aspects they found to be of importance.

Practical implications – The website quality aspects identified in this paper can be used as insights for how to develop and improve the quality of websites with the public sector.

Social implications – The overall digital enabled transformation of government appears to be guided by a rather heterogeneous set of quality standards. While a variance of quality standards might stimulate innovation in websites, it can also lead to a substantial difference in digital services provided to citizens. Thus, the authors' research stimulates the awareness of diversity of quality parameters and could have as an implication that national and international standards beyond accessibility standards are more explicitly shared and debated.

Originality/value – The aim of this paper is to provide insights into website practitioners' (i.e. webmasters') perception and explanation of quality aspects in websites. Webmasters are important contributors to the quality of available websites, and it is of particular benefit to learn about their suggestions. Most

studies tackle perception of website quality from a user's point of view, while the added knowledge in this paper is the webmaster's explanation.

Website quality in government:

Exploring the webmaster's perception and explanation of website quality

1. Introduction

The use of information systems (such as web sites) has become a central part of interactions between the public sector and citizens (Panagiotopoulos et al., 2012). Despite the expectation of rapid uptake of synchronous and user-generated, content-driven social media in government, government-managed 1.0 web sites continue to be the dominating internet digital channel for communication between citizens and government. In President Obama's strategic document on Digital Government: building a twenty-first Century Platform to Better Serve the American People (Office of E-Government & Information Technology, 2012), strategic focus on information centric, citizen-centric and shared services aims at bringing government to a more innovative and higher quality of the use of information technology. Studies on progress on eGovernment in the US and elsewhere have pointed to slow take-up (Norris and Reddick, 2012; King and Kraemer, 2012; OECD, 2009) and significant challenges in measuring and delivering web site quality in line with expectations of the citizens (Markaki et al., 2010).

At the blog for the internet Society, one of the eye opening statements on design reads:

> Truth be told, I have actually been instructed by a Deputy Undersecretary of
> Defense to remove the gloss from my website designs – intentionally make

them ugly – so that no one poking around for government waste would take issue with our web presence or call us out for spending too much on a superfluous thing like design (Internet Society, 2012).

Although we do not know how generalizable this point of view is, we use this as our point of departure. Whereas other studies have pointed to the need for more knowledge of monitoring the service quality output of eGovernment (Candiello et al., 2012) and the external users' assessment of quality (Saha et al., 2012), we focus in this paper on webmasters' explanations only – not on those of designers, users/consumers, managers or shareholders.

The aim of this paper is therefore to explore how webmasters explain web site quality. Although webmasters are in a key position in the digital transformation of the public sector, the existing knowledge of how they perceive web site quality is sparse and unfocused. The few studies that have examined the webmaster's/web designer's perspective on web site quality suggest that webmasters may harbor idiosyncratic explanations of web site quality that only partly concern what webmasters/designers believe and hope that users will appreciate, but the explanations also include other web site quality dimensions. It is thus of particular interest to investigate webmasters' views on web site quality. Consequently, the contribution of this paper is in grounding the knowledge of webmasters' explanations of web site quality.

The rest of the paper is organized as follows. In Section 2, we base our study on the body of research published on web site quality, focussing particularly on the design and usability aspects, since these are of particular relevance for our discussions with webmasters. We then account for the methodological and empirical design of our study (Section 3). In Section 4, we describe the analysis

and report the findings, after which we discuss the findings in Section 5. Section 6 concludes the paper and provides propositions on the impacts for practice and research.

2. Guiding framework for grounding the knowledge of the webmaster's perception of web site quality

The making and shaping of public sector web sites is in part done by the webmasters that are in charge of design issues and technical features, and partly because they ensure that web site service quality meets the user's interests, needs and requirements (Lazar et al., 2004). Webmasters have the daily responsibility for the updates and maintenance of public sector web sites. They are therefore important contributors to quality improvement of web sites, and it is of particular benefit to take note of their suggestions. Despite holding this important position, there is a knowledge gap in the literature in understanding how webmasters perceive and explain quality in web sites. While other people within the organization and external users and experts also have an opinion of web site quality, webmasters are particularly interesting to focus on because of their accountability for web site quality.

Web site quality aspects are widely discussed in the research literature, and many studies assessing web site quality provide empirical evidence that web site users and designers consider quality to be a multi-dimensional construct (Kim and Stoel, 2004). Webmasters and web designers have to focus sharply on users' needs and requirements to facilitate great user experiences on the Web (Lindgaard et al., 2006). Liu and Arnett (2000) used webmasters as a target group for a survey, and the results identified four factors that in the view of webmasters are perceived to be critical: information and service quality, system use, playfulness and system

design quality. The four factors identified in this study are important aspects for how people interact with web sites, their motivation for use, actual use and the outcome of various activities and interactions that takes place. However, while usability and, to some extent, user experience of web sites are well defined and studied, e.g. Bai et al. (2008), there are surprisingly few studies on how webmasters perceive, experience and explain web site quality or design issues.

In our exploration of webmasters' views on web site quality, we have adopted the DeLone and McLean model for guiding the research and reporting the outcomes. The original DeLone and McLean IS success model published in 1992 provided a comprehensive framework for measuring IS success as a result of the performance of information systems. This framework was based on theoretical and empirical research within the IS field conducted by a number of researchers in the 1970s and 1980s. A decade after the original IS success model was published in 1992, DeLone and McLean published an updated framework (DeLone and McLean, 2003).

The model captures three web site quality aspects: information-, system- and service quality. Information quality captures the web site/application content. Web content should be personalized, complete, relevant, easy to understand and secure if one expects users to return to a site on a regular basis. System quality is measuring the desired characteristics of a system or a web site. Dimensions of system quality include usability, availability, reliability, adaptability and response time. The service quality aspect covers the overall support delivered by service providers, and concerns aspects such as trust, empathy and response time. By using this model, measurable goals for each of the three web site quality aspects are provided. However, the model is only a guide to identification of success metrics, and it has to be adapted to the individual study context (DeLone and

McLean, 2003). DeLone and McLean explicitly state that web designers, web users and other stakeholders can have a different opinion of what constitutes quality. However, by introducing this model, each of the success variables is defined in relation to each other and the way they interact and affect each other (positively/negatively).

The webmaster's role is partly that of the designer and partly that of the user representative; accordingly, the most important related work has to do with the usability and designer perspectives on web site quality. Thus, we are using this body of literature to qualify the DeLone and McLean model with respect to user-oriented issues of web site quality and designer aspects of the webmaster's role. The international standard ISO 9241-11 defines usability as "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" (ISO, 1998). There is a more recent international standard that defines user experience as "a person's perceptions and responses that result from the use or anticipated use of a product, system or service" (ISO, 2010). The ISO definitions of usability and user experience indicate broad characteristics of a system or a web site, and can be used to evaluate prototypes and finished designs from a user's point of view, but they do not cover all the user's needs. In contrast, most of the empirical studies of web site quality explore various factors and aspects of web site quality of particular importance for supporting sales, stimulating the lock-in effect and creating customer loyalty.

Web site quality from a user's perspective has to do with the usability of the web site and user experiences related to finding information and completing tasks. According to Baker (2009), web site usability "refers to the relative ease with which a novice maneuvers around an actual web site and does something" (p. 82).

Elling et al. (2007) posit that in informative web sites, web site quality is most likely associated with usability. Further, usability requirements are frequently addressed as a means to stimulate efficiency and effectiveness (Bai et al., 2008; Choudrie et al., 2004, 2009; Baker, 2009). Within a government setting, accessibility requirements are also found to be important (Snaprud and Sawicka, 2007) in order to ensure that everyone has the same access to participate in the digital society; additionally, the quality of web site content (Barnes and Vidgen, 2005; Ethier et al., 2006) and trust (Tan et al., 2008) are also relevant. Even though there is a difference between portals, government web sites, private web sites and e-commerce sites, there are also overlaps that designers and developers need to be aware of in order to focus on the quality aspects that may influence the user's interaction with a web site.

Iwaarden et al. (2004) have identified the quality aspects that were perceived to be the most important for users in the use of web sites, positing that fast access, easy navigation on the web site, a complete overview of the order before final purchase decision, and a simple registration process is important to bear in mind. Although this study is concerned with the service sector, many of the same aspects seems to be applicable to other business domains. Moreover, Aladwani and Palvia (2002) have examined web site quality from a user's perspective. In their study, web site quality is measured by technical adequacy, web content and web appearance.

A number of design principles have also been promoted and used by webmasters when re-designing web sites. Often these are associated with general design beliefs about a user's view of web sites. Chang and Chen (2009) suggest focussing on the user interface design, suggesting that the quality and perceived security clearly affect user satisfaction and loyalty (Chang and Chen, 2009). Through an investigation of the role of design elements on a web site, Zahedi and Song (2009)

provide a list of design elements which could serve as input in order to focus on important factors to be kept in mind for web designers and developers. Perceived as particularly important are factors such as competitive price, responsive service, informal influence, ease of use and made-for-the-medium content. De Wulf et al. (2006) propose that:

> [. . .] website owners should understand the importance of creating websites that induce affective feelings of pleasure in the online shopper, thereby contributing to user satisfaction, commitment, and trust in the site owner (p. 443).

Further, the authors propose that the information presented on the web site should be applicable, believable, sufficient and up-to-date. Other implications that designers should be aware of are the structure and the web site layout. In addition, more attention could be paid to use of multimedia tools in order to increase levels of pleasure, and personalization could increase the user's interactivity.

Summing up, our guiding framework has been shaped by the DeLone and McLean model and is qualified by the research on design and usability reported below. Our review of previous research has revealed a very scattered landscape of research. The next section details how we gathered empirical data to help ground knowledge of the webmaster's perception and explanation of web site quality.

3. Research methodology

To qualitatively investigate how webmasters explain web site quality, our collection of data and the subsequent analysis aim at the creation of grounded theory models (inductive categories and subcategories with relations) of web site quality in different types of award-winning web sites. Our unit of analysis is webmasters from Norwegian web-award-winning organizations. Webmasters in

Norway typically have as their main responsibility the task of designing the content of the web site and facilitating the update of content (Furu, 2006). In total, eight webmasters from four types of web sites were interviewed:

(1)   the inviting web site (InvW), with elegant graphical expression, well formulated texts and solid search functionality;

(2)   the intuitive web site (IW), catering for high traffic and many users where there are only a few steps needed to move from the user's query to completion (e.g. requiring only a few clicks to complete a transaction) and user-generated content;

(3)   the easy to use web site (EUW), being extremely user friendly, thus making it easy to find information and empower users; and

(4)   the simple web site (SW), with target group entrances, overview of content and   keywords in the content structure of the web site.

The four types of web sites are derived from the national web award jury's assessments of web sites.

We conducted qualitative, open-ended interviews with two webmasters from each category, thus aiming to establish a conversational setting in which webmasters could explain how they viewed web site quality aspects. Before the interview, we briefed the interviewees thoroughly about the intention, background and purpose of the interview. The interviews took place at the participants' own business environment (office location or meeting room). The interviews were carried out in Norwegian and were recorded with notes taken. To ascertain the reliability regarding the conversation, each informant read through the transcript. Three of the webmasters had no comments on the transcribed text of their interview. One

webmaster made a few comments and wanted to add some information, which was included in the text that was used in the analysis.

The analysis of the interviews was carried out by following the procedures of grounded theory: "open," "axial" and "selective" coding (Strauss and Corbin, 1998). The first sub-step in the post-session analysis was started during the interview session, consisting of identification and naming of segments of the interview with concepts of interest to the investigation (open coding). Concepts of interest were found by listening and looking for related utterances that seemed to concern the same concept.

By re-reading the interviews, text segments of interest were found, after which the segments were coded into categories that were again refined during the analysis. The text segments were mostly at the paragraph level, for which the total number of segments for the eight interviews was 641. For this analysis, we focused on the webmasters' explanations of web site quality. These were coded in 15 categories (corresponding approximately to the interview themes from the interview guide) and grounded in 59 text segments.

The next sub-step was categorization of related phenomena (axial coding). At this stage, we began to look for relations between categories and consequences thereof. We decided which categories were centrally important to the webmasters' explanations of web site quality. The final sub-step in our analysis was looking for a common theme for all categories, finding a core category (selective coding) and its relations to other categories, as well as refining and developing these. The main category in our analysis was "explanations of web site quality."

The way we used transcript excerpts and presented the analysis was governed by rules of authenticity (display data in their original form to force the reader to

diagnose on the basis of the original situation), inclusion (displays should never show just examples, but the data set itself) and transparency (displays should be explained, axes and dimensions need to be clear to the reader, and data sorting should be intuitive and easy to understand) (Dahler-Larsen, 2002). Each quotation was referenced to the webmaster we cited.

We quality checked our categorization of data by having two members of the research team perform the iterative data coding and analysis. One of the authors of this paper did the first round of coding, after which a second author double checked the coding, and did the first round of model building. The first author then checked it again and further developed the model building; finally, all three authors discussed the coding, analysis and findings. The main data categorizations were discussed by all authors. The mechanisms through which we sought disconfirmatory evidence or alternative explanations for the results were, in particular, by interviewing a second webmaster from the same web site category, and by looking for conflicting explanations within and across web site categories.

4. Findings

We have mapped our findings from the grounding analysis along the DeLone and McLean model since this constitutes what can be viewed as a widely-adopted approach to capture measurement of web site quality. Comparing the DeLone and McLean model with our grounded theory model of webmasters' explanations of web site quality that consisted of 15 web site quality aspects across different categories of web sites, we found in our model an overlap between the three DeLone and McLean quality dimensions. The webmasters explained information-, system- and service quality at varying levels of detail and completeness; all three aspects of the DeLone and McLean model entered each webmaster's explanation

of what was relevant and important in order to present a high quality web site. We speculate that this explanation may be independent of the business domain or the type of users. Compared to the DeLone and McLean model, we found that our webmasters tended to focus their explanation on system quality. Before presenting the findings, we return to the names given to the four types of web sites, namely:

(1)   the inviting web site (InvW);

(2)   the intuitive web site (IW);

(3)   the easy to use web site (EUW); and

(4)   the simple web site (SW).

The webmasters within the four categories (types) are named webmaster 1 to 8 (W1-8). Data from the webmaster interviews indicate that system quality was important to webmasters, but that there were very different aspects of system quality that were important in different types of web sites. Common to all four web site categories were:

- the importance of presenting a web site that accommodates the WAI principles; and
- the need to cater to users with various disabilities.

In the IW, the webmaster talked about system quality as traditional usability's (ISO, 1998) effectiveness and efficiency qualities such as users finding what they are looking for and the shortest way possible; the third component of traditional usability and satisfaction, however, was not talked about. In contrast, in the InvW category, although system quality also concerned effectiveness, this had to do with response time and simplicity; furthermore, the webmasters in this category also covered the satisfaction component of usability by talking about the aesthetics

features, such as the use of nice pictures. These qualities have been discussed by Lindgaard et al. (2006), who argue that web designers have only as little as 50 milliseconds to make a good impression on users before they go on to the next web site, and hence aesthetics is an important system quality feature.

The two different views of system quality that were represented in the IW and the InvW appeared to be complementary without any overlap. The third category, the EUW, shared the aesthetic element with the InvW as well as the effectiveness with the IW, but emphasized the interactivity of the site. By many researchers, interactivity is seen as a key feature of web site success, and is explained in relation to message types (Song and Zinkhan, 2008), impression formation (Sundar et al., 2003) and customization (Palmer, 2003). A web site that is very interactive may, however, put a cognitive load on its users (Sicilia et al., 2005), which may be part of an explanation for why interactivity was mentioned by the webmasters of the EUW and the SW. The fourth site, the SW, also prioritized ease of use. Such a priority is not surprising, as there are studies showing that the traditional technology-acceptance model can account for as much as 64 percent of the variance in usage (Chuan-Chuan Lin and Lu, 2000).

From the webmasters' explanations, the importance of search functions/engines was mentioned as a quality factor, but paving the way to high ranking in search engines (organic search) was not explicitly mentioned as a separate concept. However, in many cases, this is a technical issue beyond the traditional webmaster's knowledge. Whereas accessibility issues are mentioned as being important quality aspects among all four type of web sites as well as in the research literature (Lazar et al., 2004; Snaprud and Sawicka, 2007), we found that the webmaster's knowledge is important, especially in government web sites, where public information and services must be accessible among various user

groups with different requirements and needs. The four different views of system quality presented here indicate that system quality may be something very different, depending on the type of web site, as seen from a webmaster's perspective. Although we are not in a position to challenge DeLone and McLean's (2003) general model of web site quality, the findings in this study suggest caution is needed when using their definition of system quality and when dividing system quality into measurable aspects. Based on our findings, system quality deals with various quality aspects and design issues; aestheticism and interactivity are also seen as important aspects, in addition to traditional system quality measures such as usability.

In our study, information quality was mentioned explicitly. All eight webmasters stated that the information must be easy to find, and it is important not only that users find what they are looking for but that they also understand and find the information usable and trustable. In contrast, only the EUWs explicitly mentioned that the information needs to be updated and that the actual information presented at the web site must be true and updated all the time. Moreover, for the SWs, dependable data could be an aspect of information quality, especially concerning the importance of presenting data/information that users can trust. In the literature, there is agreement that high quality content is important in order to achieve a high quality web site, but there is not much discussion on how content on web sites that provide public information differs from that on e-business web sites. Information presented on e-business web sites can refer, for example, to factors such as personalization and security regarding transaction of money and use of credit cards (DeLone and McLean, 2004; Ahn et al., 2007). This aspect is, of course, also important for public web sites, but on a different level, that is, it is related to the type of information and services presented, use of technology and the extent to

which all users have the same access to information in various systems/applications.

Regarding service quality, our study indicates that for two categories of the web sites, the InvW and the EUW, service quality as a quality aspect is relevant. Service quality as an aspect of web site quality is not only relevant for companies in e-commerce, but is also an important factor for satisfying users and encouraging them to be more interactive with, for example, digital self-services. However, for e-business, providing service quality is one of the main drivers for selling products, as well for influencing users and customers to return to the web site. Service quality as an aspect of web site quality in the public sector is highly important in order to serve businesses and citizens in fulfilling their needs and requirements. In the DeLone and McLean model, service quality is seen as the overall support delivered by the service provider. In our study, the webmaster from the EUW and the InvW noted service quality as the importance of being visible to users (e.g. providing contact information) and providing fast feedback and help to users. This has also been found to be important in prior research studies (Negash et al., 2003; Ahn et al., 2007), but leaves out, for instance, the importance of empathy and credibility for users.

To get information on what a user wants, whether it is via the web site or e-mail, service quality is important for the experience of the organization, communication and the trust that is created among users, as demonstrated by this study. However, it could be time-consuming and hard to measure the level of service quality from a user's point of view, as it presupposes that one is in contact with the organization in some way. But the speed and extent of feedback on various issues could be one way of examination. Since service quality also includes aspects such as trust,

empathy and credibility, it is especially important to be aware of this. Drawn from one webmaster's own experience, seemingly negative, the webmaster explained that even the large and serious companies take a long time to respond, and that is if you are lucky and get any feedback at all. This also testifies to the fact that the issue concerning customer loyalty, due to personal preference and experiences, affects how the webmasters themselves think and want to be perceived by their users. Table I displays the three quality aspects from the DeLone and McLean model and the webmasters' explanations are summarized in the right column.

Information quality captures the web site/application content. Web content should be personalized, complete, relevant, easy to understand, and secure if one expects users to return to a site on a regular basis. System quality is measuring the desired characteristics of a system or a web site. Dimensions of system quality include usability, availability, reliability, adaptability and response time. The service quality aspect covers the overall support delivered by service providers, and concern aspects such as trust, empathy and response time. During the analysis we also found explanations of web site quality that are not covered in the model, i.e. interactivity (explained in Sections 4.1, 4.2 and 4.4) and deliberate (explained in Section 4.2).

In the following sections, we detail the findings, categorizing these according to the four categories of web sites derived from the analysis of the award winning web sites:

(1)   the inviting web site (InvW);

(2)   the intuitive web site (IW);

(3)   the easy to use web site (EUW); and

(4)   the simple web site (SW).

Quality aspects	Webmasters explanation
Information quality (captures the web site/application content)	Content
	Dependability
	Updated
System quality (measuring the desired characteristics of a system or a web site)	Accessibility
	(WAI standard)
	Effective use
	Personalization
	Search functions
	Speed
	Uptime
	User-friendly
Service quality (covers the overall support delivered by the service provider)	Fast mail response
	Fast response for the users
	Service quality (easy help)

Table I. Mapping the webmasters explanation of web site quality

We find that the webmasters in the four different categories have substantially

different perceptions of web site quality but, to a varying extent, give fruitful explanations of important quality aspects. Repeated explanations of web site quality across the four web site categories are mainly related to user-friendliness, effective web site usage, content-related issues and accessibility (WAI-principles).

4.1 Web site quality in the SW

The explanation for quality in the SW encompasses three explanations for web site quality also found in three other web site categories: accessibility, effective use and user-friendliness. The webmasters in the SW design category find accessibility to be a formal part of web site quality: "we use the quality criteria developed by the government as guidelines in order to present a high quality website" Webmaster no. 1 (W1). (Hereafter Webmasters 2-8 will be referred to as W2, etc.). In these guidelines, accessibility is highly important, together with user-adoption and web site content. One of the webmasters refers to a redesign process where a new design was launched:

> During the redesign process we missed one thing! The color we use is not suitable for people that are color-blind, but I thought that was tested. However, it was not done well enough, and we missed something important (W1).

This statement shows that formal criteria for accessibility are important; however, formal criteria are not the only criteria. One of the webmasters notes that: "To a large extent we have arranged for a website to be easy to use for most people. For instance by following the WAI principles related to accessibility." He explains, "We do not use lots of fancy effects (even if there could have been a little more), like pictures and animations" (W2). The webmasters of the SW explain

accessibility as a matter of simplicity, arguing that if a web site is simple in design, it will be accessible to more people. Effective use is important for all four web site categories, also for the SW design: "[. . .] it has to be as easy as possible for the users to find the services on the website [. . .]" (W2). This aspect of effective use is shared with the EUW.

A user-friendly web site is seen as an important web site quality by all the eight webmasters interviewed in this study; however, the webmasters in the SW design category identify two features unique to the category of user-friendliness. The first unique meaning of user-friendliness for the SW category is that users should be able to find the services they need: "[. . .] the services that are most relevant for the users shall be easy to find [. . .]" and "[. . .] that it is findable, that is a criteria [for good usability]" (W2). The second unique meaning of user-friendliness for the SW category is that content should be organized in a way that clearly separates the different parts from one another. A webmaster from the SW category explains this view of web site quality: "The content shall be organized in such a way that the users can separate the different services from each other [. . .]" (W2). Usability for the SW is closely related to content being "easy to find" and well "organized" so that users can discover and retrieve relevant information and services.

Some of the SW webmasters' explanations of web site quality are only shared with some, not all, of the other web site category webmasters. The explanation of web site quality as having to do with (access) speed is something that the webmasters of the SW category share with those of the InvW. As one of the SW webmasters indicates:

For instance, if there is a delay at the website, this is something that annoys the users [. . .] either there is too much data to download or use of the wrong software (W2).

The webmasters of the simple and IWs focus on presentation of data and use of technologies.

Some of the SW webmasters' explanations of web site quality are unique to the SW webmaster, that is, they are not found in explanations of webmasters from other categories. Web site quality for the SW webmaster has to do with dependability. A webmaster from the SW category explains dependability thus: "It is important that the users find correct and believable data/information" (W1). This kind of dependability, simply described as "dependable data," is unique to the SW category. Interactivity is explained by the webmaster as "More use of the technological opportunities in order to present information, movies and animations that could be of interest for the users" (W2). This feature of the explanation is shared with other web site categories (EUW and InvW).

Another category unique to the SW category, explaining web site quality, is uptime; as one of the webmasters explains: "[. . .] internal in the organizational we have some standards to follow, for instance uptime" (W1). Uptime is not related to access speed, which is also seen as an important quality aspect, but, rather, to the web site's availability to users. Server problems are given as an example for when a web site fails in uptime.

4.2 Web site quality in the EUW

Similar to the SW category, the explanation for quality in the EUW encompasses accessibility, effective use and user-friendliness. The feature of effective use is shared with the SW and discussed above. A feature of user-friendliness in the

explanations of web site quality which only the EUW webmasters and the InvW webmasters hold is that a web site should be lucid, and it should be easy to find things on the web site. A webmaster in the EUW category explains: "Lucid and easy to find the information is what you are looking for" (W3). Again, this explanation is grounded in the importance of supporting user-satisfaction and efficiency of use. Similarly, user-friendliness has a unique meaning in the EUW category, that is, avoiding scrolling on the web site, as explained by one of the webmasters in this category: "It is important for us that the users find our services easy to use and we arrange for the users to avoid scrolling" (W4). This aspect may be related to the efficiency aspect of standard definitions of usability discussed later.

In the EUW explanation of web site quality, the meaning of updating is the same as that in the explanations of web site quality in the IW category, suggesting that the information presented on the web site must be currently valid. Another webmaster from this category reveals:

> We present a large amount of information and the information we present is updated. That is the most important thing for me as a webmaster. In addition, the information we present must be true, otherwise the users cannot trust us (W3).

In addition, a webmasters from the IW category points out the importance of presenting updated information: "The website should be updated all the time" (W3). "Updated" here is not used in the everyday sense of a software patch, but the actual information presented (i.e. about the organization and the services presented).

Personalization of web content and the opportunity of presenting personalized information is a way of accommodating the users' needs and their expectations:

> In order to improve the website I would use the potential of web 2.0 technologies and make the website more personalized. An example is the website presented by BBC, where the users adapt the content in order to meet personal criteria (W3).

It is an explanation that the EUWs share with the InvW category. A webmaster gives an example related to concretization of product search, and the user's opportunity to log in with a unique username and password and, to some extent, personalize the web site content, saying: "It is more exciting to work with the website when it is personalized, and it should be fun (to work with the website) – that is important!" (W3).

Interactivity as a quality aspect featuring the potential of using new technologies is an explanation the EUW webmaster share with the SW webmaster, and covers the use of technological opportunities in order to present interesting and useful information in new ways: "Most website users expect more than a static website containing lots of information, there should be some interactivity which also appears as an added value" (W4). However, the webmaster is very satisfied with his organization's arrangement for interactivity, in addition to presenting electronic services the users expect to find.

Although the concept of dependability is presented in explanations of web site quality from more than one web site category, the unique feature of the EUW explanation is that dependability means true, updated and trustworthy information. This is explained by one of the webmasters in this category: "The content must be true and all the time updated and trustable" (W3). The webmaster also refers to

other organizations that provide updated information that affects whether or not users return to the web site.

Service quality is a quality aspect in this web site category explained by the importance of presenting responses on the web site. One of the webmasters for the EUW expects a fast response as part of service quality, as "I think it is important that people get an answer [. . .]" (W4). Thus, service is not only about speed in response, but in the sense that you get an answer when you ask a question. Content as a concept in the explanation of web site quality is shared among the EUW, IW and InvW. The meaning of content as an explanation of web site quality, which the EUW category shares with the InvW category, is that the web site uses pictures: "In our new design we have some pictures revitalizing our website" (W4), and "we have focus on great pictures at the front page, as we often change, and about once a week" (W8). Finally, in the EUW category, a unique feature for content as an explanation of web site quality is the use of easy language:

> The language must be simple and too much text should not appear on the screen. We try to make the information as simple as possible, but the lawyers in the organization tell us that it cannot be so simple that it turns out to be wrong. Nor so easy that it turns out to be wrong [. . .] (W4).

This citation explains how the content on the web site can contribute to making the web site more reader-friendly and easy to use.

In addition, the analysis reveals three unique explanations for the EUW category: faster response for users, fast mail response and feedback to users and deliberate responses. On the first of these, faster response for users, one of the webmasters says:

Unless it is a difficult case, I believe it is important to respond to mails from the users within a day. That is very important for us, as well as surprising many users when we respond so quickly (W4).

The webmasters refer to personal experience from other organizations that do not respond at all or are very late in responding. The second unique explanation of web site quality for the EUW category is fast response and feedback to users: "[. . .] that the users find information on the Web. And the most important thing is that they avoid long telephone queues, as it can be in hectic periods" (W4). The third unique explanation for this category is "deliberate," which emphasizes the importance of presenting content that users are looking for and expecting to find at web sites. The webmaster states: "Those responsible for the website must be aware of what the users is interested in" and, accordingly, present content thereafter that will satisfy them; otherwise, in the worst case, the users will not return to the web site (W3).

4.3 Web site quality in the IW

Similar to the SW and EUW categories, the explanation for quality in the IW encompasses three explanations for web site quality that are also found in three other web site categories: accessibility, effective use and user-friendliness. These have been described above. However, while effective use is a concept used in explanations of web site quality in all four web site categories, in the IW category it has a unique meaning of the "shortest way possible." As one of the webmasters in this web site category explains: "It should be as shortest route possible from what you have in mind until you actually find it" (W5). Thus, the web site needs to enable users to accomplish their goals and tasks without carrying out any additional steps. User-friendliness is also an explanation of web site quality found

in all web site categories, but has two unique meanings in the explanations found in the IW category. First, user-friendliness means that the web site appears to have a "logical structure." One of the webmasters in the IW category gives the following explanation of this feature:

> This can be explained by how easy it is for the users to find out what they want to do, as in our case is related to buy or sell [. . .] (W5).

The other webmaster in this web site category says: "The structure of the website must be logical [. . .]" (W6). Second, user-friendliness in the IW web site means that "the users shall find what they are looking for." One of the webmasters states in the interview:

> I think website quality means that the users easily find what they are looking for – whether it is through the main menu at the start page or in an internal search engine on the website (W6).

How the users find information seems not to be of particular importance, but what is important is the issue of easily finding information.

For the webmasters in the IW web site, content is talked of thus: "It is not enough to have a good structure and a clear idea of what to present, you also need to have quality of content presented" (W6). In addition, one of the webmasters from the InvW category claims: "The information value has gone if the content fails to be updated." He states further:

> It is better to present a website that is a little hard to use, with poor design – but has correct content, compared to a website with very nice design but with content the users cannot trust (W6).

This citation signifies that the content is of first priority among the webmasters in this web site category, while design issues come second.

A unique feature in the IW webmaster's explanation regarding updating of the web site is continuous development. As one of the webmasters in the IW category explains:

> Today we do not present a website, and then wait three years in order to present a new one. It is a continual development process to present an updated website (W6).

This explanation is witness to the fact that there is a need to progress in order to present an attractive web site that pleases the users.

4.4 Web site quality in the InvW

The explanation of quality in the InvW category web site encompasses three explanations for web site quality that are also found in three other web site categories: accessibility, effective use and user-friendliness. However, in the InvW category, explanations of web site quality as effective use have two unique features. First, the web site should always make it possible for the user to make the right choice:

> We still have lots of work to complete and we can always improve the user experiences. However, for us effective use is related to presenting detailed information which makes it easier for the users to choose correctly. That is the point – helping the users to make the right decision (W7).

Second, users should be able to find information fast as part of effective use: "[. . .] if it doesn't work, I get impatient – and then I leave the website [. . .]" (W7). Web site development in this category is also seen as a continual process where

there is always room for improvement. One of the webmasters in the InvW category compares effective use with presenting content in order to help users in decisions and tasks as primarily related to the type of services and information they present on the web.

Similarly, even though user-friendliness is a category of explanation that the InvW category shares with the other three web site categories, it also has meanings unique to this web site category. First, the feature that the web site should be lucid and it should be easy to find things – "[. . .] there should be a good overview [on the website]" (W7) – is shared with the EUW category. Second, a unique feature to InvW about user-friendliness is an indication that it is important how easy it is to buy a product:

> That means anything. People are impatient and if the website is hard to use – they give up. We want most people to buy a product, and it must be easy to accomplish a deal (W7).

Similarly, it is a unique feature of user-friendliness for the InW category that it should be possible to avoid errors: "The website content must be correct, and then the users will allocate the information easily and without any errors" (W7). In business domains, where competitors are only a mouse-click away, user-friendliness seems to be of particular importance from a webmaster's point of view.

The InvW explanation of web site quality has more sub-categories than the other web site categories, as the webmaster's definition of web site quality in this category covers many and various quality aspects. In addition to the quality aspects presented in the previous sub-sections, the InvW category introduces some new features. There are several explanations for what are seen as web site quality

among the webmasters in the InvW category: accessibility, effective use, user-friendliness, content, dependability, service quality, interactivity, personalization, speed, as well as a unique explanatory category – search functions. Personalization and speed are two explanations that this web site shares with some of the other web sites discussed above, and these shared explanations have no features unique to the InvW category.

The content of the web site is also explained as a quality aspect in this web site category, and one of the webmasters focuses on the use of pictures: "We focus on delicate pictures on the main page as we often change, about once a week" (W7). This is explained by the importance of presenting a dynamic web site – one which makes the users return to the web site in order to find updated information. One of the webmasters from the web site category EUW also highlights the use of nice pictures, explaining: "In our new design we use pictures in order to lighten up the design" (W7). Pictures are therefore seen as a valuable contribution and a design element that is important to users. Both content and use of pictures are features of explanations that the InvW shares with some of the other web sites. The content presented must be relevant for the target group, while functionality and web site design come second.

The unique feature for dependability in this web site category is related to trust. One of the webmasters from the InvW category explains dependability thus: "The content must be trustable; otherwise it is not interesting to the users – regardless of the functionality presented at the website [. . .]" (W7). The web site content is again seen as being highly important, and users must believe it.

Service quality is also seen as an important quality aspect in this web site category and, for InvW, the unique explanation is that the web site should present help functions at the web site. As one of the webmasters for the InvW explains:

> The users must easily have an opportunity for help, the contact information must be visible on the website, as well as someone from the company being able to help the users (W7).

This statement reflects the importance of satisfying users by providing help and support. Providing a high quality web site is not enough, but organizations must also arrange for a high level of service quality.

In order to create interactivity at a web site and to contribute to more knowledge among users, the unique feature of this web site category (InvW) is pedagogy through games. This feature is mentioned by one of the webmasters in this web site category as an opportunity: "We have discussed slightly how, for instance, to develop games in order to give the users advice and knowledge about relevant topics" (W7). The webmaster refers to products and services they present and new ways to interact and communicate with the users through games. More use of interactivity and new ways of presenting and visualization of web content are also mentioned by one of the webmasters in the SW category. Search functions – the unique explanatory category for the InvW – are explained by one of the webmasters in the InvW as the importance of presenting a concretized product search: "In order to improve the website quality I would probably concretize the product search further [. . .]" (W8).

The webmaster's description of the web site is close to what the webmaster finds important:

I think the website meets my requirements in a good way, but we can always be better. If I had unlimited resources and could make some changes I would concretize the search for products further. We could also make it more exciting for the users by personalizing the website more than today, and I believe the customers would appreciate it. And, more apparent categorization, more articles about updated topics [. . .] but we are on our way to doing it [. . .] and have more focus on learning and making the articles (information) easier to understand for everybody, as well as trying to avoid internal terms (W8).

This testimony confirms the importance of: presenting search functions in order to make it easier for finding relevant information, personalizing web content, and making updates and continuous improvements.

Table II lists the identified explanations found in each of the four web site categories:

Main categories of concepts found in explanations	The simple web site (SW)	The easy to use web site (EUW)	The intuitive web site (IW)	The inviting web site (InvW)
Accessibility (WAI standard)	+	+	+	+
Content	-	+	+	+
Deliberate	-	+	-	-
Dependability	+	+	-	+
Effective use	+	+	+	+
Fast mail response	-	+	-	-
Faster response for the users	-	+	-	-
Interactivity	+	+	-	+
Personalization	-	+	-	+
Search functions	-	-	-	+
Service quality (easy help)	-	+	-	+
Speed	+	-	-	+
Updated	-	+	+	-

Uptime	+	-	-	-
User-friendly	+	+	+	+

Table II. The concepts identified in webmasters explanations of the four types of web site quality

(1)   the inviting web site (InvW);

(2)   the intuitive web site (IW);

(3)   the easy to use web site (EUW); and

(4)   the simple web site (SW).

5. Discussion of findings

Our findings in this study seem to be consistent with other studies of webmasters' views of web site quality; however, a key contribution of our study is a more detailed and comprehensive list of web site quality components. Consistent with the study by Tan et al. (2009), we found content, categorization of information, update, downloading time and effective navigation to be part of webmasters' explanations of web site quality. We did not find support for Tan et al.'s (2009, p. 156) other categories: "[. . .] colors, font style and size, mix of text and graphical information and sort, shape, size and placement of links". If these were present at all in our webmasters' explanations, it was on a more detailed level in the explanations, and not as important web site quality components.

We did not find any explanations concerning brand or web site identity, graphic usage, or advertisement/pop-ups/animations, all of which were part of the comprehensive list of important considerations that web designers should take into

account, according to Tan et al. (2009). Barnes and Vidgen (2005) divide quality aspects into five categories: design, information, trust, empathy and usability. In our webmasters' explanations we found strong support for the importance of information quality and usability.

Concerning trust, we found that web site information must be true and trustable for users, as one of the webmasters (W3) confirmed. Another webmaster (W6) explained that web sites need to present quality of content, which could be one dimension of trust. A further webmaster (W7) added that one of the missions for a web site is to help users make the right decisions. This seems to be closely related to the truthfulness of the information presented, trustability and the organization's empathy towards the users.

In comparison to the study by Zahedi and Song (2009), referring to the fact that it is highly important the way price information is presented, we found additionally that informal influence and made-for-the-medium content are important web site quality components. These aspects of web site quality that emerged from our study are only covered to a certain extent in other studies, or only covered by more general explanations as usability and design quality. Service quality covers aspects such as fast response time and the importance of presenting visible contact information to users: if users need help, it must be easy to get in touch with the organization.

6. Conclusion

Our analysis of the interviews with the webmasters indicates that information quality is important and seen as a driver in influencing users to return to a web

site. This finding reveals that usability is an important dimension of a broader concept of web site quality. Our analysis of how webmasters explain web site quality reveals 15 different explanations or aspects of web site quality. The keywords of web site quality are mainly related to user-friendliness, effective web site usage, content-related issues and accessibility (WAI-principles). Comparing our findings to the three groups of independent variables in the DeLone and McLean IS success model, we find that caution is needed when using their definition of system quality and when dividing system quality into measurable aspects. Since our findings show that system quality may vary – depending on the type of web site – and a key word for system quality is a broad definition of user-friendliness, we encourage more research on web site quality from the viewpoint of webmasters.

A limitation of this study is that the selection of webmasters interviewed represents elite web sites, i.e. those web sites that have received a national award. It would add to the richness of the study if webmasters with other backgrounds were to be interviewed. A similar argument could be stated about the award-giving committee; it would thus add to the quality of the study if better definitions and typologies of these committees could be developed. Also, it would be an improvement to add another round of interviews and follow-up questions on other issues relevant to web site quality, such as exploring the degree to which webmasters explore their freedom to design, or whether they are just doing what they are told to do. Nevertheless, we believe that the findings in our study can be helpful for academia and professionals in order to prioritize and focus on web site-quality aspects that most likely satisfy both web designers' aspirations and users' needs and requirements. Regarding practical implications, the web site quality aspects identified in this paper can be used as insights for how to develop and

improve the quality of web sites within the public sector. The overall digital enabled transformation of government appears to be guided by a rather heterogeneous set of quality standards. While a variance of quality standards might stimulate innovation in web sites, it can also lead to a substantial difference in digital services provided to citizens. Thus, our research stimulates the awareness of diversity of quality parameters and could have as an implication that national and international standards beyond accessibility standards should be more explicitly shared and debated.

References

Ahn, T., Ryu, S. and Han, I. (2007), "The impact of web quality and playfulness on user acceptance of online retailing", Information & Management, Vol. 44 No. 3, pp. 263-275.

Aladwani, A. and Palvia, P. (2002), "Developing and validating an instrument for measuring user-perceived web quality", Information & Management, Vol. 39 No. 6, pp. 467-476.

Bai, B., Law, R. and Wen, I. (2008), "The impact of website quality on customer satisfaction and purchase intentions: evidence from Chinese online visitors", International Journal of Hospitality Management, Vol. 27 No. 3, pp. 391-402.

Baker, D.L. (2009), "Advancing e-government performance in the United States through enhanced usability benchmarks", Government Information Quarterly, Vol. 26 No. 1, pp. 82-88.

Barnes, S. and Vidgen, R. (2005), "Data triangulation in action: using comment analysis to refine web quality metrics", Proceedings of the 13th European Conference on Information Systems (ECIS 2005), Regensburg, Germany.

Candiello, A., Albarelli, A. and Cortesi, A. (2012), "Quality and impact monitoring for local eGovernment services", Transforming Government: People, Process and Policy, Vol. 6 No. 1, pp. 112-125.

Chang, H.H. and Chen, S.W. (2009), "Consumer perception of interface quality, security, and loyalty in electronic commerce", Information & Management, Vol. 46 No. 7, pp. 411-417.

Choudrie, J., Ghinea, G. and Weerakkody, V. (2004), "Evaluating global e-government sites: a view using web diagnostic tools", Electronic Journal of e-Government, Vol. 2 No. 2, pp. 105-114.

Choudrie, J., Wisal, J. and Ghinea, G. (2009), "Evaluating the usability of developing countries' e-government sites: a user perspective", Electronic Government: An International Journal, Vol. 6 No. 3, pp. 265-281.

Chuan-Chuan Lin, J. and Lu, H. (2000), "Towards an understanding of the behavioural intention to use a web site", International Journal of Information Management, Vol. 20 No. 3, pp. 197-208.

Dahler-Larsen, P. (2002), At Fremstille Kvalitative Data, Odense Universitetsforlag, Denmark.

DeLone, W.H. and McLean, E. (2004), "Measuring e-commerce success: applying the DeLone & McLean information systems success model", International Journal of Electronic Commerce, Vol. 9 No. 1, pp. 31-47.

DeLone, W.H. and McLean, E.R. (2003), "The DeLone and McLean model of information systems success: a ten-year update", Journal of Management Information Systems, Vol. 19 No. 4, pp. 9-30.

De Wulf, K., Schillewaert, N., Muylle, S. and Rangarajan, D. (2006), "The role of pleasure in web site success", Information & Management, Vol. 43 No. 4, pp. 434-446.

Elling, S., Lentz, L. and de Jong, M. (2007), "Website evaluation questionnaire: development of a research-based tool for evaluating informational websites", Proceedings of the 6th International Conference, EGOV in Regensburg, Germany.

Ethier, J., Hadaya, P., Talbot, J. and Cadieux, J. (2006), "B2C web site quality and emotions during online shopping episodes: an empirical study", Information & Management, Vol. 43 No. 5, pp. 627-639.

Furu, N. (2006), "Nettredaktørundersøkelsen", available at: www.nettredaktor.no (accessed 15 July 2012).

ISO (1998), ISO 9241-11 – Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs) – Part 11: Guidance on Usability, ISO, Geneva.

ISO (2010), ISO 9241-210 – Ergonomics of Human System Interaction – Part 210: Human-Centered Design for Interactive Systems, ISO, Geneva.

Iwaarden, J.V., Wiele, T.V.D., Ball, L. and Millen, R. (2004), "Perceptions about the quality of web sites: a survey amongst students at Northeastern University and Erasmus University", Information & Management, Vol. 41 No. 8, pp. 947-959.

Kim, S. and Stoel, L. (2004), "Dimensional hierarchy of retail website quality", Information & Management, Vol. 41 No. 5, pp. 619-633

King, J.L. and Kraemer, K.L. (2012), "Too early to say", in Snellen, I.T.M., Thaens, M. and Van De Donk, W.B.H.J. (Eds), Public Administration in the Information Age: Revisited, IOS Press, Amsterdam.

Lazar, J., Dudley-Sponaugle, A. and Greenidge, K.-D. (2004), "Improving web accessibility: a study of webmaster perceptions", Computers in Human Behavior, Vol. 20 No. 2, pp. 269-288.

Lindgaard, G., Fernandes, G., Dudek, C. and Brown˜, J. (2006), "Attention web designers: you have 50 milliseconds to make a good first impression!", Behaviour & Information Technology, Vol. 25 No. 2, pp. 115-126.

Liu, C. and Arnett, K.P. (2000), "Exploring the factors associated with web site success in the context of electronic commerce", Information & Management, Vol. 38 No. 1, pp. 23-33.

Markaki, I., Charilas, D. and Askounis, D. (2010), "Evaluating the quality attributes of e-government websites", E-Government Website Development: Future Trends and Strategic Models, IGI Global, Hershey, PA.

Negash, S., Ryan, T. and Igbaria, M. (2003), "Quality and effectiveness in web-based customer support systems", Information & Management, Vol. 40 No. 8, pp. 757-768.

Norris, D.F. and Reddick, C.G. (2012), "Local e-government in the United States: transformation or incremental change?", Public Administration Review, Vol. 73 No. 1.

OECD (2009), "Rethinking e-Government services: user-centred approaches", available at: www. oecd.org (accessed 21 December 2012).

Palmer, J.W. (2003), "Web site usability, design, and performance metrics", Information Systems Research, Vol. 13 No. 2, pp. 151-167.

Panagiotopoulos, P., Al-Debei, M.M., Fitzgerald, G. and Elliman, T. (2012), "A business model perspective for ICTs in public engagement", Government Information Quarterly, Vol. 29 No. 2, pp. 192-202.

Saha, P., Nath, A.K. and Salehi-Sangari, E. (2012), "Evaluation of government e-tax websites: an information quality and system quality approach", Transforming Government: People, Process and Policy, Vol. 6 No. 3, pp. 300-321.

Sicilia, M., Ruiz, S. and Munuera, J.L. (2005), "Effects of interactivity in a web site: the moderating effect of need for cognition", Journal of Advertising, Vol. 34 No. 3, pp. 31-44.

Snaprud, M. and Sawicka, A. (2007), "Large scale web accessibility evaluation – a European perspective", Proceedings of the 4th International Conference on Universal Access in Human-Computer Interaction: Applications and Services, Springer, Berlin.

Song, J.H. and Zinkhan, G.M. (2008), "Determinants of perceived web site interactivity", Journal of Marketing, Vol. 72 No. 2, pp. 99-113.

Strauss, A. and Corbin, J. (1998), Basics of Qualitative Research – Techniques and Procedures for Developing Grounded Theory, Sage, London.

Sundar, S.S., Kalyanaraman, S. and Brown, J. (2003), "Explicating web site interactivity: impression formation effects in political campaign sites", Communication Research, Vol. 30 No. 1, pp. 30-59.

Tan, C.-W., Benbasat, I. and Cenfetelli, R.T. (2008), "Building citizen trust towards e-government services: do high quality websites matter?", Proceedings of the 41st Hawaii International Conference on System Sciences.

Tan, F.B., Tung, L.L. and Yun, X. (2009), "A study of web-designers' criteria for effective business-to-consumer (B2c) websites using the repertory grid technique", Journal of Electronic Commerce Research, Vol. 10 No. 3, pp. 155-177.

Zahedi, F. and Song, J. (2009), "Do web sites change customers' beliefs? A study of prior-posterior beliefs in e-commerce", Information & Management, Vol. 46 No. 2, pp. 125-137.

APPENDIX B: PAPER 2

Public websites and human-computer interaction:

an empirical study of measurement of website quality and user satisfaction

Authors: Hanne Sørum, Kim Normann Andersen and Ravi Vatrapu

Abstract

The focus of this paper is to investigate measurement of website quality and user satisfaction. More specifically, the paper reports on a study investigating whether users of high-quality public websites are more satisfied than those of low-quality websites. Adopting a human–computer interaction perspective, we have gathered data from the 2009 public website awards in Scandinavia. Our analysis of Norwegian and Danish websites reveals that the use of quality criteria is highly technical compared to the traditional usability testing focus on efficiency, effectiveness and satisfaction of the actual system use by representatives. A Pearson correlation analysis of user evaluation from 296 websites that participated in the Danish web award Bedst på Nettet ('Top of the Web') showed no significant positive correlation between website quality and user satisfaction. We put forward recommendations for further investigation: (1) inclusion of real users (citizens and businesses) in real-use setting in the evaluation process could help move forward the understanding of the relationship between website quality and end-user satisfaction; (2) the lack of correlation between website quality and user satisfaction could be a point of departure for critical discussions of future

implementation of public information and services and (3) additional and in-depth research of the measurement of website quality in the public sector, user expectations and the impacts of website quality improvements on user satisfaction.

Keywords: public sector websites; human-computer interaction; website quality; website evaluation; user satisfaction

Public websites and human-computer interaction:

an empirical study of measurement of website quality and user satisfaction

1. Introduction

Citizens and businesses can interact with public online information and services 24 h/day. For instance, using public websites, citizens put forward questions, complete various types of registrations, pay taxes and apply for scholarships. Personal interactions with government employees and paper forms are therefore becoming more and more blurred by technology mediation, since a large part of public information and services is today available online. Although it is hard to ensure that all users have the same satisfying experience with public information systems, we can improve the possibility by focussing on aspects that are vital in order to establish good human–computer interaction (HCI) with public websites. From a government perspective, it is important to provide information and services that users (citizens and businesses) can easily access (Meyer 2005).

In order to reach a certain quality level and generate further improvements in the public sector, website quality criteria are used to assess public websites and online services. The website quality criteria reify what the government defines as being important and should be prioritised in the continuous development process of public websites. To meet the users' needs and requirements as well as to stimulate quality improvements within the sector, assessment of hundreds of websites has been an annual event in Norway and Denmark since 2001. The evaluation process focuses on website quality aspects that are not always a part of the public website development process, but nevertheless are seen as highly important in order to

ensure citizen participation and create user satisfaction. Even though there is a major difference between movie awards, such as the Oscar ceremony and the assessment of hundreds of public websites, the public website awards analysed have generated public attention. The winners are intended to serve as good practice examples, to inspire improved quality, facilitate shared learning and spur innovation. Accordingly, we pursue the following overall research question in this paper: *Are public website users more satisfied with high-quality websites compared to low-quality websites?*

Apart from providing a direct relevant contribution to the ongoing efforts to improve the quality of public websites in the two countries covered in our analysis, the paper contributes in helping to improve measurement of eGovernment success or failure out-side the Scandinavian context. The relationship be-tween public website quality and user satisfaction has received scant attention in HCI and eGovernment research literature. Given the vastly increased re-sources spent on quality improvement in public organisations, along with a public debate of how to satisfy the different user groups and successfully deliver services online, this paper aims to provide additional insights to the HCI and eGovernment fields.

This rest of this paper is organised as follows. Section 2 presents prior research and the framework of the study. The data collection and analysis are described in Section 3, after which the findings are offered in Section 4. Section 5 discusses the findings in relation to the research question addressed in this study. The paper ends with conclusions and a call for future research.

1.1 Background of the awards

The Norwegian government wants to make daily life easier for the population and ensure security, prosperity and welfare. The government has stated that information technology (IT) applied in the right way makes an important contribution to the achievement of these goals (Meyer 2005). One of the initiatives launched to evaluate the above-mentioned goal of the government is to have an annual review of about 700 public sector websites, organised by the Agency for Public Management and eGovernment. In Denmark, where the quality level of public websites is assessed almost to the same extent as in Norway, the evaluation process is organised by the National Danish IT and Telecom Agency.

In view of the fact that the government defines the standard and develops quality criteria and guidelines for the assessment process, the use of quality criteria and evaluation methods is of particular interest for assessing end-user satisfaction and public value. The use of public website quality criteria is mainly grounded in national plans, political goals and technical standards. In order to achieve these objectives, which clearly state that all individuals should have the same opportunity to participate in the digital community, the public sector needs to ensure that users with different requirements and needs have almost the same access to online information and services, as well as having almost the same positive experience with online public information and services. Through annual assessment of hundreds of public websites, the goal is also to trigger the attention and willingness of the different government agencies to invest in website quality aspects that often have low priority in many organisations.

The use of quality criteria in these awards has gone through some changes since the first event that took place in 2001. In Norway, only small changes were made in the set of quality criteria in 2005, 2006 and 2008. However, extensive changes

were made in 2007. In Denmark, there were further comprehensive changes, and a new concept was launched in 2009. Since 2009, as a part of the evaluation process, results from an online user satisfaction survey were published on the organisers' (The National Danish IT and Telecom Agency) websites, as well as the results for a self-evaluation questionnaire concerning organisational impacts. All the results counted in the total score. The evaluation process in 2009 was thus more extensive than ever before – not just based on standardised objective measures and heuristic evaluation. It was voluntary for the participating organisations (public websites) to collect and report the results from these evaluations.

After the evaluations in Norway and Denmark were completed, the results were made publicly available. Subsequently, the organisations have been able to learn from one another in order to develop the public websites further, be inspired by good practice examples, and stimulate for creativity and innovation within the public sector. During a 1-day conference, the winners are announced at a ceremony serving as an occasion for social interaction and networking among the participants.

2. Prior research and framework

What is perceived and experienced to be a good website varies within a particular user group and between different user groups. While a website can be both effective and efficient to use, the users may not be satisfied with it. Important is whether the users like or dislike what they perceive and experience on the website, that is, the first impression from the initial user engagement is highly important and powerful on the Web. Web designers and developers have about 50 ms to make a Web designers and developers have about 50 ms to make a good first

impression on the users good first impression on the users, and visual appeal seems to be very important (Lindgaard et al. 2006).

In order to arrange for high-quality websites, we need to consider the HCI aspects of the phenomena, which require knowledge about the users, their prior experience, expectations and needs. HCI or human factor studies in management information systems are concerned with the ways that users interact with information, different technologies and various tasks, especially in business, managerial, organisational and cultural contexts (Zhang et al. 2005). Usability is a key term in HCI and has been defined as the capability to be used by humans easily and effectively (Shackel 1991). The international standard ISO 9241-11 defines usability as 'the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use' (ISO 1998). A usability evaluation provides a strong and rich basis for understanding and improving the design of users' interaction, and provides feedback that impacts the developers' under-standing of usability due to the interaction that takes place.

Usability reports have a strong impact on the developers' understanding of specific usability problems, and support a systematic approach to deal effectively with problems concerning a planned design (Høegh and Jensen 2008). However, the feedback from both formative and summative usability evaluation must convince developers about the relevance and importance of a usability problem, convey an under-standing of the problem and suggest design alternatives and solutions in order to solve the problems (Nørgaard and Hornbæk 2009). Usability applies to all aspects of a system with which a human might interact, including installation and maintenance procedures (Nielsen 1993). The field of HCI is also concerned with interaction design, which casts its net much wider with theory,

research and practice of designing user experiences for all manner of technologies, systems and products. Compared to interaction design, usability has traditionally had a narrower focus concerning interaction with computer systems (Sharp et al. 2007).

Various usability evaluation methods have been developed to provide practical tools for good practice, and representative methods as 'think aloud', 'heuristic evaluation' and 'cognitive walkthrough' (Hwang and Salvendy 2009). Heuristic or expert evaluation and usability testing can often reveal various usability problems (Sharp et al. 2007). Moreover, usability tests can take various forms and can be done using a paper prototype or in expensive usability laboratories using special one-way mirrors, video cameras, eye tracking equipment and other observational instrumentation (Heim 2007).

Through usability testing, different types of measures can be used to evaluate each of the principles: for instance, time to complete a task, number and type of errors per task, number of errors per unit of time and number of users completing a task successfully. It can be hard to understand aspects of user behaviour with no examination of the behaviours in a realistic setting, e.g. through field studies on website usage (Kellar et al. 2008). In some cases, it is expensive and time-consuming to involve real users, and expert usability evaluations can then be a solution to provide feedback to a development and/or evaluation process. This can be done in different ways, like heuristic evaluation carried out by usability experts using a predetermined set of criteria developed in order to measure the usability and usefulness of a specific design application (Heim 2007).

There are some critical dimensions that must not be ignored in an eGovernment context: accessibility, usability, functionality of technological tools and content

type (Pasinetti 2009). Satisfying users is perceived as highly important, as well as assessing eGovernment success from a citizen's perspective by use of a Web application (Wang and Liao 2008). In order to investigate website accessibility, which makes a website available to a wider population (user group), some of the most advanced eAccessibility assessments on a national level are carried out by Denmark, the Netherlands, Norway and Sweden (Snaprud and Sawicka 2007). In all cases, the evaluations have been performed by public agencies. However, available accessibility guidelines do not necessarily guarantee universal design, leading to usable websites by a diverse set of users, particularly when specific groups of users with special needs are considered (Leporini and Paterno`2008), as in eGovernment.

Prior research on user involvement in eGovernment projects in Norway has found that there is an agreement on the importance of user involvement in development projects. Moreover, there is a more explicit need for structured processes concerning user involvement activities in eGovernment projects (Følstad et al. 2004). One of the strengths within HCI empirical research is the emphasis on users and their needs and expectations apart from the technical concerns about systems development. Therefore, since most public websites have an audience with various needs and requirements, we need to ensure that all users have the same access to, and similar positive experience of, online public services and information.

3. Data collection and analysis

In our investigation of the overall research question in this paper, we collected data from Danish and Norwegian public sector web awards in order to: (a) map how the two awards associate website quality and user satisfaction and (b)

perform a correlation test (Pearson) between user satisfaction and evaluation of the quality of the websites.

As for the mapping, online eGovernment reports and documents from both countries were read and analysed in order to get an overview of national plans and strategies for improving quality and satisfaction among the users of public websites. We also reviewed the annual quality assessment of public websites in Norway (www.norge.no/kvalitet) and Denmark (www.bedstpaanettet.dk) in 2009, as well as the use of quality criteria and evaluation processes and methods. The research investigation team had native Norwegian and Danish speakers, but to ensure that the entire research team could take part in the analysis of the data material, data collected from the organiser's website were translated into English from Norwegian and Danish.

Table 1 depicts how the results from the Danish public sector website evaluation in 2009 are disseminated on the Web. For each of the websites evaluated, the overall score from the technical screening of websites (done by a consultancy company), the organisation's self-assessment and the user's evaluation are listed. Additionally, a total score and a visualisation of the Internet value (netkroner) are presented for each website. The scores from the screening test, self-evaluation and user evaluations were based on weightings of 30%, 40% and 30%, and then the scores were converted into an aggregate score. Based on this score, the Internet value is presented by a number of crowns, ranging from one to five crowns (the Danish currency), with five being the highest. For each of the evaluated websites, a more detailed set of data can be viewed along with possibilities of benchmarking the website with results from other websites. Data extracted from this source were used in the correlation analysis performed in this paper.

Table 1. Illustrative results from the Danish public sector website evaluation in 2009.

Organisation	Technical screening of websites	Organization's self-assessment	User evaluation	∑ Total score	Internet value (Internet crowns)
The National Enterprise and Construction Authority	96.47	100.00	63.05	87.86	
Ministry of Education	88.52	94.00	64.23	83.43	
Forest and Nature Agency	86.75	88.54	69.44	82.27	
The Ministry of Climate and Energy	83.61	89.00	71.82	82.23	
The National Board of Social	98.36	74.00	72.76	80.94	

Services

Ministry of Finance	77.36	95.00	64.33	80.51	🔴🔴🔴🔴🔴
Danish Agency for Libraries and Media	82.05	89.77	62.83	79.37	🔴🔴🔴🔴
The University and Property Agency	85.54	76.00	74.60	78.44	🔴🔴🔴🔴
The Official Portal for Foreigners and Integration	82.35	75.00	N.A.	78.15	🔴🔴🔴🔴
The IT Centre for Education and Research	98.82	69.00	68.08	77.67	🔴🔴🔴🔴

Source: www.bedstpaanettet.dk

To investigate the relationship between website quality and user satisfaction, results from the online user satisfaction survey carried out in Denmark during the evaluation process in 2009 were included in the present study. The survey required more than 30 respondents in order to count as a part of the evaluation process in the award. From the organiser's website (www.bedstpaanettet.dk), we ascertained that 296 of the 586 organisations that participated in the annual website awards process reported the results from the online user satisfaction survey during the evaluation process in 2009. The respondents answered the questionnaire from a user's point of view, and the results (score on user satisfaction) were included in this study in order to investigate the impact of website quality on user satisfaction.

In the online survey, user satisfaction was measured by: (1) how easy it is to find information on the website, (2) content of the website and (3) usefulness of the website. The measurement scale in the survey was a four-point scale, from 'strongly agree' to 'strongly disagree'. Using the Likert items (and not the Likert scale) with a four-point scale, the survey forces respondents to take a stand, and it could be argued that there is a potential positive bias, starting with 'strongly agree' and putting 'strongly disagree' as the bottom of the scale. The following number of points was given to the questions: 'strongly agree': 6 points; 'agree': 4 points; 'disagree': 2 points and 'strongly disagree': 0 points. The questionnaire contained in total nine predefined questions, and all nine questions had equal weighting on the total score. In addition, the organisation could add three questions defined by the organisation itself. In total, 14 questions could therefore be implemented in the survey (including two background questions).

For the purposes of the present study, website quality was operationalised as the score on the website quality screening test (minimum score of 0 and maximum score of 100), whereas user satisfaction was operationalised as the score on online

user survey score. In order to investigate the relationship between user satisfaction and website quality, the dataset was categorised into two variables: (1) the score on website quality and (2) the score on user satisfaction. The data (scores) were then collected for each of the 296 participating organisations (public websites) in the award that included the questionnaire in the evaluation process.

Subsequently, the data were analysed using the Statistical Package for the Social Sciences (SPSS 18) for running a correlation test (Pearson). The primary analytical aim was to investigate and characterise the results of the relationship between users' perception of website quality (as evidenced by the online user survey score) versus the results from the evaluation conducted by the government (as evidenced by the website quality screening test score). The findings are reported in the next section.

4.Findings

Through the annual quality assessment of public websites, the goal is to trigger the attention and willingness of individual government agencies to invest in website quality. Table 2 presents the use of quality criteria and the evaluation process in Norway and Denmark in 2009. The second column from the left presents the website quality criteria that are measured in each of the awards; column number three lists the number of measures for each of the quality criteria; column four gives examples of how the quality criteria are actually operationalised and measured; column five describes the extent to which the quality criteria are objective or subjective and the column at the far right indicates the type of evaluators deployed to measure each of the quality criteria (experts or users). There is a difference between the professional practice of traditional usability testing and the use of website quality criteria to determine public website usability. As listed in Table 2, website quality assessment is mainly restricted to aspects

concerning system functionality and information quality. Moreover, service quality is only assessed to a small extent, possibly because it is considered time-consuming to assess and requires an interaction with the organisation. Information quality is also evaluated only superficially and not in detail. The uses of quality criteria are therefore closely related to high-level design principles and technical features, and less to visual design, interaction design and usability measures concerning efficiency, effectiveness and satisfaction of representative users with representative tasks in representative contexts of actual use.

Table 2. Quality criteria and the evaluation process in Norway and Denmark in 2009.

Country	Criteria category	Number of criteria	Example criteria	Criteria type	Evaluators
Norway	Accessibility	11	Text size can be changed, correct HTML coding, contrasts	Objective	Experts
	User adoption	13	Download time, search functions, use of sitemap	Objective	Experts
	Useful content	9	Contact information, information about the organisation, website titles	Objective	Experts

Denmark	Navigation	8	Search functions, navigation structure, link labels	Objective	Experts
	Usability in self-services	7	Relevance of services presented, opportunities for personal help, personalisation	Objective	Experts
	Openness and utility value	9	Contact information, subscription for RSS-feeds, use of HTML	Objective	Experts
	User satisfaction	14	Quality of the website, content of the website, expectations	Subjective	Online users
	Self-evaluation	25	Organisational work, collaboration, business case	Subjective/ objective	Organisation itself (e.g. the webmaster / IT manager)

Source: www.norge.no/kvalitet; www.bedstpaanettet.dk

Further, the use of quality criteria and evaluation methods in Norway and Denmark is similar and, to a large extent, overlapping. In addition, there is an

overload of technical measures; for instance, criteria related to Hyper Text Markup Language (HTML) coding and download time. The use of the measurement scale varies from dichotomous (yes/no) to textual alternatives, and tends to appear as direct input for quality improvements. Table 3 shows an example from Norway of what we classify as technical measures, along with the response alternatives and the score received.

After the evaluation process is completed, the participants are ranked according to the extent that they fulfil the criteria launched in the individual award. Finally, a panel of independent experts (a jury) evaluates the nominated websites in order to select the winners. The winners are intended to serve as good practice examples and be an inspiration for further improvements within the public sector. The jury in these awards has specific guidelines to follow in order to select the winners. In Norway, the following guidelines were used in 2009: (1) the website shall be user-orientated in proportion to expression, content, structure and navigation; (2) the website shall be innovative, exploit the technological opportunities and (3) receive four stars or more in the evaluation process. As an example, we present one comment from the Norwegian jury:

> "A higher degree of user-involvement will be important in order to improve the website, for the future development of the website, ethical issues should be taken into consideration, more use of the social media in order to satisfy a young target group, and development of more liveliness on a text-heavy website, for instance by using video". (www.norge.no/kvalitet).

Table 3. An example of the use of quality criteria in Norway in 2009.

Quality criteria	Measure	Answer alternatives	Score
Accessibility	Is the HTML coding correct?	Failed – the validation shows 6 errors or more	0
		Passed – the validation shows 5 errors or less	2
User adoption	Is the website easy to download?	The home page is larger than 350 kb	0
		The home page is between 300 and 350 kb	1
		The home page is between 250 and 300 kb	2
		The home page is less than 250 kb	3

Source: www.norge.no/kvalitet

Compared to the use of standardised and objective quality criteria in the evaluation process, we clearly see a gap between the assessment of a high-quality website and the quality of feedback for improvement. In addition, these comments from the jury are far more subjective and related to the use of new technologies than what is covered in the quality criteria, e.g., the opportunities in Web 2.0 and user-generated content are seen as important quality aspects. With respect to

heuristic evaluations, in particular, and usability evaluations, in general, an 'evaluator effect' has been reported in the usability literature (Hertzum and Jacobsen 2001). The 'evaluator effect' refers to the empirical finding that different usability experts, serving as usability evaluators, typically identify different sets of usability problems with a given system. Since the website quality standards and metrics are developed and implemented by the government, we speculate 'evaluator effects' both at the level of individual evaluators of public websites and at the national governmental level (between Denmark and Norway in the context of this study).

In order to investigate the extent to which website quality impacts user satisfaction, we used the results from the evaluation process in Denmark in 2009. In the award Bedst på Nettet, as mentioned earlier, user satisfaction measured through an online survey was one of three evaluation methods. During the evaluation process, an online questionnaire was published on the organisation's website. While the results from the survey cannot shed light on why and how users answered as they did, the results do provide indicators about the strengths and weaknesses of the website. Certainly, the results are important in order to get an impression of how users experienced the website and to what extent they were satisfied with the website and/or services presented.

Since public websites are intended to serve all citizens and businesses, the results from this online survey are also interesting in the way that they include the users. By comparing the score from the survey with the score given in the screening test, we intend to investigate to what extent there is a correlation between website quality and user satisfaction. Regarding the website quality and its impact on user satisfaction, Table 4 summarises the scores for the 296 selected website (organisations). The scores in this table represent the lowest score and the highest

score received in the screening test as well as the lowest and highest scores received in the user satisfaction survey. The results show that the average score from the screening test is 77.14, while the average score from the user satisfaction survey is 68.11. Although it is distinctly between the extremes in terms of how the website scores (and the average score on user satisfaction is lower compared to the screening test), the data show that there is a large spread and variance in the quality of the websites evaluated. Figure 1 presents Box-and-Whisker plots of the two variables.

Table 4. Descriptive statistics for screening and user satisfaction.

	N	Range	Minimum	Maximum	Mean	SE	SD
Screening	296	75	25	100	77.14	0.861	14.813
User satisfaction	296	49	46	96	68.11	0.368	6.329

An inspection of Figure 1 shows the positive bias in the user satisfaction score (possibly due to the Likert items' construction of starting with positive and ending with the negative).

Figure 1. Box and Whisker plots of screening and user satisfaction variables.
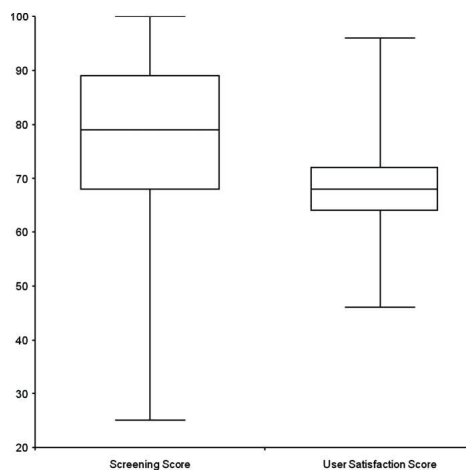
Regarding website quality and its impact on user satisfaction, Table 5 shows the score on user satisfaction among the seven winners of various prize categories in 2009. As seen in Table 5, the average user satisfaction score is 72.8 among the seven winners, and varies between a score on 63.05 and 91.41.

Table 5. Scores for the seven winners in each of the prize categories.

Website/winner	Screening score	User satisfaction score
Danish Enterprise and Construction Authority	96.47	63.05

(www.ebst.dk)

Gentofte Municipality (www.gentofte.dk)	89.01	69.00
Engineering College of Aarhus (www.iha.dk)	85.19	76.14
The Working Environment Information Centre (www.arbejdsmiljoviden.dk)	88.52	72.94
Stevns Library (www.bibliotek.stevns.dk)	90.59	91.41
Hillerød Hospital (www.hillerodhospital.dk)	91.01	68.35
ATP Pension Fund (www.atp.dk)	69.05	69.01

Source: www.bedstpaanettet.dk

Further, we investigated the correlations between the results from the screening test and the user satisfaction online survey. We performed a Pearson test and found that the correlation coefficient is 70.178, which is statistically significant, suggesting that there is a small negative correlation (Cohen 1988) between the level of website quality and user satisfaction. The results indicate a low statistical correlation between the results from the quality assessment process, where the website quality is assessed by experts and based on standardised and objective

quality criteria, and user satisfaction measured through an online questionnaire as seen from actual users' point of view.

5. Discussion

With a special emphasis on HCI, the purpose of this study has been to draw attention to the evaluation of website quality in an eGovernment web award context, and the relationship between website quality and user satisfaction. The use of quality criteria in Scandinavian web awards is highly technical and, at best, the criteria can be used to improve trivial usability problems. Compared to traditional usability testing, where the aim is to understand users and how they interact with websites, the users seem to be ignored in the evaluation process of public website quality. We argue that the evaluation based on the present quality criteria and use of heuristic usability methods only provides a limited understanding of how the users perceive, interact with and experience public websites.

The current evaluation process does not focus on user perceptions and experiences with public information and services, and is not conducted with representative settings of actual use with representative tasks and representative stakeholder groups. In addition, we found no positive correlation between website quality assessed by experts in an eGovernment web award context and user satisfaction seen from a user's point of view. Since the main aim of these web awards is to contribute to website quality improvements in the public sector (and the awards have been in effect since 2001), the results from the 2009 survey are surprising. One reason for the remarkable results may be the high use of technical quality criteria in the evaluation process, and an exclusion of actual use and users.

There is common agreement of the importance of satisfying users (McCracken and Wolfe 2004, Cato 2001, Sharp et al. 2007, Bevan 1995) and the quality of a website presentation being assessed by using various methods (Sharp et al. 2007). Providing high-quality websites in the public sector in Norway and Denmark is the stated aim and goal of the government, based on impacts and values that can be created for the citizens, businesses and public organisations. Public websites are intended to serve all users, with various needs and requirements. In a modern digital community where much public information and many services are available online, the government needs to ensure that all users have the same access. Annual quality assessment of public websites in Norway and Denmark back up this initiative, and focus on quality aspects that are not always a part of the development process but are nevertheless important, seen from a government perspective.

Visual aspects, other design issues and the content of the website are more or less left out in the evaluation process. Traditional usability testing, where the users are asked to accomplish tasks and evaluate a website from a subjective user's point of view, is ignored in the current web award context, as are also the users' experiences when interacting with a website, and how well users can learn and use a website in order to achieve their goals. One reason may be that usability testing is time-consuming and expensive when faced with the common public sector organisational reality of limited amount of resources. However, the feedback obtained from the evaluation process is intended to serve as inspiration for further improvements, albeit the type of feedback is very technical. This means that most of the improvements based on the feedback from the evaluation process require far more effort from a typical webmaster and are thus likely to incur higher costs. As such, it is not always clear what, if any, will be the resulting usability benefits.

In the area of HCI, involving the website users in both the design and evaluation processes is essential, and user needs and requirements need to be fulfilled (Sharp et al. 2007). Public websites have a large and non-homogeneous target group, and meeting the needs and expectations of diverse target groups could be demanding and challenging. Consequently, listening to users' voices, their requirements and needs, is probably more critical than ever. Public websites make ever more information available on the Web, and the number of electronic government services is increasing in most countries. Thus, it is likely that public attention and user-centred design need to be focussed on, and require user feedback and involvement in order to understand what is seen as a usable and good website from their point of view.

The use of quality criteria reported in this study is, to some extent, similar to those used in traditional usability testing, where the aim is to identify usability problems. However, the differences lie in the overload of criteria related to accessibility of the website, and can be explained – from a government perspective – that satisfying people with special needs and requirements is highly important (Pasinetti 2009). Moreover, the use of methods in these awards excludes the real users of public websites and the extent to which they are satisfied or not. The time needed to complete a task, the number of errors made, etc., are left out of the evaluation process, and actual use is therefore ignored.

The usefulness of the feedback provided by the government may certainly vary, but one hypothesis is that the feedback provided by the current practice of website quality awards can, at best, be used to improve trivial technical errors, rather than successfully deal with aspects related to design issues, subjective feelings and the interaction between user and computer. The reason why people return to a website

is content-dependent (Nielsen 1993), and in an award context, content is measured by the extent to which the website presents contact information as well as information about the organisation. The quality of writing, use of pictures and the relevance of the actual content are more or less absent. In prior research (Wangpipatwong et al. 2009, Wang and Liao 2008) and traditional usability testing, information quality is measured by how users actually experience the quality level of information presented.

This study also shows a gap between the results from the evaluation process and user satisfaction seen from citizens' point of view. Even if the users seem to be the main reason for this quality assessment of public websites, they are left out in the actual evaluation process in Norway and are replaced by experts. The implications are that real users are ignored, and the level of website quality is not measured from a typical user's perspective. In order to improve the quality as well as provide feedback for further website development, the user's opinion is decisive (Cato 2001, McCracken and Wolfe 2004).

We offer two substantial interpretations of the negative but weak Pearson correlation observed between website quality and user satisfaction. Assuming that the website quality criteria were robust, rigorous, reliable and valid, and further assuming that the online user satisfaction survey targeted the representative user segments yielding valid and reliable scores, we interpret the negative correlation between website quality and user satisfaction as an instantiation of the 'preference vs. performance paradox' (Vatrapu et al. 2008). The preference versus performance paradox has been observed in HCI (Bailey 1993, Nielsen and Levy 1994), as well as in other domains such as Computer Supported Collaborative Learning (CSCL) (Prins et al. 2005, Khandaker et al. 2006) and e-learning

(Picciano 2002). The 'preference vs. performance paradox' points to the empirical finding that high levels of user performance are in some instances accompanied by low user satisfaction scores. If this is indeed a substantial case for the significant but weak negative statistical correlation observed, then it points to our earlier observation that website quality criteria used were almost always technical in nature at the expense of aesthetic design and other user experience criteria. It also points to our other observation that website content itself was not the primary focus of the website quality criteria.

An alternate interpretation of the findings is that the user satisfaction survey might be methodologically flawed in the sense that not all representative user segments were targeted and/or only those segments of the user populations with negative experiences volunteered for the survey. While we cannot discount this alternate explanation completely, given the data and the circumstances of how the website quality criteria were designed and applied, in our opinion, the first interpretation of 'performance vs. preference paradox' is a more plausible explanation of the observed empirical results.

6. Conclusion and direction for further research

The findings in this paper (website users are not more satisfied with high-quality websites compared to low-quality websites) bring up a range of unexplored set of issues that we urge other researchers to help investigate. In order to get a more comprehensive assessment process, other types of testing (evaluation) could also be considered in the coming years, and we believe this might have great potential. A highly relevant discussion is to what extent there is a mismatch between the use of criteria and what the users expect of a public website. The use of quality criteria

differs from traditional usability testing grounded in the HCI literature, as well as the use of usability evaluation methods; thus, in order to develop websites that users find efficient, effective and satisfying, the intention of national ranking of websites in this context is a subject of discussion. Since typical user tasks are excluded, in addition to commonly used design principles, the level of website quality is challenging to measure, let alone rank-ordered for awards.

Based on our findings, we present three recommendations that could form the basis for further research on the measurement of website quality:

(1) Include real users in the evaluation process in addition to standardised and objective measures. Traditional usability testing could pro-vide added value and insights to the public website assessment process. By including real users, such as citizens and businesses in the evaluations, the gap between website quality and user satisfaction could be minimised, and we could increase our understanding of the impacts of website quality improvements.

(2) The presence of a weak negative correlation between website quality and user satisfaction calls for a focus on quality improvements and further implementation of public information and services. In addition to the use of quality criteria and evaluation methods, the users' interests and needs are to be considered in acquiring knowledge about their requirements and expectations. As there are various user groups with different needs, a further under-standing of the users' interests may contribute to improved website quality and increased user satisfaction.

(3) We call for additional research and discussions regarding measurement of website quality in an eGovernment context, the level and use of public

information and services, user expectations and the impacts of website quality improvements on user satisfaction.

Our proposed future work includes a rigorous usability evaluation of the public websites using representative users and representative tasks, as well as a diversity of usability assessment methods such as usability testing, cognitive walk-throughs, cultural probes and so on. Further, many erstwhile homogenous societies are transforming into heterogeneous societies on ethnic, cultural and linguistic dimensions. Given cross-cultural differences in HCI and usability (Vatrapu and Pérez-Quiñones 2006, Vatrapu and Suthers 2010), a more culturally sensitive public website usability evaluation process is needed.

References

Bailey, R.W., 1993. Performance vs. preference. Human Factors and Ergonomics Society Annual Meeting Proceed-ings, 5, 282–286.

Bevan, N., 1995. Measuring usability as quality of use. Software Quality Journal, 4, 115–150.

Cato, J., 2001. User-centered web design. London: Pearson Education Limited.

Cohen, J., 1988. Statistical power analysis for the behavioral sciences. Hillsdale, NJ: Erlbaum.

Følstad, A., Jørgensen, H.D., and Krogstie, J., 2004. User Involvement in eGovernment Development Projects. In: NordiCHI 2004, Tampere, Finland. New York: ACM, 217–224.

Heim, S., 2007. The resonant interface: HCI foundations for interaction design. London: Pearson Education, Inc.

Hertzum, M. and Jacobsen, N.E., 2001. The evaluator effect: a chilling fact about usability evaluation methods. International Journal of Human-Computer Interaction, 13, 421–443.

Hwang, W. and Salvendy, G., 2009. Integration of usability evaluation studies via a novel meta-analytic approach: what are significant attributes for effective evaluation? International Journal of Human-Computer Interaction, 25, 282–306.

Høegh, R.T. and Jensen, J.J., 2008. Case study: integrating usability activities in a software development process. Behaviour & Information Technology, 27, 301–306.

ISO, 1998. ISO 9241-11 – Ergonomic requirements for office work with visual display terminals (VDTs) – Part 11: Guidance on usability. Geneva: ISO.

Kellar, M., et al., 2008. Challenges of capturing natural web-based user behaviors. International Journal of Human-Computer Interaction, 24, 385–409.

Khandaker, N., Soh, L.K., and Jiang, H., 2006. Student learning and team formation in a structured CSCL environment. In: R. Mizoguchi, P. Dillenbourg and Z. Zhu, eds. Proceedings of the 2006 conference on learning by effective utilization of technologies: facilitating inter-cultural understanding.

Leporini, B. and Paterno`, F., 2008. Applying web usability criteria for vision-impaired users: does it really improve task performance? International Journal of Human-Computer Interaction, 24, 17–47.

Lindgaard, G., et al., 2006. Attention web designers: you have 50 milliseconds to make a good first impression!. Behaviour & Information Technology, 25, 115–126.

McCracken, D.D. and Wolfe, R.J., 2004. User-centered website development: a human-computer interaction ap-proach, New Jersey: Pearson Prentice Hall Inc.

Meyer, M.A., 2005. eNorway 2009 – the digital leap [online]. Available from: http://www.regjeringen.no/upload/FAD/ Vedlegg/IKT-politikk/eNorway_2009.pdf [Accessed 10 February 2010].

Nielsen, J., 1993. Usability engineering. Boston, MA: Academic Press.

Nielsen, J. and Levy, J., 1994. Measuring usability: preference vs. performance. Communications of the ACM, 37, 66–75.

Nørgaard, M. and Hornbæk, K., 2009. Exploring the value of usability feedback formats. International Journal of Human-Computer Interaction, 25, 49–74.

Pasinetti, C., 2009. Accessibility, usability, and functionality in T-government Services. In: M. Pagani, ed. Encyclope-dia of multimedia technology and networking. 2nd ed. Pennsylvania: IPG Idea Publishing Group Inc.

Picciano, A.G., 2002. Beyond student perceptions: issues of interaction, presence, and performance in an online course. Journal of Asynchronous Learning Networks, 6, 21–40.

Prins, F.J., et al., 2005. Formative peer assessment in a CSCL environment: a case study. Assessment & Evaluation in Higher Education, 30, 417–444.

Shackel, B., 1991. Usability – context, framework, definition, design and evaluation. Cambridge: Cambridge University Press.

Sharp, H., Rogers, Y., and Preece, J., 2007. Interaction design: beyond human-computer interaction. New York: Wiley.

Snaprud, M. and Sawicka, A., 2007. Large scale web accessibility evaluation – a European perspective. In: C. Stephanidis, ed. Universal access in human–computer interaction: applications and services. Lecture notes in computer science. Berline/Heidelberg: Springer, 150–159.

Vatrapu, R. and Pérez-Quiñones, M., 2006. Culture and usability evaluation: the effects of culture in structured interviews. Journal of Usability Studies, 1, 156–170.

Vatrapu, R. and Suthers, D., 2010. Intra- and inter-cultural usability in computer supported collaboration. Journal of Usability Studies, 5, 172–197.

Vatrapu, R., Suthers, D., and Medina, R., 2008. Usability, sociability, and learnability: a CSCL design evaluation framework. Proceedings of the 16th international con-ference on computers in education (ICCE 2008). Avail-able from: http://www.apsce.net/ICCE2008/papers/ ICCE2008-paper242.pdf (Accessed 24 October 2010).

Wang, Y.-S. and Liao, Y.-W., 2008. Assessing eGovernment systems success: a validation of the DeLone and McLean model of information systems success. Government Information Quarterly, 25, 713–733.

Wangpipatwong, S., Chutimaskul, W., and Papasratorn, B., 2009. Quality enchancing the continued use of e-government web sites: evidence from e-citizens of Thailand. International Journal of Electronic Government Research, 5, 19–35.

Zhang, P.I., et al., 2005. Human-computer interaction research in the MIS discipline. Communications of the Association for Information Systems, 9, 334–355.

APPENDIX C: PAPER 3

Dressed for Success?

Perception of Website Quality Among Webmasters in Government Bodies

Author: Hanne Sørum

Abstract

The central governments in Scandinavia aim to be world-leading on the Web. In this regard, the quality level of public websites is essential. The contribution of this paper is to identify perception of website quality within government bodies. Findings from an online survey questionnaire (N=519) conducted among webmasters in Norway and Denmark are provided. The results show that the level of website quality is perceived to be high with regards to content quality, trust in information and services, as well as security in use. More attention should be paid to issues concerning usability, accessibility, website integration and use of updated technologies. Regarding, service quality we find that public sector is helpful, strives to provide short response time and have empathy towards website users. The findings also reveal that webmasters in Denmark find the quality of public websites to be higher compared to that of Norwegian webmasters.

Dressed for Success?

Perception of Website Quality Among Webmasters in Government Bodies

1. Introduction

Many organizations spend considerable time and effort in offering high quality websites. In this regard, we find that government bodies are no exception - rather the opposite in many cases. Enormous investments from governments across the world have been made in relation to design, implementation and management of information systems in public organizations in order to facilitate online interaction with citizens and businesses (Andersen, Medaglia et al. 2011). We also witness that traditional face-to-face interaction has, in many cases, been replaced by computer interaction and online communication. In the coming years, this trend will only increase (Accenture 2007; Departementene 2012; EuropeanUnion 2012). We also find that the governments face many challenges, but also windows of opportunities for new ways of interacting with citizens and businesses. Therefore, we need to ensure user satisfaction and key factors for success in use of information systems in government is ease of use and usefulness (Gil-Garcia and Pardo 2005).

In this regard, a high quality level of public websites is essential. Accepting that almost all households in Scandinavian countries have Internet access and that much of the information flow within the public sector goes through the Web, perception of website quality is an area of special interest. In 2011, 90% of

households and 98% of enterprises in Denmark had Internet access (EuropeanUnion 2012). In 2010, the figures of citizens in Denmark using the Web for interaction with public authorities were reported as: 68.2% for obtaining information, 38.8% for downloading forms and 49.6% for returning filled-out forms (EuropeanUnion 2012). Due to the increased use of the Web for transactions and interaction during the last decade, there has been pressure from the central government to increase the quality level of websites. We also witness that the public sector, to a large extent, has a monopoly on information and services provided, and thus issues concerning usability and great user experiences is of particular importance.

Despite the fact that Scandinavian countries are ranked highly in international benchmarking studies, and aim to be world- leading on the Web, in terms of technical standards, innovation, citizen-centered focus and in offering high quality systems, prior studies conclude that eGovernment does pay off, but that public authorities profit more than the users (Capgemini 2004). However, we find that Scandinavian countries are examples of having high ambitions and strategies to achieve their goals in terms of offering a high level of information quality, system quality and service quality in websites. In August 2011 a new digitalization strategy was published in Denmark with the central aim that by 2015 digital self-services would be established as the most common way for citizens to interact with government (EuropeanUnion 2012), that is, citizens would use the Internet for applications and notification to the sector. Further, various services for citizens would also be launched, for instance, income tax, job searches, car registration, applications for building permission, statements to the police and enrolment in higher education/university (EuropeanUnion 2012).

The government in Norway states that digitalization will lead to a better and faster meeting for citizens and businesses with the public sector, and better use of resources within the public sector (Departementene 2012; EuropeanUnion 2012) . Regarding this, we find that efficiency and effectiveness in perceived as important, both from a user's (citizens and businesses) and organizational (government) perspective. Furthermore, the government wants everyone to have the opportunity of participating in the digital society. In order to facilitate participation, the central government intends to ensure that not only the services and information provided are accessible to all users, but also that digital services are focused on individual interests and needs (Ministry of Modernisation 2005). Special requirements must, therefore, be treated carefully and with respect, and we cannot overlook users with various forms of disability.

Regarding facilitation of website quality, webmasters play an important and central role in organizations. In earlier research, few studies have emphasized the webmaster's role and their perception of website quality, but have instead, put effort into focussing on users' requirements and needs in websites. However, the importance of the webmaster's role has been emphasized by other researchers by highlighting the webmaster as the one who has the highest influence on currently existing websites (Lazar, Dudley-Sponaugle et al. 2004). While other people in the organization may also have an opinion about the website, the webmaster (or a person in a similar position) usually has the most accountability for, and the most knowledge about, the website.

Webmasters can be seen as being more than purely web designers or purely user representatives. They are in charge of everyday design issues and technical features, thus holding the main responsibility for ensuring that the website meets

users' expectations and needs. The contribution of this paper is related to the importance of listening to the webmaster's voice in website quality. Regarding website quality improvements, they are key contributors in prioritizing and allocation of resources. Their perception of the website quality will, therefore, play a central role. In order to investigate the quality in public websites from a webmaster's point of view, the following research question is addressed in this paper:

- *What is the webmaster's perception of website quality within government bodies?*

The data reported in this paper are from an online survey conducted in the public sector in Norway and Denmark in December 2010. The purpose of the survey in its entirety was to examine a webmaster's perception of website success, measured by website quality, user satisfaction, net benefits and the extent of user involvement in website quality improvements. In this paper, descriptive data regarding perception of website quality (information quality, system quality and service quality) is reported. The aim has not been to take an explanatory approach, but rather provide an overview of perception of quality.

The rest of this paper is structured as follows. In section 2, quality assessment in government is presented. Section 3 deals with methodology and in section 4, the findings are provided, followed by a discussion in section 5. Section 6 concludes the paper, pointing to further research.

2. Quality Assessment in Government

Scandinavian countries have many similarities in terms of a high level of education, Internet access among citizens and businesses, welfare, organizational structure, as well as political goals and strategies. Norway and Denmark could appear as a homogeneous country, with a total population of about 10 million people (Norway 5 million; Denmark 5.6 million). Geographically speaking, there are major differences between the countries. Denmark is the smallest and southernmost of the Nordic countries, but has the highest population density. Norway has a larger area and a more scattered population. We also see that the local structure is different (Norway has 429 municipalities; Denmark 98), and state control is organized in different ways, although the standard of living, unemployment, access to social benefits and welfare is very comparable.

Digitization in the public sector has been challenging, and new ways of communication and interaction with users require considerable resources of organizations. The governments in Denmark and Norway aims to be in the forefront internationally in delivering digital public services to citizens and businesses, thus making dealing with the public less time consuming and making the public sector more efficient (Departementene 2012; EuropeanUnion 2012). Facilitation for high quality interactions and great user experiences on the Web is therefore important, and in many cases a prerequisite for success.

In order to facilitate and present websites that maintain a high level of quality, we find that governments are putting considerable pressure on public organizations. Moreover, in the public sector central guidelines for quality indicators in websites have been launched, and hundreds of websites are evaluated annually and ranked

by quality. According to the quality assessment in Norway (done by The Agency for Public Management and eGovernment), the definition of website quality emphasizes public information and online services meeting a predefined standard or level of quality that fulfils central user requirements and needs (Ølnes 2007). Early quality ranking of public websites in Norway and Denmark has its roots in 2001, and such evaluations still serve as great inspiration for quality improvements in many organizations. According to Esteves and Joseph (2008), the implications of web awards highlight the importance of standards and measurable aspects for quality assessment of websites when investigating success and failure in website development and quality improvements.

In Norway, assessment of website quality is based on a standardized criteria set. The evaluators typically are experts (e.g., usability specialists or consultants) with objective evaluation criteria. The quality criteria can be divided into three main quality aspects of a website: accessibility of the website, user adoption and website content. In Denmark the criteria set is related to website aspects such as navigation, digital self -services, openness and usefulness. There are many similarities in the quality assessment conducted, but there still are some differences. In Denmark, the participants are also asked to evaluate their own performance regarding the business case and usefulness of the website. In addition, through an online user satisfaction survey, where the questions cover the general impression of the website, real users have an opportunity to evaluate the website from their subjective point of view. (As of 2012, Norway is considering extending the evaluation process to almost the same extent as that of Denmark).

The target groups of public websites often appear to be fuzzy and non-homogeneous, but can generally be seen as: the government, the users (citizens

and businesses) and/or the public organization itself (the service provider). In government bodies, eGovernment maturity models have been discussed and refined through time, aimed at classifying the degree of successful information systems adoption in Government (Andersen and Henriksen 2006). Tan et al. (2008) found that quality matters in building user (citizen) trust towards public electronic services. In order to apply a citizen-centered approach, user involvement in development projects and quality improvements in websites is one such action (Følstad, Jørgensen et al. 2004). Through this, the organization ensures that the users' interests are taken care of in the best possible way. By delivering online services in a citizen- centered rather than government-centric way, the public sector aims to create a better connection and improved trust with its citizens (Accenture 2007).

The use of information systems (such as websites) has become a central part of interactions between the public sector and citizens (Panagiotopoulos, Al-Debei et al. 2012), and more attention has been given to research within user-centered issues (Choudrie, Wisal et al. 2009). Every study assessing website quality that Kim and Stoel (2004) located provided some empirical evidence that website quality is a multidimensional construct. There is no unambiguous and clear definition of website quality; rather, there are many and various definitions that aim to define the term. In order to evaluate the quality of websites, Barnes and Vidgen (2005) developed the eQual approach. This instrument is divided into five main categories: website design, information, trust, empathy and usability, and finally, measurement of how total quality level is perceived from a user's point of view. To examine the usability issues of developing countries eGovernment websites, Choudrie et al. (2009) investigated quality aspects such as navigation, search engine, text, layout and help features. Many of the same measures can be

applied to websites within highly developed countries, in the sense that public websites intend to serve a wide target group with various skills and experience regarding website usage.

Usability is an important subject in website quality and can be defined as "the effectiveness, efficiency and satisfaction with which specified users achieve specified goals in particular environments" (ISO 1998). Website usability also refers to the ease of website usage during first time use, and how user friendly the system actually is (Baker 2009). There is also general agreement that usability can provide benefits by producing increased efficiency, reduced support and more satisfied users (Benbunan-Fich 2001; Rogers, Sharp et al. 2011); however, we need to be aware that usability in eGovernment varies between countries and needs to be evaluated in cultural contexts (Clemmensen and Katre 2012). Focussing on the users' needs and requirements is therefore perceived as being critical (Verdegem and Verleye 2009).

De Wulf et al. (2006) developed and validated a process model of website success by identifying the role of pleasure among website users. This concerns more the total user experience through use. Website evaluations (by focussing on content, organization and technology) were posited by the authors as affecting satisfaction, commitment and trust in the service provider. Pleasure was introduced as a variable mediating the relationship between website evaluation and website success. Moreover, van Iwaarden et al. (2004) identified the quality aspects that were perceived to be the most important for users in the use of websites, indicating that fast access, easy navigation on the website, a complete overview of the order before final purchase decision and a simple registration process were important to keep in mind. Although this study concerned the service sector, many of the same

aspects appear to be applicable to other business domains, such as the public sector.

In order to ensure participation in a digital society and provide high quality websites, accessibility requirements is also perceived as being important in government bodies (Lazar, Dudley -Sponaugle et al. 2004; Snaprud and Sawicka 2007; Ølnes 2007; Pasinetti 2009). To increase the level of accessibility in the public sector, Kuzma (2010) provided a higher level of awareness and methods that web designers can apply. In government documents and strategies we also find that issues concerning accessibility have a high priority (Ministry of Modernisation 2005; Departementene 2012; EuropeanUnion 2012) and are given much attention.

3. Method

In order to tackle website quality in this paper, we used the IS success model from DeLone and McLean (2003) as a framework to identify important quality aspects. The original DeLone and McLean IS success model published in 1992 provided a comprehensive model for measuring IS success as a result of the performance of information systems. Information quality covers the content issue, system quality covers the desired characteristics of a website/system, and service quality covers the quality delivered by the service provider. The DeLone and McLean IS success model contains concepts of success that are perceived as being important in the field of information systems research, and the model has been widely tested and cited in prior research contributions, e.g., (Jennex, Olfman et al. 1998; Almutairi and Subramanian 2005; Kulkarni, Ravindran et al. 2006; Wu and Wang 2006; Wang and Liao 2008; Scott, DeLone et al. 2009).

3.1 Data Collection

The sample of websites included in this study were from all levels of government in Norway and Denmark, such as local, central, county, directorates and other public enterprises that had all been part of the annual assessment of public websites. A link to the questionnaire was sent by email to the respondents, along with a letter of introduction that was aimed at giving the respondents information regarding the purpose of the research study before they answered any of the questions. Email addresses of the respondents were collected manually by visiting each website. The survey was distributed (N=1237) in the middle of November 2010 and was closed in December 2010. Two weeks after the respondents received the afore-mentioned email informing them of the purpose of the study, and giving the web link to the online questionnaire, a reminder email was sent to all respondents. Those who had already participated were thanked for their participation, and those who had not answered the questionnaire were encouraged to complete the survey within a week.

After four weeks the survey was closed, with 541 useful responses in total for both countries, representing a response rate of 44%. In Norway, 290 questionnaires were found to be useful in the analysis accomplished in this study, while from the Danish dataset, 229 questionnaires were found to be useful (N=519). The 22 respondents that did not provide any background information were excluded from the analysis in this paper, since we are investigating impacts of webmaster preferences in relation to perception of quality. In the public sector it is not legal to use economic incentives, and therefore the incentives used in this study comprised a summary report of the results from the survey. The report was mailed to the respondents in the Spring of 2011.

3.2 Survey Questionnaire Design

As mentioned, the IS success model from DeLone and McLean (2003) was used as a framework for studying website quality. Each construct/variable was operationalized with a set of questions to be answered by the webmasters in the online survey questionnaire conducted. Website quality concerns information quality, system quality and service quality. The three quality aspects and dimensions identified in the model were operationalized into 22 questions (Table 1).

Website quality	Dimensions
Information quality	Updated information, current information, relevant information, clear and understandable information, trustable information, adapted information and information at the right level of detail
System quality	Ease to use, intuitive and clear menu structure, appropriate visual, design, download time, accessibility requirements, secure use, integration with internal systems (applications), integration with external systems (applications), use of updated technology
Service quality	Helpful in solving users' problems, short response time for general inquiries, short response time to users with specific problems, , service that meets users' expectations, empathy for users and trust in services

Table 1. Website quality in this study adopted from DeLone and McLean (2003).

The respondents to the survey questionnaire were exposed to a Likert-type scale with Likert items, with the following alternative degrees to each of the questions: very low, low, medium, high and very high. Accordingly, the measurement scale (presented in the questionnaire) on perceived website quality varies from 1–5, with 5 being the highest (1=very low extent, 2=low extent, 3=middle, 4=high extent and 5=very high extent). 'Not relevant' was also included as an alternative answer along with the main scale. Examples of questions asked are: *To what extent do you perceive that the website presents updated information to the users?* (Information quality), *To what extent do you perceive that the website has an intuitive and clear menu structure?* (System quality) and, *To what extent do you perceive that the organization has empathy towards the users?* (Service quality). In addition, the respondents were given the opportunity to write their own comments in an open text field, in order to deepen understanding and supplement information. The survey questionnaire was developed and electronically distributed to the respondents by using an online survey tool.

To ensure readability and accessibility, neutral colors and an appropriate font/size easy to read on the Web (screen) were chosen. A progress bar was also implemented in the survey questionnaire to inform the respondents at any time of the percentage of the remaining survey.

Two pilot tests were conducted in order to ensure readability and to enhance the design of the questions, in addition to the use of measurement scales. The first was distributed to the finalists in the European eGovernment Award in November 2009. In the second round of improvements, three experienced webmasters (one from Norway and two from Denmark) provided valuable qualitative feedback during face-to-face meetings.

3.3 Respondents' Profile

Findings show that a majority of respondents had been employed in their current position for five years or more. We therefore assumed that they knew their organization well and should have good insight into various services and information offered to users. Further, the majority of the respondents were in the 36–55 age group. There were few or no webmasters younger than 25 or older than 65 years old. Within the public sector in Scandinavia, we observe that employees in general are employed for long periods, with many possibly changing positions within the organization. The findings also indicated that webmasters were relatively evenly distributed in relation to gender, despite the fact that in both countries there was a slight preponderance of women in this position.

In addition to gender and age, the respondents were asked about their level and type of education. In Norway, the findings revealed the following: No higher education, 16 people; Professional certification/training, 30; Bachelor's degree or equivalent, 168; Master's degree, equivalent or higher, 76; however in Denmark: No higher education, 6; Professional certification/training, 25; Bachelor's degree or equivalent, 48; Master's degree, equivalent or higher, 150.

In general, we see that webmasters in Denmark had a higher educational level than did those in Norway. Regarding the type of education among the respondents, 171 of the respondents in Norway had education related to information and communication, and 72 in IT and web technology. The results in Denmark showed that 172 had education in information and communication and 82 in IT and web technology. Some of the respondents were educated in both areas.

3.4 Data Analysis

The first step in the analysis process was to transport the data from the online survey tool to Microsoft Excel. In Excel, the data were coded and prepared for statistical techniques in SPSS (Statistical Package for the Social Sciences). Standard techniques were used to get an overall impression of the data and to check for normality in the data set. Since the aim of this paper is to provide an overview of the data collected through the online survey questionnaire, in this paper we present descriptive data analysis, rather than taking an explanatory approach. We do not aim to explore any correlations or relationships among the variables, but we provide an overview of perception of website quality from a webmaster perspective within government bodies. Accordingly, this paper presents primary descriptive analysis by reporting mean scores and standard deviation for each of the success items presented in the questionnaire. In addition, a one-way between-groups analysis of variance was conducted to explore the impacts of webmaster preferences (country, gender and age) on perception of website quality, as measured by the Life Orientation test (LOT). The aim of these analyses was to investigate whether any preferences (characteristics) of the respondents had any significant impact on perception of website quality.

4. Findings

Drawing on findings from the online survey questionnaire (N=519) conducted among public sector employees in Norway and Denmark, this study investigates perception of website quality from a webmaster's point of view. In order to give a brief overview of perception of quality, Figure 1 shows the spread of the mean score for each of the three quality dimensions concerning information quality, system quality and service quality. Information quality covers the content issue,

system quality covers the desired characteristics of a website/system, and service quality covers the quality delivered by the service provider.
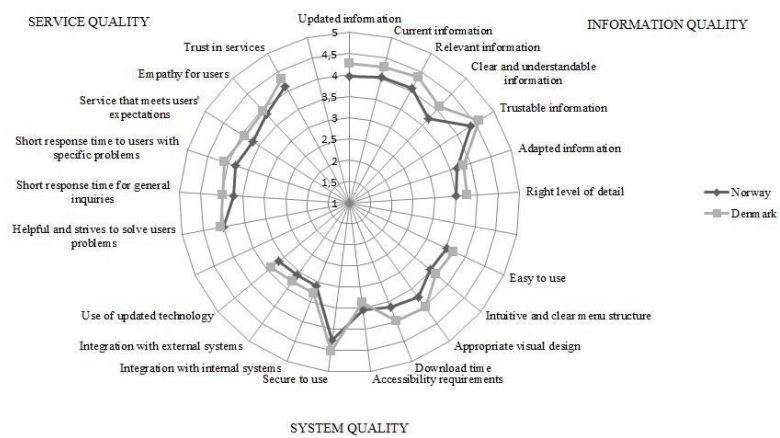
Figure 1. Perception of website quality in public websites

The first interpretation of the findings shows that there is a variation in how the different dimensions of website quality score in most of the three quality aspects measured. In addition, the results indicate that the public sector generally perceives that websites within government bodies hold a relatively high level of quality with regards to information quality, system quality and service quality. The measurements scale on perception of website quality varied from 1–5, with 5 being the highest and 1 being the lowest. Regardless of which variables were investigated, we find that the scores are above the middle (which is 3) and in the top view. The pattern also reveals that webmasters in Denmark find the quality of public websites to be higher compared to that of Norwegian webmasters. Consequently, the website quality in Denmark is perceived to be greater than in

Norway. Regarding information quality, we find that trustable information scores high in both countries and is related to the extent to which users can rely on the information presented. In addition, the webmasters find themselves presenting updated, current and relevant information to the users. Furthermore, in both countries we find that adapted information to the users' needs and levels of details in the information presented are found to be weaker. The pattern also reveals that, in general, quality dimensions regarding information (content) quality are perceived to be greater than aspects concerning system-and service quality, except from issues concerning trust and security.

Regarding system quality, the overall findings reveal that there are potential for improvements regarding issues concerning usability, accessibility, and use and integration of web technologies. However, the findings also show that public websites are perceived to be secure in use, which is important in relation to online transactions and handling of personal information. In public websites, accessibility requirements are also of particular importance in order to ensure that all participants (users) in the digital community have the same access to online information and services. It is thus surprising that the webmasters find that their websites do not perform higher regarding this issue. One implication may be that requirements regarding accessibility (WAI-principles) are largely dependent on the use of (website) technologies. In order to ensure efficiency and effectiveness in website usage, usefulness and ease of use are of high importance. In this study, issues concerning usability are measured by how easy the users can find information and services on the website and to what extent the menu structure are found to be intuitive and clear to the users. Regarding this, the findings show that there is room for improvement and more attention should be paid to this concern in development and quality improvements of websites.

Regarding service quality, we find that public sector deliver services that users can rely on. Trust is found to be important in order to facilitate for high quality interaction between government and citizens. Concerning service quality the findings also reveal that the organizations provide relatively short response time to users, with both specific questions and general inquiries. In addition, they are helpful and strive to solve the users' problem. The same holds for empathy and trust which is considered being important aspects in delivering service quality. When it comes to delivering quality associated with web services, it is important to meet users' needs and requirements. Findings also show that users' expectations are largely met.

Tables 2 to 4 (below) present the mean scores and standard deviation for each of the quality dimensions. In the questionnaire, 'not relevant' was included as an answer alternative for those respondents that did not find the quality dimension (question) relevant to their website. Therefore, N is not consequent and varying in assessment of each of the quality dimensions.

	Norway			Denmark		
Information quality	**N**	**Mean**	**Std.**	**N**	**Mean**	**Std.**
Updated information	290	3.9759	.78222	229	4.2751	.78267
Current information	290	4.0379	.70731	229	4.2926	.76400
Relevant information	290	4.0552	.68376	229	4.3712	.70540
Clear and understandable	290	3.7172	.69803	229	4.0786	.82872

	Norway			Denmark		
	N	Mean	Std.	N	Mean	Std.
Trustable information	289	4.3772	.62885	228	4.6009	.57357
Adapted information	290	3.6448	.76339	228	3.8202	.89941
Right level of detail	289	3.5017	.70279	228	3.7632	.82689

Table 2. Descriptive data on information quality.

Regarding information quality, we find that trustable information scores very high in the category of information quality, and there is no dimension of information quality that stands out as having a particularly low score. The scores on the dimensions related to information quality vary from 3.5017 to 4.3772 in Norway and from 3.7632 to 4.6009 in Denmark. The calculated standard deviation reported, which is an estimate of how scores are distributed away from the mean average, shows a relatively low spread of the data regarding information quality. We can also report that almost all respondents found the dimensions, concerning this aspect, to be relevant to their website. Table 3 (below) presents details regarding perception of system quality.

	Norway			Denmark		
System quality	**N**	**Mean**	**Std.**	**N**	**Mean**	**Std.**
Easy to use	290	3.5310	.74921	229	3.6943	.81273
Intuitive and clear menu structure	290	3.4655	.85680	228	3.6316	.87312
Appropriate visual design	290	3.7414	.79706	229	4.0306	.85014

Download time	290 3.6241	.97020	228 3.9781	.79339	
Accessibility requirements	290 3.5379	1.0751	227 3.3656	1.07804	
Secure to use	252 4.2540	.70780	197 4.5076	.70435	
Integration with internal systems	259 3.0965	1.00885	189 3.2857	1.12177	
Integration with external systems	262 3.1031	.96732	195 3.2769	1.02305	
Use of updated technology	289 3.1453	1.00329	229 3.3799	1.04283	

Table 3. Descriptive data on system quality.

The scores on the dimensions related to system quality vary from 3.0965 to 4.2540 in Norway and from 3.2769 to 4.5076 in Denmark, indicating that issues concerning usability and accessibility are surprisingly low - bearing in mind that these issues are areas that receive most attention in the public sector. In terms of system quality, secure use scores particularly highly. The scores on use of technologies and system integration show room for improvement, despite the fact that this is also considered to be important in eGovernment environments. According to the standard deviations reported, we do not find a large spread of the data. However, dimensions concerning security and system integration have a significantly lower number of respondents in both countries, and we can therefore conclude that these are not relevant to a larger number of public websites. In

general, the scores on system quality are low in both countries, compared to those on perception of information quality and service quality. Table 4 (below) presents details regarding perception of service quality.

		Norway			Denmark	
Service quality	N	Mean	Std.	N	Mean	Std.
Helpful and strives to solve users problems	284	4.0035	.74006	229	4.0786	.75098
Short response time for general inquiries	284	3.7148	.75167	229	3.9825	.71307
Short response time to users with specific problems	258	3.8217	.76854	229	4.0873	.78431
Service that meets users' expectations	287	3.6794	.67032	229	3.9214	.75098
Empathy for users	276	3.8514	.77438	229	3.9476	.76483
Trust in services	286	4.1224	.58854	229	4.3144	.63302

Table 4. Descriptive data on service quality.

The scores on the dimensions related to service quality vary from 3.7148 to 4.1224 in Norway and from 3.9214 to 4.3144 in Denmark. Regarding service quality, the findings show that the respondents consider their organization to be

service-minded, striving to provide a short response time and to deliver services that meet users' needs and expectations. The standard deviations reported are considered to be relatively low, and most of the respondents found the website quality dimensions in service quality to be relevant to their website.

Finally, a one-way between-groups analysis of variance was conducted to explore the impact of country, gender and age on perceived website quality (information quality, system quality and service quality), as measured by the Life Orientation test (LOT). Respondents were divided into different groups according to their preferences concerning: country (group 1: Denmark and group 2: Norway), gender (group 1: Female and group 2: Male) and age (group 1: 25 year or younger, group 2: 26–35 years, group 3: 36–45 years, group 4: 46–55 years, group 5: 56–65 years and group 6: more than 66 years).

The findings reveal that there is a significant difference between perception of information quality, system quality and service quality between webmasters in Norway and Denmark. Despite reaching statistical significance, the actual differences in mean scores between the groups (Norway and Denmark) were quite small. Regarding the preference differences between gender and age on website quality (information quality, system quality and service quality), and we cannot conclude any statistical significance between the groups.

5. Discussion

With the goal of shedding light on how the public sector perceives website quality, the overall objective in this paper is to examine perception of quality in websites within government bodies. The aim is to provide an overview of the data collected, by presenting descriptive data analysis, rather than taking an explanatory approach. We return now to the research question addressed: *What is*

the webmaster's perception of website quality within government bodies? In plans and strategies launched by the governments in Scandinavia, we find that all individuals shall have the same opportunity to participate in the digital society (Ministry of Modernisation 2005; Departementene 2012). In order to ensure participation, we thus need to take care of the users' needs and requirements (EuropeanUnion 2012) in information systems, such as websites. Although various initiatives are launched by governments (e.g., providing guidelines for quality improvements, yearly evaluation and ranking of websites), individual organizations have the main responsibility. This encourages allocation of resources, management support, and webmaster skills, etc.

In this regard, webmasters play a central role in organizations (Lazar, Dudley-Sponaugle et al. 2004). Generally, webmasters in government bodies are not only relatively equally distributed in gender, are relatively experienced but they are also well educated, both in terms of length and direction of education, even though webmasters in Denmark hold a higher level of education compared to Norwegian webmasters. Despite the fact that there are varying types of working tasks that a webmaster has - depending on the type of organization and the individual's knowledge and skills - the findings reveal that this position is filled by employees who have been employed for a long time. We can speculate whether this could have an impact on perception of website quality, but education, age and knowledge of the organization's role (in the society) are believed to have a significant effect in relation to facilitation for high quality information and services offered on the website.

Further, findings indicate that there is a statistically significant difference between perception of information quality, system quality and service quality between

webmasters in Norway and Denmark. We find that Denmark score higher than Norway. However, despite reaching statistical significance, the actual differences in mean scores between the groups (Norway and Denmark) were quite small. When it comes to the preference differences between the gender and age on perception of website quality (information quality, system quality and service quality), we cannot conclude any statistical significance between the groups. Taking into account that Norway and Denmark are relatively homogeneous countries, there are small differences between those who hold a position as webmaster within the public sector.

Website quality aspects concerning information quality, system quality and service quality are considered to be of particular importance (DeLone and McLean 2003; Scott, DeLone et al. 2009). An interpretation of the findings in this paper reveals that public organizations find their website quality to be, in general, relatively high, although we find room for improvement and can point to issues that need to be addressed. Regarding information quality, the organizations perceive that they present trustable information, closely followed by relevant information, current information and updated information. Trust and content quality in websites are also found to be of importance in prior research studies (Barnes and Vidgen 2005; Tan, Benbasat et al. 2008). The findings in this paper also reveal that perception of information quality is higher than that of system quality and service quality. As webmasters have the daily responsibility of updating and maintaining website content, we may speculate that information quality is what webmasters have most influence on, and therefore find most satisfying. The webmasters can easily, and with less effort, change and publish content, compared to changing design features, technical issues and accessibility requirements.

Regarding system quality, we find that webmasters perceive public websites to be secure in use. Security in online information and services is also found to be of high importance from a user's point of view (Accenture 2007), that is, it is important in order to ensure a trustable dialogue with the government through website interactions (Ministry of Modernisation 2005; EuropeanUnion 2012). Although we know that websites aim to stimulate efficiency and effectiveness (Departementene 2012), from both an organizational and a user's perspective, the findings indicate room for improvement in regards to system integration and accessibility requirements. In order to give all individuals an opportunity to participate in a digital society, and also to ensure user participation (Snaprud and Sawicka 2007; Pasinetti 2009; Kuzma 2010), this should be emphasized to a larger extent within the public sector.

Issues concerning usability in eGovernment websites are also found to be important (Gil-Garcia and Pardo 2005; Choudrie, Wisal et al. 2009; Kuzma 2010) in order create great user experiences and user satisfaction, and is highlighted as one of the main drivers in system success (DeLone and McLean 2003; van Iwaarden, van der Wiele et al. 2004; Choudrie, Wisal et al. 2009). Knowing users' requirements and needs is thus of particular importance (Verdegem and Verleye 2009; Rogers, Sharp et al. 2011). Guidelines to website quality launched by governments - aim to identify citizens' interests; however, through the use of quality criteria in annual evaluations and ranking of public websites, they are found to be highly technical. Real website users should also - even to a larger extent - be involved in the evaluation process in order to identify critical user problems. Involvement of traditional HCI (human-computer interaction) methods and criteria should be considered in yearly quality assessment of public websites, although these awards are identified by standardized and measureable targets

(Esteves and Joseph 2008) that organizations can use as guidelines for quality improvements.

We also find potential for improvements regarding website integration with other systems (internal/external applications), which may have an impact on efficiency and effectiveness, and the type of services provided on the Web, closely followed by the use of updated technology, which may also have an impact on the innovation factor and the facilitation for high quality interactions. The users today are even more demanding, requiring the government to provide high quality solutions, e.g., use of Web 2.0 technologies, customized information and services. Regarding service quality, we find that trust and helpfulness in services is important (Tan, Benbasat et al. 2008). In this relation, public organizations perceive themselves to be service -minded, with empathy towards users, and therefore ensure existing knowledge of the importance in building trust in public information and service. Feedback and response time is also an important dimension in perception of service quality, and is central in the digital communication between users and government bodies. Here, the public sector performs relatively high, striving to provide quality in services, through low response time and empathy towards users.

6. Conclusion

Drawing on the findings in this paper, we conclude that, in general, government bodies perceive themselves to be successful when emphasizing website quality aspects such as information quality, system quality and service quality. The user's requirements and needs are taken care of in quality improvements, although there is room for improvement, especially in relation usability issues, accessibility

requirements, use of technologies and website integration with other system (applications). Public websites perform very well in presentation of trustable online information, current information and relevant information, as well as secure digital services. In addition, the organizations are helpful and have empathy towards website users. We conclude that, in the coming years, there should be more awareness of real user involvement in quality assessment in order to satisfy ever more demanding website users. This is also important in order to address issues concerning usefulness and accessibility of public websites. For upcoming research contributions and practice, we suggest that at least three beneficial issues need to be addressed: (1) the role of user involvement and testing in website quality improvements, and impacts on website success within government bodies, (2) the use of website quality requirements launched by governments in order to facilitate high quality interactions and stimulate increased efficiency and effectiveness in websites and (3) the role of webmasters within the public sector, and perception of website quality versus actual user experiences.

References

Accenture (2007). Leadership in Customer Service: Delivering on the Promise, The Government Executive Series.

Almutairi, H. and Subramanian, G. H. (2005). "An Empirical Application of the DeLone and McLean Model in the Kuwaiti Private Sector." Journal of Computer Information Systems 45(3): 113-122.

Andersen, K. N., Medaglia, R., Vatrapu, R., Henriksen, H. Z. and Gauld, R. (2011) . "The forgotten promise of e -government maturity: Assessing

responsiveness in the digital public sector." Government Information Quarterly 28(4): 439-445.

Andersen, K. V. and Henriksen, H. Z. (2006). "EGovernment maturity models: Extension of the Layne and Lee model." Government Information Quarterly 23(2): 236-248.

Baker, D. L. (2009). "Advancing E-Government performance in the United States through enhanced usability benchmarks." Government Information Quarterly 26(1): 82-88.

Barnes, S. and Vidgen, R. (2005). Data triangulation in action: using comment analysis to refine web quality metrics. ECIS 2005 (13 th European Conference on Information Systems) Regensburg, Germany.

Benbunan-Fich, R. (2001) . "Using protocol analysis to evaluate the usability of a commercial web site." Information & Management 39: 151-163.

Capgemini. (2004). "Does e-Government Pay Off?" Retrieved 24.03, 2011, from http://www.eupan.eu (Accessed: 01.06.2012)

Choudrie, J., Wisal, J. and Ghinea, G. (2009). "Evaluating the usability of developing countries' e-government sites: a user perspective." Electronic Government, an International Journal 6(3): 265-281.

Clemmensen, T. and Katre, D. (2012). Adapting e-gov Usability Evaluation to Cultural Contexts. Usability in Government Systems, Elsevier Inc.

De Wulf, K., Schillewaert, N., Muylle, S. and Rangarajan, D. (2006). "The role of pleasure in web site success." Information & Management 43: 434-446.

DeLone, W. H. and McLean, E. R. (2003). "The DeLone and McLean Model of Information Systems Success: A Ten-Year Update." Journal of Management Information Systems 19(4): 9-30.

Departementene. (2012). "PÅ NETT MED INNBYGGERNE Regjeringens digitaliseringsprogram." from http://www.regjeringen.no/upload/FAD/Kampanje/DAN/Regjeringensdigitaliseri ngsprogram/ digit_prg.pdf (Accessed: 03.09.2012)

Esteves, J. and Joseph, R. C. (2008). "A comprehensive framework for the assessment of eGovernment projects." Government Information Quarterly 25(1): 118-132.

EuropeanUnion. (2012). "eGovernment in Denmark." from http://www.epractice.eu/files/eGovernmentDenmark.pdf (Accessed: 04.06.2012)

Følstad, A., Jørgensen, H. D. and Krogstie, J. (2004). User Involvement in eGovernment Development Projects. Proceedings of the third Nordic conference on Human-computer interaction (NordiCHI '04), Tampere, Finland.

Gil-Garcia, J. R. and Pardo, T. A. (2005). "E-government success factors: Mapping practical tools to theoretical foundations." Government Information Quarterly 22: 187-216.

ISO (1998). ISO 9241- 11 - Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 11: Guidance on usability, ISO.

Jennex, M., Olfman, L., Panthawi, P. and Park, Y.-T. (1998). An Organizational Memory Information Information Systems Success Model: An Extension of

DeLone and McLean's I/S Success Model Proceedings of the 31 st Hawaii International Conference on Systems Sciences Big Island, Hawaii.

Kim, S. and Stoel, L. (2004). "Dimensional hierarchy of retail website quality." Information & Management 41: 619-633.

Kulkarni, U. R., Ravindran, S. and Freeze, R. (2006). "A Knowledge Management Success Model: Theoretical Development and Empirical Validation " Journal of Management Information Systems 23(3): 309-347.

Kuzma, J. M. (2010). "Accessibility design issues with UK e-government sites." Government Information Quarterly 27(2): 141-146.

Lazar, J., Dudley-Sponaugle, A. and Greenidge, K.-D. (2004). "Improving web accessibility: a study of webmaster perceptions." Computers in Human Behavior 20(2): 269-288.

Ministry of Modernisation (2005) "eNorway 2009 - the digital leap". from http://www.regjeringen.no/upload/FAD/Vedlegg/IKT-politikk/eNorway_2009.pdf (Accessed: 10.09.2012)

Panagiotopoulos, P., Al -Debei, M. M., Fitzgerald, G. and Elliman, T. (2012). "A business model perspective for ICTs in public engagement." Government Information Quarterly 29(2): 192-202.

Pasinetti, C. (2009). Accessibility, Usability, and Functionality in T-government Services. Encyclopedia of Multimedia Technology and Networking 2nd Edition. M. Pagani. PA, USA, IPG Idea Publishing Group Inc.

Rogers, Y., Sharp, H. and Preece, J. (2011). Interaction Design: Beyond Human-Computer Interaction. New York, Wiley.

Scott, M., DeLone, W. and Golden, W. (2009). Understanding Net Benefits: A Citizen- Based Perspective on eGovernment Success. International Conference on Information Systems (ICIS). Phoenix.

Snaprud, M. and Sawicka, A. (2007). Large Scale Web Accessibility Evaluation – A European Perspective, Lecture Notes in Computer Science: 150-159.

Tan, C.-W., Benbasat, I. and Cenfetelli, R. T. (2008). Building Citizen Trust towards e-Government Services: Do High Quality Websites Matter? The 41st Hawaii International Conference on System Sciences.

van Iwaarden, J., van der Wiele, T., Ball, L. and Millen, R. (2004). "Perceptions about the quality of web sites: a survey amongst students at Northeastern University and Erasmus University." Information & Management 41(8): 947-959.

Verdegem, P. and Verleye, G. (2009). "User-centered E-Government in practice: A comprehensive model for measuring user satisfaction." Government Information Quarterly 26(3): 487-497.

Wang, Y.-S. and Liao Y.-W. (2008). "Assessing eGovernment systems success: A validation of the DeLone and McLean model of information systems success." Government Information Quarterly 25(4): 717-733.

Wu, J.-H. and Wang Y.-M. (2006). "Measuring KMS success: A respecification of the DeLone and McLean's model." Information & Management 43: 728-739.

Ølnes, S. (2007). Accessibility of Norwegian Public Web Sites. NOKOBIT, Oslo, Tapir Forlag.

APPENDIX D: PAPER 4

Perceptions of information system success in the public sector:

Webmasters at the steering wheel?

Authors: Hanne Sørum, Rony Medaglia, Kim Normann Andersen, Murray Scott
and William H. DeLone

Abstract

Purpose – The purpose of this paper is to explore the relationships between constructs of information system (IS) success in the public sector, as perceived by webmaster intermediaries, and investigate how user testing affects these relationships.

Design/methodology/approach – Online surveys were conducted, using questionnaires, with webmasters in Denmark and Norway who participated in the public sector web award contests organized by the government (n = 1,237, n = 541; response rate 44 percent).

Findings – It was found that the frequency with which webmasters carry out user testing affects their perceptions of IS success, with those who conduct no user testing displaying the weakest associations among success variables. Findings also suggest that webmasters who do little or no user testing conveniently assume that

citizen users are satisfied, while webmasters who are more knowledgeable of the user experience have a greater perception of levels of success.

Practical implications – The fact that the majority of webmasters do not perform any type of user testing triggers a reflection on the need for such important intermediaries to enhance their feedback channels. User involvement in assessing IS success cannot be overlooked, especially considering that user empowerment in the design, implementation, and evaluation of information systems matches a window of opportunity originating in the ongoing growth of web interactivity.

Originality/value – The paper is one of the few that investigates constructs of IS success in the public sector, and arguably the first one that focuses on the impacts of user testing on the relationships between constructs of IS success in a public setting.

Keywords: Denmark, Norway, Information systems, Web sites, Public sector, Feedback, Intermediaries, DeLone and McLean IS success model, Webmasters, User testing

Paper type: Research paper

Perceptions of information system success in the public sector:

Webmasters at the steering wheel?

1. Introduction

User involvement and testing are widely viewed as being critical to the improvement of information systems (IS) (Mumford and Ward, 1968; Bansler, 1989; Iivari and Lyytinen, 1998; Sharp et al., 2007). The possibility of having real users participate in providing feedback for developing and refining the IS they are intended to use is even more important in a public sector setting, where it is taxpayers' money that finances the main service providers. In the era of public sector e-services, this materializes, for instance, in a spread of government-run and private contests of public web sites where prizes are awarded for categories, such as design and usability (Sørum et al., 2009), which are assessed by both users and usability experts/consultants.

This study is interested in exploring what webmasters of public sector web sites know about their users and how they link improvement in technology artifacts, information, and services with possible associated benefits for the users. Drawing on the DeLone and McLean model of IS success (DeLone and McLean, 1992; DeLone and McLean, 2003), this paper investigates how webmasters identify the impact of information, system, and service quality on user satisfaction and user benefits in a sample of public agency web sites in Denmark and Norway. This investigation aims at shedding light not only on the perception of IS success by key stakeholders, such as public agency webmasters, but also on whether performing user testing makes any difference to the perceptions of webmasters in

the relationship between IS quality factors and perceived user benefits and satisfaction. Our study is driven by two research questions:

RQ1. What are the relationships between constructs of IS success in the public sector, as perceived by webmaster intermediaries?

RQ2. How does user testing affect these relationships?

The uniqueness of this study is twofold. First, while there is a wealth of studies investigating IS success using the DeLone and McLean model, very few do so in a public sector setting. This research seeks to add to the body of knowledge by investigating which unique features within the public sector affect success. Second, by assessing the role of user testing in the relationships between the constructs of the DeLone and McLean model of IS success, we begin this investigation by challenging the assumption that user testing matters.

Understanding the role of intermediaries in delivering public sector services is key to comprehending the shift in the division of labor between government and companies (Al-Sobhi et al., 2010). Despite the emerging transformation by external intermediaries, we take the position that webmasters still have a key role in the choices of design and implementation of new web site functionalities, while content provision is delivered by the individual public department/worker intermediaries and end-users, for instance, through interaction via Web 2.0 (Van der Walt and Van Brakel, 2000; Hendricks, 2007). Thus, there is a need to investigate how webmasters connect internal information and service resources with the external demand from citizens. We work from the assumption that public sector webmasters have a key role to play in delivering online services. There are several possible implications on the design of web sites, and the creation of public

single-entry points to the public sector engaging the state-individual relationship (Ranerup, 2011).

The article is structured as follows. The next section anchors the study in the body of IS literature and outlines the research framework. The background information on the cases chosen in Denmark and Norway is then presented, where we argue for their relevance as objects of study. After describing the research method and data collection, the results of data analysis are reported and discussed. The concluding section sums up the findings, highlights the contribution of this study to research and practice through IS success factors in a public sector setting, and identifies possible avenues of future research

2. Previous research

Market rivalry between competing companies is fueled by constant intermediation and re-intermediation processes in the value chains (Porter, 2001). Although there is no unidirectional evidence indicating that better and more robust web design leads to more sales and profit, the transformation towards the digital economy is orchestrated by crawlers, mark-ups, and other types of intermediaries aiming at creating the best and fastest match between customer preferences and the supply of goods and services (Bakos, 1998). In theory, the consumers' choice of online products and services will eventually value good web site design, products, and services. By contrast, public sector web sites are supply- and cost-driven, with the webmaster as a key player in designing the user interface and as the intermediary between citizens and in-house content providers.

Both within the research and the practitioner community involved in the public sector IS, there is an increasing awareness of the need for shared knowledge on the measurement of success of IS investments in the public sector. Virtually every

public agency is nowadays expected to invest to some degree in establishing a web presence. Heavy investments in the establishment of a web site, and on its continuous improvements and updates required by users, however, often fail to be evaluated against well-grounded measures of success.

In the literature on the uptake of government e-services, various studies have identified gaps between the citizen readiness and demand for services, and the supply from government. Barriers, such as the lack of security, the fear of loss of privacy, and the lack of infrastructure, have been identified as reasons for citizens not using the often quite generous list of free online services. Consequently, international and national policy institutions, such as the OECD, the UN, and the UK Cabinet Office, publish annual reports where a list of barriers and drivers are identified for different nations (United Nations Public Administration Network, 2010; OECD, 2009). Paradoxically, even though there is an increasing awareness of the need to include not only the user perspective, but also a range of public values in assessing the success of IS in the public sector (Scott et al., 2009), we are short on knowledge of how webmasters view IS success and to what extent they gather knowledge of their users and other stakeholders' viewpoints.

Since the early 1980s, IS researchers have put an increasing effort into identifying IS success factors and building empirically-based models for understanding what makes an IS successful. In their seminal work, DeLone and McLean (1992) performed a comprehensive review of studies on IS success published in the previous decade, and proposed a comprehensive model, including six components of IS success: system quality, information quality, use, user satisfaction, individual impact, and organizational impact.

An overwhelming and still expanding body of literature has put effort into empirically testing the multidimensional relationships in the DeLone and McLean model (Goodhue and Thompson, 1995; Saarinen, 1996; Rai et al., 2002). The original model has been challenged by proposals of refinement and integration. These focus on the constructs of use, as opposed to usefulness and user involvement (Seddon and Kiew, 1994), or aim at extending the individual and organizational impacts of IS to a wider range of measures of net benefits of IS use and perceived usefulness (Seddon, 1997).

The rapid growth of eCommerce was one of the triggering factors that led to an update of the 1992 DeLone and McLean model of IS success (DeLone and McLean, 2003). The updated model introduced the construct of service quality, replacing the variables of individual and organizational impacts with the construct of net benefits, and including impacts at different levels of analysis (e.g. workgroups, industries, and societies) (Petter et al., 2008). Surprisingly, few studies have looked at the multidimensional relationships explaining success of IS in a governmental setting, however (Rosacker and Olson, 2008; Angelopoulos et al., 2010). Research efforts have been aimed, for instance, mainly at assessing government web site: sophistication and quality (Choudrie et al., 2004; Moon and Norris, 2005; de Jong and Lentz, 2006; Barnes and Vidgen, 2007; Panopoulou et al., 2008), usability (Huang, 2003; Becker, 2005), and interactivity (Criado and Ramilo, 2003). As a result, these approaches provide only a glimpse of IS success in settings where information resource managers bridge content provision and use without facing market competition factors.

Despite the awareness that user factors, such as perceived ease of use, compatibility, and trustworthiness, are important factors affecting citizens' intention to use an e-government service (Carter and Be´langer, 2005; Teo et al.,

2008), there is a research gap concerning the role of user testing in public IS success. Rosacker and Olson (2008), for instance, focus on factors related to success of public IS concerning project management. Prybutok et al. (2008) introduced the DeLone and McLean model into a government context by investigating leadership and IS quality, and the effect on net benefits in eGovernment environments. In their study, net benefits were measured with items incorporating user satisfaction, and individual and organizational performance. The findings reveal that leadership is positively related to IS quality, and IS quality and leadership are positively related to net benefits. Wang and Liao (2008) tested an adaptation of the DeLone and McLean's IS success model in the context of government citizen services. They drew on the six constructs of the model, information quality, system quality, service quality, use, user satisfaction, and perceived net benefits, to collect data on users of government IS in Taiwan. Their findings show that:

- information quality, system quality, and service quality positively affect user satisfaction;
- that use positively affects user satisfaction and the perceived net benefits; and
- that user satisfaction positively affects perceived net benefits.

Recently, Scott et al. (2009) proposed a balanced success model, an extension of the DeLone and McLean, 2003 model, tailored for the public sector that aims at developing a measure of net benefits centered on the perspective of the citizen. The model draws on the paradigm of public value (Moore, 1995), and evaluates the impact of IS quality (information quality, systems quality and service quality) on eGovernment success by exploring what citizens define as being important in

the success of eGovernment services and which aspects of IS quality affect eGovernment success.

3. Research framework

The research framework for this paper has been developed to capture how frequently webmasters conduct user testing, the type of user testing, and how webmasters perceive the relationship between key IS success constructs: information quality, system quality, and service quality, leading to user satisfaction and net benefits. Figure 1 contains the schema for the proposed research framework, drawing on the DeLone and McLean model of IS success (2003).
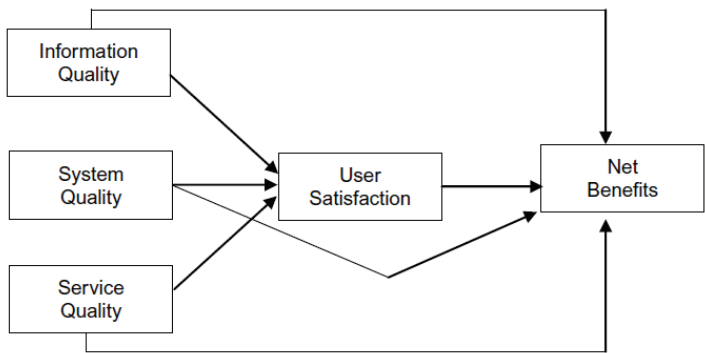
Figure 1.Visualization of the research framework in this study

From the eGovernment supply side, important contributors to web site quality improvements and general IS success are: the service provider, government organizations, and back-office support. In this study, webmasters are described as being key contributors in delivering eGovernment services, and act as an immediate interface between service provider and service receipt. As such, they

have a unique perspective on the effectiveness of eGovernment as a channel for providing successful services and useful information to users. The users of government web sites are assumed to be citizens, businesses, and the government itself. Various tasks and interactions may take place, depending on the goal to be completed, the purpose of the web site visit, and usage.

Web site quality is measured by information quality, system quality, and service quality, and is under the control of the service provider. The construct of information quality captures the content of the system/web site, and concerns aspects such as accuracy, personalization, and relevance of the information. System quality concerns the overall quality of the system that the users interact with, and focuses on aspects such as usability and ease of use. Service quality is measured by the overall service level delivered by the service provider, including aspects such as empathy for the users and trust. User satisfaction is measured by measuring how satisfied the users of a given system or web site are perceived to be. In our study, we investigated the webmasters' perception of user satisfaction, since they act as a pivotal figure in delivering eGovernment information and services. In order to explore the net benefits of IS success, we included constructs of user benefits, such as time and cost savings, trust, and interaction with government. Table I provides details of important dimensions and the related literature for each of the constructs used in the framework.

Quality aspects	Dimensions of website quality	References
Information quality	Presence of updated information, current information, relevant information, clear and understandable information, trustable information, adapted information, detailed information.	Seddon and Kiew (1996), Lee et al. (2002), McKinney, et al.(2002)
System quality	Ease of use, intuitiveness and clarity of navigation structure, visual design, download time, accessibility requirements, secure use, integration with internal data feeding & processing, integration with external data feeding & processing, use of updated technology.	Seddon and Kiew (1996), McKinney et al. (2002), Wang and Liao (2008)
Service quality	Helpfulness and willingness to solve users' problems, empathy for users, and trust.	Pitt et al. (1995, 1997), Barnes and Vidgen (2003), Teo et al. (2008)
User satisfaction	The overall satisfaction of the user including perceptions of website efficiency and meeting users'	Seddon and Kiew (1996)

	expectations.	
User benefits	Improved information and services, effective communication, 24 hour accessibility, as well as cost and time savings.	Reddick (2006), Prybutok et al. (2008), Wang and Liao (2008), Scott et al. (2009)

Table I. Operationalization of the research framework

When measuring the success of IS systems, user satisfaction and net benefits are perceived as being highly important. Net benefits can be assessed at various levels and from different perspectives. While we find that the users who may achieve user benefits for their personal interest are driven by use and user satisfaction, the service provider/organization (demand side) may also obtain success, which can be measured by organizational efficiency and effectiveness.

4. Case choice and research method

In order to address the research questions, a self-administered online survey was designed to capture constructs of IS success, as perceived by public sector webmasters in Denmark and Norway. Both of these small countries each have a population of approximately 5 million. The government plays a large role in their economies, employing about one-third of the total workforce. The two countries have a history of commitment to ambitious IT policies, resulting in a strong record of being ranked among the top countries in the world as far as digital readiness in general, and eGovernment maturity in particular (Table II). Similar to other countries, Scandinavian countries have experienced a shift in the channels of communication within both the public and private sector. In 2010, 90 percent of

all households in Norway had internet access, and 81 percent used the internet for communication with the public sector.

	Denmark	Norway
United Nations (2010)	7	6
OECD (2009)	3	1
Economist Intelligence Unit (2010)	2	6

Table II.International rankings of eGovernment: Denmark and Norway

Most public organizations have their own web site, or are linked to another web site. Most organizations update and maintain the information by themselves, and have the daily responsibility for contact with various stakeholders. The technological solutions (e.g. web sites) are developed autonomously or by an external company. In most cases, it is the organization's own responsibility to provide web site content and various digital services that aim at benefiting the users or the organization itself, in addition to responsiveness and daily contact with web site users. In order to ensure a high web site quality level, 600-700 public web sites in Norway and Denmark have been ranked on a yearly basis since 2001 organized by the government in both countries. The ranking results are made publicly available on the internet for comparison. The criteria used in the evaluations (i.e. the quality aspects measured) carried out in these web awards are largely rooted in long-term strategies and plans stated by the government. For instance, the eNorway 2009 plan supports government policy for economic growth, as well as increased value creation, prosperity, welfare development, and change in the sector. There are three main target areas for public web sites:

(1) citizens as individuals;

(2) innovation and growth in business and industry; and

(3) a coordinated and user-adapted public sector.

The public sector's stated aim is that everyone will have an opportunity to participate in the digital community, and have the same access to digital information and services. The evaluation process in Norway and Denmark focuses on how the web site/service actually appears on the screen, and the criteria are mainly grounded on standardized objective measures, which, to a large extent, assess technical aspects (Sørum et al., 2009).

The design of the survey instrument in this study has drawn on the operationalization of the DeLone and McLean IS success model in an eGovernment context (Scott et al., 2009). Each construct was operationalized with a set of questions to be answered by webmasters, e.g. "To what extent do you consider that the organization's web site provides updated information to the users?". In addition, the survey included questions not only on the extent to which webmasters know the users, e.g. "Please indicate to what extent your organization knows the needs of users and their expectations from the web site", and in the extent to which they perceive users to be satisfied, on how they perceive the extent there are net benefits (e.g. "According to your assessment, to what extent does the web site provide time savings to users?"), but also on how frequently they perform user testing and with what methods. Respondents answered each item using a five-point Likert scale, varying from "very low degree" to "very high degree". The following number of questions was to measure each of the constructs: information quality: seven; system quality: nine; service quality: three, user satisfaction: four, and user benefits: five questions. The items used to measure each construct were drawn from seminal studies in the area and where possible used established

metrics adapted for the eGovernment context. The key references used in the construction of instruments for this study are presented in Table I. In order to investigate the correlations in this study, we looked at the mean score for each of the constructs, and created a new variable (used in the analysis) based on the score of each of the questions.

In the development of the questionnaire, experienced webmasters from municipalities, and a university library were initially invited to provide comments and suggestions for improvements in the online survey. A pilot test was then conducted over a period of six months, including a sample of 33 European E-Government Award finalists.

The pilot test led to minor revisions of questions and layout issues. An invitation to participate in the survey was finally e-mailed to 1,237 public sector organizations in Norway and Denmark in the period November to December, 2010. The respondents received an e-mail with an introductory letter that informed them about the purpose of the study, and a web link to the online questionnaire. It was clearly stated in the e-mail that the respondent should be the webmaster (or a person in a similar position) in the organization. E-mail addresses of the respondents were collected manually by visiting each web site. All of the public organizations selected had participated in a yearly national web award arranged by the governments in Norway and Denmark in 2009.

Within the first two weeks we received 464 completed questionnaires and then, after two weeks, a reminder e-mail was sent to all potential respondents. Those who had already participated were thanked for their participation, and those who had not answered the questionnaire were encouraged to complete the survey within a week. After four weeks the survey was closed with 541 useful responses,

representing a response rate of 44 percent, of which 22 respondents did not fill in background data.

Table III shows the details of the respondent profiles. Most of the webmasters have a relatively long affiliation with the organization: 217 of the 541 respondents have been the webmaster in their organization for more than five years. The respondents are quite mature, with two-thirds older than 36 years of age. Regarding training and education, the respondents overall have training in communication but little training in IT/technology. Of the respondents, 22 did not fill in the background information, and therefore the total number shown in Table III is 519, not 541.

Length of employment as webmaster	Less than a year ago: 64
	1-2 years ago: 94
	3-5 years ago: 144
	More than 5 years ago: 217
Gender	Female: 271
	Male: 248
Age	25 years or younger: 1
	26-35 years: 100
	36-45 years: 197
	46-55 years: 139
	56-65 years: 81
	More than 65 years: 1
Highest completed level of education	No higher education: 22
	Professional certification/training: 55
	Bachelor's degree or equivalent: 216
	Master's degree, equivalent or higher: 226

Education courses related to information/communication	Yes: 343 No: 176
Education courses related to IT/web technology	Yes: 154 No: 365

Table III. Profile of the survey respondents (webmasters)

In order to conduct an analysis of non-response bias, the reliability results for various constructs were compared among early, middle and late responses. No significant differences were found lending credibility to the data set along with the high response rate gathered (44 percent). Furthermore, the majority of the respondents were reported to have been in their position as a webmaster for more than three years (including 217 being in the position for more than five years) lending experience and further credibility to their perspective as survey participants. The survey protected the anonymity of the respondent and there were no factors due to bias related to incentives (e.g. economic earnings) that could impact the response, other than access to a summary report of the survey. In addition, the survey instrument was based on a reliable set of IS success items tested within the literature to measure the items in the questionnaire.

The methodology used in this study has a number of limitations. First, while Denmark and Norway are uniquely relevant cases for their high technology penetration and commitment to IT policies, findings from these two countries, nevertheless, can be generalized only to some extent, and would need to be corroborated with data from different study settings, e.g. countries with greater digital divides, and different degrees of government IT policy commitment.

Second, the sample choice of webmasters who have participated in the official government web awards may also affect finding generalizability. On the one hand, this choice would support the argument that the sample includes web sites (and webmasters) that put the most effort into fulfilling criteria of excellence in implementing digital public services. On the other hand, for the same reason, the sample choice cannot ensure that webmasters that do not participate in web awards would show the same attitudes as the ones measured in this study.

5. Findings

Our analysis of the webmasters' frequency of user testing shows a diverse rather than a unified or unidirectional pattern. Less than half (46.8 percent) of the 541 webmasters conducted some type of user testing (n = 253). Table IV displays the frequency and type of user testing carried out by the 253 respondents that answered yes to the question on whether their organization conducted user evaluation and testing of their web site. The sum of values is greater than 253, as respondents could indicate more than one method of user testing.

	Frequency of testing				
Type of testing	Several times during the last year (%)	Once during the last year (%)	1-2 times during the last two years (%)	More than two years ago (%)	Total (%)
Representative users solve realistic tasks	13 (14)	28 (31)	28 (31)	32 (35)	101 (111)
Online user satisfaction survey(s)	13 (16)	31 (40)	23 (29)	33 (42)	100 (127)
User satisfaction survey(s) via telephone, in person or by e-mail	16 (7)	23 (10)	32 (14)	30 (13)	100 (44)
Focus groups/ interviews with users	15 (12)	22 (18)	28 (23)	35 (29)	100 (82)
Eye-tracking laboratory test	11 (2)	39 (7)	17 (3)	33 (6)	100 (18)

Notes: n=253: n values are given in parentheses

Table IV. Methods and frequency of user testing

The most frequently used method of collecting feedback from users is through online user satisfaction surveys (n = 127). This type of data collection provides an overall impression of the extent to which users are satisfied, and vague patterns of how, to what extent, and where there is potential for quality improvements. Online satisfaction surveys are followed in popularity by methods involving representative users in solving tasks (n = 111) in order to gain knowledge on user behavior in a setting that simulates everyday use.

Even though there are various ways of conducting testing in order to observe and evaluate user performance, the results given in online surveys may, at best, give direct input to improvements of quality. Of the respondents, 82 noted that traditional focus groups and interviews with users were a way of facilitating rich in-depth explanations for why users perform as they do. One side of the coin is what people (users) actually do and how they perform, while the other side concerns the extent to which they are satisfied and how they interact with a web site. The least frequently used method of user testing is eye-tracking technology. One reason may be that eye-tracking is a relatively expensive technology, often used only by professional usability experts/consultants.

The technology is often used in conjunction with other methods, such as involving representative users in solving realistic tasks. Overall, the findings indicate that there is a large potential for involving users to a greater extent in order to improve the quality interaction with public web sites. One explanation for this may be that the public organizations find the annual quality ranking of public web sites satisfactory or sufficient in terms of feedback, even though these web awards generally involve real users to a low extent.

In order to begin analyzing our research framework, an initial examination of reliability analysis was performed for each construct using Cronbach's for composite constructs. The results, presented in Table V, indicate good internal consistency among the items representing each construct of success.

Constructs of success	Cronbach's α
Information quality	0.868
System quality	0.837
Service quality	0.739
User benefits	0.859
User satisfaction	0.749

Table V. Reliability analyses for the construct

Table VI presents descriptive statistics on the constructs success (n = 541) and shows that the mean score varies from 4.0213 (information quality) being the highest, to 3.5822 (system quality) being the lowest. The mean of service quality is almost the same as information quality. In general, webmasters give their web sites high grades on quality.

Constructs of success	Mean	SD
Information quality	4.0213	0.55923
System quality	3.5822	0.60673

Service quality	4.0467	0.57266
User satisfaction	3.7530	0.55589
User benefits	3.6694	0.67579

Table VI. Descriptive statistics on the constructs of IS success

In order to investigate the proposed relationships perceived by webmasters between constructs of IS success in the public sector, correlation analyses (Pearson) were performed. In accordance with the research framework, the strengths of the correlations between the constructs of information, system, and service quality, with both user satisfaction and user benefits are presented in Table VII, based on responses for all respondents included in the analysis (n = 541).

Constructs of success	User satisfaction	User benefits
Information quality	0.540*	0.553*
System quality	0.464*	0.491*
Service quality	0.733*	0.432*
User satisfaction	1	0.481*

Notes: n=541: *. Correlation is significant at the 0.01 level (two-tailed)

Table VII. Correlation test results between the IS success constructs

These findings underline the importance of IT quality in governmental web sites. Overall, the correlations between the constructs of IS success vary between 0.432 (service quality and user benefits) and 0.733 (service quality and user satisfaction). Following the interpretation of Cohen (1988), these correlation test scores reveal a medium level of correlation strength between the constructs of success.

In order to investigate the impacts of user testing, as defined by RQ2 of this study, the correlations among IS success constructs were retested on differing sub-samples selected based on frequency of user testing. The data displayed in Table VIII reveals the results from correlation tests conducted with five differing samples of webmasters, ranging from those who indicated that they conducted user testing several times in the last year to those who have never performed user testing. These correlation results on the whole provide significant associations among success constructs thus again supporting the efficacy of the DeLone and McLean IS success model in the eGovernment context. Subtle variations in the strengths of these associations can be observed however when presented according to frequency of user testing. Although exploratory, the correlation results from the sample that never conduct user testing display on balance a lower level of significance across most of the proposed associations. Similarly, in four of the proposed relationships it is observed that the strength of correlation is highest in the sample that conducted user testing the most frequently when compared to the other samples.

Relation-ships	All the respon-dents (N=541)	Never performed user testing	More than two years ago	1-2 times during the last two years	Once during the last year	Several times during the last year
InfQ→User satisfaction	0.540*	0.458*	0.621*	0.707*	0.436*	0.569*
SyQ→User satisfaction	0.464*	0.343*	0.611*	0.532*	0.471*	0.646*
SeQ→User satisfaction	0.733*	0.718*	0.688*	0.851*	0.682*	0.865*
InfQ→Net benefits	0.553*	0.505*	0.619*	0.502*	0.524*	0.626*
SyQ→Net benefits	0.491*	0.462*	0.581*	0.257*	0.574*	0.643*
SeQ→Net benefits	0.432*	0.364*	0.469*	0.546*	0.464*	0.463*

| User satisfaction →Net benefits | 0.481* | 0.397* | 0.526* | 0.554* | 0.556* | 0.418 |

Notes: *Correlation is significant at the 0.01 level (two-tailed)

Table VIII. IS success and frequency of user testing

In order to summarize the findings of this study and the impacts of user testing, Figure 2 shows the correlations presented in Tables VII and VIII. Figure 2 shows the key findings from this study aligned to the two main research questions. First, the correlation results from the complete sample are displayed in the search framework providing evidence of the validity of the DeLone and McLean model when examining success in the eGovernment context. Second, the correlation results from the sub-sample that conducted no user testing are presented in the parentheses. The results from these tests provide an initial assessment of RQ2 and an insight into the impact of user testing on perceptions of success. The sample that conducted no user testing demonstrate a significantly lower correlation among the constructs of IS success. The impact of no user testing is therefore relatively negative on the constructs of IS success identified by this study.

6. Discussion and conclusion

6.1 Research synthesis

This paper aims at answering two research questions:

RQ1. What are the relationships between constructs of IS success in the public sector, as perceived by webmaster intermediaries.

RQ2. How does user testing affect these relationships?

We collected data from webmasters in Denmark and Norway that participated in the official web award contests organized by the government. The identification of webmasters as important eGovernment intermediaries and the analysis of the impacts of user testing on webmaster perceptions of success are important unique contributions of this research. This study also contributes to the understanding of IS success constructs in a public sector setting. More importantly, this study contributes to the literature on the impact of user testing on the relationships between constructs of IS success based on the perception of webmasters. Previous research has shown that there are external factors that affect the importance of the constructs of the DeLone and McLean IS success model.
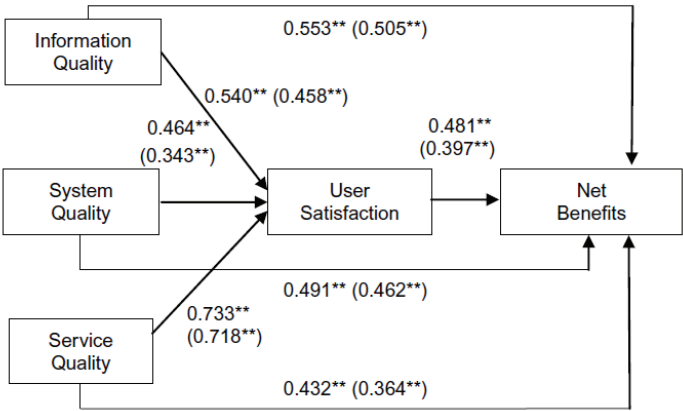
Figure 2. Summary of findings

For instance, the degree of centralization of computing in an organization makes a difference in the degree of importance of each construct of IS success. Heo and Han (2003) use the DeLone and McLean model of IS success to investigate firms with different characteristics. The authors find that organizations that have centralized computing tend to place more emphasis on system quality for IS success, while organizations that have decentralized computing emphasize information quality. However, the role of user testing on the perceptions of the relationship between IS success constructs for eGovernment web sites has remained unexplored.

Our study shows that less or no user testing results in a perception of weaker correlation between constructs of IS quality (information quality, system quality, and service quality) and user satisfaction. This finding suggests that the less webmasters know about their users (by performing user testing), the less they tend to see a correlation between IS quality and user satisfaction. Such findings can be considered as an attempt to fill the research gap in IS research concerning the investigation of IS success constructs in a public sector setting, and particularly concerning the role of user involvement in the design, implementation, and testing of government IS.

Although not conclusive, this study would seem to indicate that frequency of user testing results in variations among the perceptions of success among webmasters, with those who conduct no user testing displaying the weakest associations among success variables. Varying correlation strengths is an important contribution in relation to user testing and indicates that future research in this area is necessary to further probe the need for user feedback in developing an institutional understanding of eGovernment success.

These findings also seem to suggest that webmasters who do little or no user testing conveniently assume that citizen users are satisfied, while webmasters that are more knowledgeable of the user experience have a greater perception of levels of success. This interpretation implies that webmasters who do not conduct user testing are poor judges of user satisfaction and user benefits. One possible explanation for this could be that webmasters do not conceptualize or factor in the citizens' end benefits. In other words, webmasters do not "travel" to the world of the users, and do not deem it necessary to explore end-user benefits.

6.2 Implications for practitioners

Findings from this study have implications for practitioners. In a government setting, we can distinguish between the public decision-makers who influence the allocation of resources for IT projects, and the intermediaries who supervise the operational element of IT implementation vis-à-vis the citizens, such as webmasters. Top level decision-makers, such as politicians, usually rely on measures of IT benefits, measures that they do not directly contribute to creating. User satisfaction, for example, is only one popular measure of IS success among many that is referred to in justifying allocation or re-location of resources for IT projects. Other measures include the number of unique visitors and other data on traffic that public web sites can provide. However, the use of these measures is not without risk when it is made too simplistically. For instance, the amount of traffic registered on a web site cannot be considered as a reliable measure of success if the service provided by the public agency aims at avoiding citizen contact, instead of maximizing it, such as in the case of, e.g. a public portal for filing taxes. This study helps decision-makers understand the constructs underlying IS success by providing deeper insight into their nature and their relationships.

The main contribution of the study for practitioners that work as intermediaries, such as webmasters, concerns the role of user testing in assessing IS success. The fact that the majority of webmasters do not perform any type of user testing should trigger a reflection on the need for such important intermediaries to enhance their feedback channels. It is paradoxical that, on the one hand, there is a growing rhetoric on the need for developing, refining, and using rich measures of IS success, such as user satisfaction, while, on the other hand, data show that the effectiveness of the crucial end-user part of IS investment is only left to be assessed by webmasters' perceptions. This is even more problematic when considering that, as our study shows, intermediaries have different perceptions of the relationships between IS quality measures and user satisfaction, depending on the degree to which they perform user testing.

Moreover, the role of user involvement in assessing IS success cannot be overlooked, especially considering that user empowerment in the design, implementation, and evaluation of IS matches a window of opportunity originating in the ongoing growth of web interactivity. For example, the emergence and spread of Web 2.0 tools calls for an increased focus on the role of citizens as users in understanding IS success factors, and maximizing the value of IS investments in the public sector.

6.3 Implications for future research

Our research also opens a potential road forward for future research. The first suggested stream of research could be to focus on extending the statistical analysis and supplementing the study with longitudinal data. Using the DeLone and McLean model with data from a single survey clearly calls for additional research on the feedback loops in the model using, for example, longitudinal data from

webmasters. Moreover, research that allows for a more explicit use of exogenous and endogenous data would be welcomed. For example, we assumed in our study that webmasters have some discretion over the design and implementation of web sites; but webmasters might only be in charge of incremental maintenance, while it might be that computer scientists and system analysts are in charge of the actual web service development instead.

A second stream of research should focus on the explanatory variables behind one of the main findings of this study: webmasters who know their users tend not to see a correlation between web site quality and user satisfaction. This first insight into the problematic area of the relationship between the presence of user testing and constructs of IS success in a government setting should be further investigated, e.g. using qualitative methods, such as interviews and focus groups with users and webmasters.

A third challenge would be in furthering research on the difference in significant association between IS quality, and user satisfaction and net benefits. A possible explanation for this difference is that while citizens may value time-saving benefits in availing themselves of online services, they still may not find the experience of using online services particularly enjoyable or satisfying. The citizen's experience of interaction with the public sector is complex – some uses can be functional or utilitarian, for example, in paying a fine or requesting a service; alternatively, citizens have increasing opportunities to engage in initiatives designed to engage and encourage their participation in democratic endeavors. The variation in possible interactions necessarily contributes to varying value perceptions in citizens. Some uses result in basic benefits, such as time or cost savings, whilst others may contribute to more hedonistic or complex value perceptions. This research therefore demonstrates the importance of reflecting on

this variation by using multi-dimensional success measures to effectively capture value. Future research should continue to focus on developing measures that reflect this variation in perception.

The fourth area for future research could further explore how unique features of public organizations impact perceptions of success. There is a need to understand the extent to which organization size, degree of centralization, government type (local, central, municipal), and government capacity factors (such as technical, financial and political) impact the perceptions of success within the organization. Such a research project could draw on the exploratory framework developed by Moon and Norris (2005), but would extend knowledge in this area by comparing across different government types (local, central and municipal). There is a need to further explore what has been close to virgin research areas since the URBIS/UC Irvine studies (Danziger et al., 1982) on the effects of organizational characteristics and government type on public sector success.

References

Al-Sobhi, F., Weerakkody, V. and Mustaffa, M. (2010), "An exploratory study on the role of intermediaries in delivering public services in Madinah City: case of Saudi Arabia", Transforming Government: People, Process and Policy, Vol. 4 No. 1, pp. 14-36.

Angelopoulos, S., Kitsios, F. and Papadopoulos, T. (2010), "New service development in e-government: identifying critical success factors", Transforming Government: People, Process and Policy, Vol. 4 No. 1, pp. 95-118.

Bakos, Y. (1998), "The emerging role of electronic marketplaces on the

internet", Communications of the ACM, Vol. 41 No. 8, pp. 35-42.

Bansler, J. (1989), "Systems development research in Scandinavia: three theoretical schools", Scandinavian Journal of Information Systems, Vol. 1 No. 1, pp. 3-20.

Barnes, S. and Vidgen, R. (2003), "Measuring web site quality improvements: a case study of the forum on strategic management knowledge exchange", Industrial Management & Data Systems, Vol. 103 No. 5, pp. 297-309.

Barnes, S.J. and Vidgen, R. (2007), "Interactive e-government: evaluating the web site of the UK inland revenue", International Journal of Electronic Government Research, Vol. 2 No. 1, pp. 42-6.

Becker, S.A. (2005), "E-government usability for older adults", Communications of the ACM, Vol. 48 No. 2, pp. 102-4.

Carter, L. and Be´langer, F. (2005), "The utilization of e-government services: citizen trust, innovation and acceptance factors", Information Systems Journal, Vol. 15 No. 1, pp. 5-25.

Choudrie, J., Ghinea, G. and Weerakkody, V. (2004), "Evaluating global e-government sites: a view using web diagnostic tools", Electronic Journal of e-Government, Vol. 2 No. 2, pp. 105-14.

Cohen, J. (1988), Statistical Power Analysis for the Behavioral Sciences, Erlbaum, Hillsdale, NJ.

Criado, J.I. and Ramilo, M.C. (2003), "E-government in practice: an analysis of web site orientation to the citizens in Spanish municipalities", International Journal of Public Sector Management, Vol. 16 No. 3, pp. 191-218.

Danziger, J.N., Dutton, W.H., Kling, R. and Kraemer, K.L. (1982), Computers and Politics: High Technology in American Local Government, Columbia University Press, New York, NY.

de Jong, M. and Lentz, L. (2006), "Scenario evaluation of municipal web sites: development and use of an expert-focused evaluation tool", Government Information Quarterly, Vol. 23 No. 2, pp. 191-206

DeLone, W.H. and McLean, E.R. (1992), "Information systems success: the quest for the dependent variable", Information Systems Research, Vol. 3 No. 1, pp. 60-95.

DeLone, W.H. and McLean, E.R. (2003), "The DeLone and McLean model of information systems success: a ten-year update", Journal of Management Information Systems, Vol. 19 No. 4, pp. 9-30.

Goodhue, D.L. and Thompson, R.L. (1995), "Task-technology fit and individual performance", MIS Quarterly, Vol. 19 No. 2, pp. 213-36.

Hendricks, A. (2007), "Webmasters, web policies, and academic libraries: a survey", Library Hi Tech, Vol. 25 No. 1, pp. 136-46.

Heo, J. and Han, I. (2003), "Performance measure of information systems (IS) in

evolving computing environments: an empirical investigation", Information & Management, Vol. 40 No. 4, pp. 243-56.

Huang, C.J. (2003), "Usability of e-government web-sites for people with disabilities", Proceedings of the 36th Annual Hawaii International Conference on System Sciences (HICSS'03).

Iivari, J. and Lyytinen, K. (1998), "Research on information systems development in Scandinavia – unity in plurality", Scandinavian Journal of Information Systems, Vol. 10 No. 1, pp. 135-86.

Lee, Y., Strong, D., Kahn, B. and Wang, R. (2002), "AIMQ: a methodology for information quality assessment", Information & Management, Vol. 40 No. 2, pp. 133-46.

McKinney, V., Yoon, K. and Zahedi, F. (2002), "The measurement of web-customer satisfaction: an expectation and disconfirmation approach", Information Systems Research, Vol. 13 No. 3, pp. 296-315.

Moon, M.J. and Norris, D.F. (2005), "Does managerial orientation matter? The adoption of reinventing government and e-government at the municipal level", Information Systems Journal, Vol. 15 No. 1, pp. 43-60.

Moore, M. (1995), Creating Public Value – Strategic Management in Government, Harvard University Press, Cambridge, MA.

Mumford, E. and Ward, T.B. (1968), Computers: Planning for People, Batsford,

London. OECD (2009), Rethinking E-government Services: User-centred Approaches, OECD, Paris.

Panopoulou, E., Tambouris, E. and Tarabanis, K. (2008), "A framework for evaluating web sites of public authorities", Aslib Proceedings, Vol. 60 No. 5, pp. 517-46.

Petter, S., DeLone, W.H. and McLean, E.R. (2008), "Measuring information systems success: models, dimensions, measures, and interrelationships", European Journal of Information Systems, Vol. 17 No. 3, pp. 236-63.

Pitt, L.F., Watson, R. and Kavan, C.B. (1995), "Service quality: a measure of IS effectiveness", MIS Quarterly, Vol. 19 No. 2, pp. 173-87.

Pitt, L.F., Watson, R. and Kavan, C.B. (1997), "Measuring information systems service quality: concerns for a complete canvas", MIS Quarterly, Vol. 21 No. 2, pp. 209-21.

Porter, M.E. (2001), "Strategy and the internet", Harvard Business Review, Vol. 79 No. 3, pp. 62-78.

Prybutok, V., Zhang, X. and Ryan, S.D. (2008), "Evaluating leadership, IT quality, and net benefits in an e-government environment", Information & Management, Vol. 45 No. 4, pp. 143-52.

Rai, A., Lang, S.S. and Welker, R.B. (2002), "Assessing the validity of IS success models: an empirical test and theoretical analysis", Information Systems Research,

Vol. 13 No. 1, pp. 50-69.

Ranerup, A. (2011), "The emergent development of public portals moulding the state-individual relationship", Transforming Government: People, Process and Policy, Vol. 5 No. 2, pp. 185-200.

Reddick, C.G. (2006), "Information resource managers and e-government effectiveness: a survey of Texas state agencies", Government Information Quarterly, Vol. 23 No. 2, pp. 249-66.

Rosacker, K.M. and Olson, D.L. (2008), "Public sector information system critical success factors", Transforming Government: People, Process and Policy, Vol. 2 No. 1, pp. 60-70.

Saarinen, T. (1996), "An expanded instrument for evaluating information system success", Information & Management, Vol. 31 No. 2, pp. 103-18.

Scott, M., DeLone, W.H. and Golden, W. (2009), "Understanding net benefits: a citizen-based perspective on eGovernment success", International Conference on Information Systems (ICIS). Phoenix, USA.

Seddon, P.B. (1997), "A respecification and extension of the DeLone and McLean model of IS success", Information Systems Research, Vol. 8 No. 3, pp. 240-53.

Seddon, P.B. and Kiew, M.Y. (1996), "A partial test and development of the DeLone and McLean model of IS success", Australasian Journal of Information Systems, Vol. 4 No. 1, pp. 90-109.

Sharp, H., Rogers, Y. and Preece, J. (2007), Interaction Design: Beyond Human-Computer Interaction, Wiley, New York, NY.

Sørum, H., Medaglia, R. and Andersen, K.N. (2009), "Assessment of website quality: scandinavian web awards right on track?", in Wimmer, M.A. et al. (Eds), Proceedings of the 8th International Conference on Electronic Government (EGOV), Linz, Austria, Springer, Berlin, pp. 198-209.

Teo, T.S.H., Srivastava, S.C. and Jiang, L. (2008), "Trust and electronic government success: an empirical study", Journal of Management Information Systems, Vol. 25 No. 3, pp. 99-131.

United Nations Public Administration Network (2010), E-government Survey 2010: Leveraging E-government at a Time of Financial and Economic Crisis, United Nations, New York, NY.

Van der Walt, P. and Van Brakel, P. (2000), "Task analysis of the webmaster: results of an empirical study", ASLIB Proceedings, pp. 20-38.

Wang, Y.-S. and Liao, Y.-W. (2008), "Assessing eGovernment systems success: a validation of the DeLone and McLean model of information systems success", Government Information Quarterly, Vol. 25 No. 4, pp. 717-33.

Appendix. Online survey questionnaire

Information quality:

· Updated information.

· Current information.

· Relevant information.

· Clear and understandable information.

· Trustable information.

· Adapted information.

· Detailed information.

System quality:

· Easy to use.

· Intuitiveness and clarity of navigation structure.

· Visual design.

· Download time.

· Accessibility requirements.

· Secure use.

· Integration with internal data feeding and processing.

· Integration with external data feeding and processing.

· Use of updated technology.

Service quality:

· Helpfulness in solving user's problems.

· Empathy for user's.

· Trust.

User satisfaction:

· Short response time for general inquiries.

· Short response time to users with specific problems.

· Services that meets the user's expectations.

· Satisfaction in general.

User benefits:

· Improved information and services.

· Effective communication.

· 24 hour accessibility.

· Cost savings.

· Time savings.

APPENDIX E: INTERVIEW GUIDE QUALITATIVE INTERVIEWS (IN NORWEGIAN)

1. Kan du så detaljer som mulig beskrive nettstedet til din organisasjon?
2. Kan du gi meg et visuelt bilde av nettstedet?
3. Hvordan er deres nettsted sammenlignet med andre nettsteder (fordeler)?
4. Hvordan er deres nettsted sammenlignet med andre nettsteder (ulemper)?
5. Hva er din definisjon av webkvalitet?
6. Med utgangspunkt i din definisjon av webkvalitet, hvordan synes du den passer inn i forhold til den nettsiden dere i dag presenterer?
7. Får dere mange tilbakemeldinger på det innholdet/tjenester som presenteres?
8. Hvordan er nettstedet integrert som en del av ditt daglige arbeid?
9. I hvilken grad syntes du nettstedet imøtekommer de kravene som du personlig synes er viktig?
10. Er det noe du er mer stolt av ved nettstedet enn andre ting? Fortell!
11. Bruker du nettstedet noen ganger til private formål?
12. Hvis du hadde ubegrenset med ressurser – hvilke endringer vil du ha gjort?
13. I hvilken grad kjenner dere til brukernes tilfredshet?
14. Hvordan måler dere verdien/ effekten av nettstedet?
15. Hvordan tror du nettstedet ser ut om fem år?

APPENDIX F: ONLINE SURVEY QUESTIONNAIRE (IN NORWEGIAN)

NORGE	
SEKSJON 1	
I denne første seksjonen er spørsmålene rettet mot informasjonskvaliteten på hjemmesiden til din organisasjon. Spørsmålene dekker aspekter som oppdatert informasjon, relevant informasjon og forståelig informasjon. Vennligst svar på de ulike spørsmålene som er presentert under, på en skala fra "veldig liten grad" til "veldig høy grad". Hvis du anser noen av spørsmålene som ikke relevante, vennligst bruk svaralternativet "ikke relevant".	
Spørsmål	**Svaralternativer**
I hvilken grad vurderer du at hjemmesiden til din organisasjon presenterer...	
...oppdatert informasjon for brukerne ...aktuell informasjon for brukerne ...relevant informasjon for brukerne ...klar og forståelig informasjon for brukerne ...informasjon som brukerne kan stole på ...informasjon som er tilpasset målgruppen(e) ...informasjon på et passende detaljert nivå (hverken for mye eller for lite informasjon)	Veldig liten grad Liten Middels Høy Veldig høy grad Ikke relevant
Hvis du har noen kommentarer knyttet til informasjonskvalitet, som ikke er dekket av spørsmålene over, vennligst spesifiser	Åpent tekstfelt

nedenfor.	
SEKSJON 2	
I denne andre seksjonen av undersøkelsen er fokuset rettet mot systemkvaliteten til hjemmesiden, og dekker aspekter som brukskvalitet, design og tilgjengeligheten av informasjonen og de tjenester som tilbys. Vennligst svar på de ulike spørsmålene som er presentert under, på en skala fra "veldig liten grad" til "veldig høy grad". Hvis du anser noen av spørsmålene som ikke relevante, vennligst bruk svaralternativet "ikke relevant".	
I hvilken grad vurderer du at hjemmesiden til din organisasjon...	
...er enkel å bruke	Veldig liten grad
...har en intuitiv og klar menystruktur	Liten
...har et passende visuelt design for en offentlig hjemmeside	Middels
	Høy
...generelt sett har minimal nedlastningstid	Veldig høy grad
...tilfredsstiller tilgjengelighetskravene (for svaksynte, hørselshemmede m.fl., jf. WAI/WCAG)	Ikke relevant
...er sikker å bruke (f.eks. personlig informasjon håndteres på forsvarlig måte)	
...har en god integrasjon med interne systemer (applikasjoner)	
...har en god integrasjon med eksterne systemer (applikasjoner)	
...gjør bruk av oppdatert og moderne web	

teknologi	
Hvis du har noen kommentarer knyttet til systemkvalitet, som ikke er dekket av spørsmålene over, vennligst spesifiser nedenfor.	Åpent tekstfelt

SEKSJON 3

I denne tredje seksjonen presenteres noen spørsmål knyttet til servicekvalitet. De referer til den service som leveres av organisasjonen, via hjemmesiden eller andre digitale kommunikasjons-kanaler. Servicekvalitet er knyttet til aspekter som tilbakemeldinger til brukerne, empati og tillit mellom brukerne og organisasjonen. Du skal svare på spørsmålene med utgangspunkt i din kjennskap til og inntrykk av organisasjonen.

Vennligst svar på de ulike spørsmålene som er presentert under, på en skala fra "veldig liten grad" til "veldig høy grad". Hvis du anser noen av spørsmålene som ikke relevante, vennligst bruk svaralternativet "ikke relevant".

I hvilken grad vurderer du at organisasjonen...	
...er hjelpfulle og etterstreber å løse brukernes problemer (uavhengig av type problem og omfang)	Veldig liten grad Liten Middels
...tilbyr kort svartid på generelle henvendelser/spørsmål	Høy Veldig høy grad
...tilbyr kort svartid på henvendelser fra brukere med spesifikke problemer (f. eks. innloggings-problemer)	Ikke relevant
...yter en service som tilfredsstiller brukernes	

behov og forventninger ...har empati overfor brukerne ...leverer service som brukerne kan stole på	
I hvilken grad bruker organisasjonen følgende kanaler for å kommunisere med brukerne?	Kontaktskjema på hjemme-siden E-post SMS Blogg Forum Chat Twitter Facebook RSS-feeds
Hvis du har noen kommentarer knyttet til servicekvalitet, som ikke er dekket av spørsmålene over, vennligst spesifiser nedenfor.	Åpent tekstfelt

SEKSJON 4

I denne fjerde seksjonen er spørsmålene knyttet til brukernes tilfredshet med hjemmesiden, organisasjonens kunnskap om brukerne og brukertesting av hjemmesiden.

Vennligst angi i hvilken grad...	
...organisasjonen kjenner brukernes behov og forventninger til hjemmesiden ...organisasjonen får tilbakemeldinger om brukernes tilfredshet med hjemmesiden	Veldig liten grad Liten Middels Høy

...organisasjonen mener at brukerne generelt sett er fornøyd med hjemmesiden ...organisasjonen får tilbakemeldinger fra brukerne som er nyttige i arbeidet med å øke kvaliteten på hjemmesiden	Veldig høy grad Ikke relevant
Vennligst angi i hvilken grad...	
...organisasjonen bruker verktøy, f. eks. Google Analytics, for å analysere brukermønstre, faktisk bruk osv. ...organisasjonen bruker resultatene fra statistikken til systematisk å videreutvikle hjemmesiden og øke kvaliteten	Veldig liten grad Liten Middels Høy Veldig høy grad Ikke relevant
I hvilken grad er det gjennomført brukertesting av hjemmesiden ved hjelp av et eksternt firma, utover den årlige kvalitets-vurderingen som organiseres av Difi?	Aldri, etter hva jeg vet Det er mer enn to år siden 1-2 ganger i løpet av de siste to årene Det er gjennomført èn i løpet av det siste året Det er gjennomført flere ganger i løpet av det siste året
Hva slags brukertesting er gjennomført? (Flere alternativer kan markeres)	Brukertesting hvor representative brukere løser realistiske oppgaver Online brukertilfredshetsunder-

	søkelse(r)
	Brukertilfredshetsundersøkel se(r) via telefon, personlig møte eller per post
	Fokusgrupper/intervjuer med brukere
	Eye-tracking
Hvis det er gjennomført andre type tester, vennligst spesifiser nedenfor.	Åpent tekstfelt

SEKSJON 5

Spørsmålene i denne femte seksjonen omhandler ulike mulige organisatoriske gevinster som hjemmesiden kan skape for din organisasjon.

Spørsmålene skal besvares ut i fra hvordan du mener hjemmesiden bidrar til å skape mulige gevinster, fra "veldig liten grad" til "veldig høy grad". Hvis du anser noen av spørsmålene som ikke relevante, vennligst bruk svaralternativet "ikke relevant".

I hvilken grad vurderer du at hjemmesiden bidrar til...	
...mer tid til å gjøre daglige oppgaver i organisasjonen	Veldig liten grad
	Liten
...en reduksjon i antall henvendelser per telefon, e-post, personlig oppmøte etc.	Middels
	Høy
...en reduksjon i organisatoriske kostnader (f.eks. prosesser automatiseres, færre antall ansatte etc.)	Veldig høy grad
	Ikke relevant
...å kunne tilby informasjon og tjenester uten å	

ha en personlig interaksjon med brukerne (i de tilfeller der det er hensiktsmessig)	
...at det er enklere å komme i kontakt med brukerne	
...en mer effektiv kommunikasjon med brukerne	
...at det er enklere å formidle informasjon og service ovenfor brukerne	
...et godt omdømme av organisasjonen blant brukerne	
...et strategisk arbeid med digitalisering i organisasjonen	

SEKSJON 6

Spørsmålene i denne seksjonen omhandler din vurdering av brukernes gevinster ved bruk av hjemmesiden.

Spørsmålene skal besvares ut ifra hvordan du mener hjemmesiden bidrar til å innfri mulige gevinster for brukerne, fra "veldig liten grad" til "veldig høy grad". Hvis du anser noen av spørsmålene som ikke relevante, vennligst bruk svaralternativet "ikke relevant".

I hvilken grad tror du brukerne vurderer at hjemmesiden bidrar til...	
...bedre informasjon og service til brukerne	Veldig liten grad
...mer effektiv og bedre kommunikasjon med organisasjonen	Liten
	Middels
...tilgang til informasjon og service når brukerne selv ønsker det	Høy
	Veldig høy grad

...en kostnadsbesparelse for brukerne (f.eks. besparelse i forhold til porto-, telefon- og transportomkostninger)	Ikke relevant
...en tidsbesparelse for brukerne (f.eks. transporttid og tapt arbeidstid)	
SEKSJON 7	
I denne siste seksjonen av spørreundersøkelsen bes du vennligst om å fylle inn bakgrunns-informasjon om deg selv.	
Vennligst spesifiser hvilken stilling du har i organisasjonen?	Åpent tekstfelt
Når startet du i din nåværende stilling?	Mindre enn ett år siden 1-2 år siden 3-5 år siden Mer enn 5 år siden
Ditt kjønn?	Kvinne Mann
Din alder?	25 år eller yngre 26-35 år 36-45 år 46-55 år 56-65 år Mer enn 65 år
Hva er ditt høyeste avsluttede utdanningsnivå?	Ingen høyere utdanning Faglig sertifisering/ kurs Bachelor grad eller

	tilsvarende
	Master grad, tilsvarende eller høyere
Er hele eller deler av utdanning informasjons-/kommunikasjonsfaglig?	Ja Nei
Er hele eller deler av utdanningen IT/webteknisk?	Ja Nei
I hvilken grad føler du at dine personlige krav til en hjemmeside med høy kvalitet stemmer overens med kvaliteten på hjemmesiden til din organisasjon?	Veldig liten grad Liten Middels Høy Veldig høy grad Ikke relevant
Hvis du helt til slutt har noen kommentarer til denne undersøkelsen, vær vennlig og kommenter. Du er også velkommen til å ta kontakt per telefon eller e-mail.	Åpnet tekstfelt
Hvis du ønsker å få tilsendt resultatene fra undersøkelsen, vennligst skriv inn din e-post adresse:	Åpent tekstfelt

19. Thomas Lyse Hansen
    Six Essays on Pricing and Weather risk in Energy Markets

20. Sabine Madsen
    Emerging Methods – An Interpretive Study of ISD Methods in Practice

21. Evis Sinani
    The Impact of Foreign Direct Investment on Efficiency, Productivity Growth and Trade: An Empirical Investigation

22. Bent Meier Sørensen
    Making Events Work Or, How to Multiply Your Crisis

23. Pernille Schnoor
    *Brand Ethos
    Om troværdige brand- og virksomhedsidentiteter i et retorisk og diskursteoretisk perspektiv*

24. Sidsel Fabech
    *Von welchem Österreich ist hier die Rede?
    Diskursive forhandlinger og magt-kampe mellem rivaliserende nationale identitetskonstruktioner i østrigske pressediskurser*

25. Klavs Odgaard Christensen
    *Sprogpolitik og identitetsdannelse i flersprogede forbundsstater
    Et komparativt studie af Schweiz og Canada*

26. Dana B. Minbaeva
    Human Resource Practices and Knowledge Transfer in Multinational Corporations

27. Holger Højlund
    *Markedets politiske fornuft
    Et studie af velfærdens organisering i perioden 1990-2003*

28. Christine Mølgaard Frandsen
    *A.s erfaring
    Om mellemværendets praktik i en transformation af mennesket og subjektiviteten*

29. Sine Nørholm Just
    *The Constitution of Meaning
    – A Meaningful Constitution?
    Legitimacy, identity, and public opinion in the debate on the future of Europe*

2005

1. Claus J. Varnes
   Managing product innovation through rules – The role of formal and structured methods in product development

2. Helle Hedegaard Hein
   *Mellem konflikt og konsensus
   – Dialogudvikling på hospitalsklinikker*

3. Axel Rosenø
   Customer Value Driven Product Innovation – A Study of Market Learning in New Product Development

4. Søren Buhl Pedersen
   *Making space
   An outline of place branding*

5. Camilla Funck Ellehave
   *Differences that Matter
   An analysis of practices of gender and organizing in contemporary workplaces*

6. Rigmor Madeleine Lond
   Styring af kommunale forvaltninger

7. Mette Aagaard Andreassen
   Supply Chain versus Supply Chain Benchmarking as a Means to Managing Supply Chains

8. Caroline Aggestam-Pontoppidan
   *From an idea to a standard
   The UN and the global governance of accountants' competence*

9. Norsk ph.d.

10. Vivienne Heng Ker-ni
    An Experimental Field Study on the

Effectiveness of Grocer Media Advertising
Measuring Ad Recall and Recognition, Purchase Intentions and Short-Term Sales

11. Allan Mortensen
Essays on the Pricing of Corporate Bonds and Credit Derivatives

12. Remo Stefano Chiari
Figure che fanno conoscere
Itinerario sull'idea del valore cognitivo e espressivo della metafora e di altri tropi da Aristotele e da Vico fino al cognitivismo contemporaneo

13. Anders McIlquham-Schmidt
Strategic Planning and Corporate Performance
An integrative research review and a meta-analysis of the strategic planning and corporate performance literature from 1956 to 2003

14. Jens Geersbro
The TDF – PMI Case
Making Sense of the Dynamics of Business Relationships and Networks

15 Mette Andersen
Corporate Social Responsibility in Global Supply Chains
Understanding the uniqueness of firm behaviour

16. Eva Boxenbaum
Institutional Genesis: Micro – Dynamic Foundations of Institutional Change

17. Peter Lund-Thomsen
Capacity Development, Environmental Justice NGOs, and Governance: The Case of South Africa

18. Signe Jarlov
Konstruktioner af offentlig ledelse

19. Lars Stæhr Jensen
Vocabulary Knowledge and Listening Comprehension in English as a Foreign Language

An empirical study employing data elicited from Danish EFL learners

20. Christian Nielsen
Essays on Business Reporting
Production and consumption of strategic information in the market for information

21. Marianne Thejls Fischer
Egos and Ethics of Management Consultants

22. Annie Bekke Kjær
Performance management i Proces-innovation
– belyst i et social-konstruktivistisk perspektiv

23. Suzanne Dee Pedersen
GENTAGELSENS METAMORFOSE
Om organisering af den kreative gøren i den kunstneriske arbejdspraksis

24. Benedikte Dorte Rosenbrink
Revenue Management
Økonomiske, konkurrencemæssige & organisatoriske konsekvenser

25. Thomas Riise Johansen
Written Accounts and Verbal Accounts
The Danish Case of Accounting and Accountability to Employees

26. Ann Fogelgren-Pedersen
The Mobile Internet: Pioneering Users' Adoption Decisions

27. Birgitte Rasmussen
Ledelse i fællesskab – de tillidsvalgtes fornyende rolle

28. Gitte Thit Nielsen
Remerger
– skabende ledelseskræfter i fusion og opkøb

29. Carmine Gioia
A MICROECONOMETRIC ANALYSIS OF MERGERS AND ACQUISITIONS

A case study of the Fashion and
Design Branch of the Industrial District
of Montebelluna, NE Italy

12. Mikkel Flyverbom
*Making the Global Information Society
Governable*
*On the Governmentality of Multi-
Stakeholder Networks*

13. Anette Grønning
Personen bag
*Tilstedevær i e-mail som inter-
aktionsform mellem kunde og med-
arbejder i dansk forsikringskontekst*

14. Jørn Helder
One Company – One Language?
The NN-case

15. Lars Bjerregaard Mikkelsen
*Differing perceptions of customer
value*
*Development and application of a tool
for mapping perceptions of customer
value at both ends of customer-suppli-
er dyads in industrial markets*

16. Lise Granerud
Exploring Learning
*Technological learning within small
manufacturers in South Africa*

17. Esben Rahbek Pedersen
*Between Hopes and Realities:
Reflections on the Promises and
Practices of Corporate Social
Responsibility (CSR)*

18. Ramona Samson
*The Cultural Integration Model and
European Transformation.*
The Case of Romania

2007
1. Jakob Vestergaard
*Discipline in The Global Economy
Panopticism and the Post-Washington
Consensus*

2. Heidi Lund Hansen
*Spaces for learning and working
A qualitative study of change of work,
management, vehicles of power and
social practices in open offices*

3. Sudhanshu Rai
*Exploring the internal dynamics of
software development teams during
user analysis
A tension enabled Institutionalization
Model; "Where process becomes the
objective"*

4. Norsk ph.d.
Ej til salg gennem Samfundslitteratur

5. Serden Ozcan
*EXPLORING HETEROGENEITY IN
ORGANIZATIONAL ACTIONS AND
OUTCOMES
A Behavioural Perspective*

6. Kim Sundtoft Hald
*Inter-organizational Performance
Measurement and Management in
Action
– An Ethnography on the Construction
of Management, Identity and
Relationships*

7. Tobias Lindeberg
*Evaluative Technologies
Quality and the Multiplicity of
Performance*

8. Merete Wedell-Wedellsborg
*Den globale soldat
Identitetsdannelse og identitetsledelse
i multinationale militære organisatio-
ner*

9. Lars Frederiksen
*Open Innovation Business Models
Innovation in firm-hosted online user
communities and inter-firm project
ventures in the music industry
– A collection of essays*

10. Jonas Gabrielsen
*Retorisk toposlære – fra statisk 'sted'
til persuasiv aktivitet*

12. Claus Bajlum
*Essays on Credit Risk and
Credit Derivatives*

13. Anders Bojesen
*The Performative Power of Competen-
ce – an Inquiry into Subjectivity and
Social Technologies at Work*

14. Satu Reijonen
*Green and Fragile
A Study on Markets and the Natural
Environment*

15. Ilduara Busta
*Corporate Governance in Banking
A European Study*

16. Kristian Anders Hvass
*A Boolean Analysis Predicting Industry
Change: Innovation, Imitation & Busi-
ness Models
The Winning Hybrid: A case study of
isomorphism in the airline industry*

17. Trine Paludan
*De uvidende og de udviklingsparate
Identitet som mulighed og restriktion
blandt fabriksarbejdere på det aftaylo-
riserede fabriksgulv*

18. Kristian Jakobsen
*Foreign market entry in transition eco-
nomies: Entry timing and mode choice*

19. Jakob Elming
*Syntactic reordering in statistical ma-
chine translation*

20. Lars Brømsøe Termansen
*Regional Computable General Equili-
brium Models for Denmark
Three papers laying the foundation for
regional CGE models with agglomera-
tion characteristics*

21. Mia Reinholt
*The Motivational Foundations of
Knowledge Sharing*

22. Frederikke Krogh-Meibom
*The Co-Evolution of Institutions and
Technology
– A Neo-Institutional Understanding of
Change Processes within the Business
Press – the Case Study of Financial
Times*

23. Peter D. Ørberg Jensen
*OFFSHORING OF ADVANCED AND
HIGH-VALUE TECHNICAL SERVICES:
ANTECEDENTS, PROCESS DYNAMICS
AND FIRMLEVEL IMPACTS*

24. Pham Thi Song Hanh
*Functional Upgrading, Relational
Capability and Export Performance of
Vietnamese Wood Furniture Producers*

25. Mads Vangkilde
*Why wait?
An Exploration of first-mover advanta-
ges among Danish e-grocers through a
resource perspective*

26. Hubert Buch-Hansen
*Rethinking the History of European
Level Merger Control
A Critical Political Economy Perspective*

2009

1. Vivian Lindhardsen
*From Independent Ratings to Commu-
nal Ratings: A Study of CWA Raters'
Decision-Making Behaviours*

2. Guðrið Weihe
*Public-Private Partnerships: Meaning
and Practice*

3. Chris Nøkkentved
*Enabling Supply Networks with Colla-
borative Information Infrastructures
An Empirical Investigation of Business
Model Innovation in Supplier Relation-
ship Management*

4. Sara Louise Muhr
*Wound, Interrupted – On the Vulner-
ability of Diversity Management*

TITLER I ATV PH.D.-SERIEN

1992

1. Niels Kornum
Servicesamkørsel – organisation, øko-nomi og planlægningsmetode

1995

2. Verner Worm
*Nordiske virksomheder i Kina
Kulturspecifikke interaktionsrelationer
ved nordiske virksomhedsetableringer i
Kina*

1999

3. Mogens Bjerre
*Key Account Management of Complex
Strategic Relationships
An Empirical Study of the Fast Moving
Consumer Goods Industry*

2000

4. Lotte Darsø
*Innovation in the Making
Interaction Research with heteroge-neous Groups of Knowledge Workers
creating new Knowledge and new
Leads*

2001

5. Peter Hobolt Jensen
*Managing Strategic Design Identities
The case of the Lego Developer Net-work*

2002

6. Peter Lohmann
*The Deleuzian Other of Organizational
Change – Moving Perspectives of the
Human*

7. Anne Marie Jess Hansen
*To lead from a distance: The dynamic
interplay between strategy and strate-gizing – A case study of the strategic
management process*

2003

8. Lotte Henriksen
*Videndeling
– om organisatoriske og ledelsesmæs-sige udfordringer ved videndeling i
praksis*

9. Niels Christian Nickelsen
*Arrangements of Knowing: Coordi-nating Procedures Tools and Bodies in
Industrial Production – a case study of
the collective making of new products*

2005

10. Carsten Ørts Hansen
*Konstruktion af ledelsesteknologier og
effektivitet*

TITLER I DBA PH.D.-SERIEN

2007

1. Peter Kastrup-Misir
*Endeavoring to Understand Market
Orientation – and the concomitant
co-mutation of the researched, the
re searcher, the research itself and the
truth*

2009

1. Torkild Leo Thellefsen
*Fundamental Signs and Significance
effects
A Semeiotic outline of Fundamental
Signs, Significance-effects, Knowledge
Profiling and their use in Knowledge
Organization and Branding*

2. Daniel Ronzani
*When Bits Learn to Walk Don't Make
Them Trip. Technological Innovation
and the Role of Regulation by Law
in Information Systems Research: the
Case of Radio Frequency Identification
(RFID)*

2010

1. Alexander Carnera
*Magten over livet og livet som magt
Studier i den biopolitiske ambivalens*