Evaluating Global e-Government Sites: A View using Web Diagnostic Tools

Jyoti Choudrie, Gheorgita Ghinea and Vishanth Weerakkody
Dept of Information Systems and Computing, Brunel University, Uxbridge, UK
Jyoti.Choudrie@brunel.ac.uk
George.Ghinea@brunel.ac.uk
Vishanth.Weerakkody@brunel.ac.uk

Abstract: Several governments across the world have embraced the digital revolution and continue to take advantage of the information and communication facilities offered by the Internet to offer public services. Conversely, citizens' awareness and expectations of Internet based online-public-services have also increased in recent times. Although the numbers of the different national e-Government web portals have increased rapidly in the last three years, the success of these portals will largely depend on their accessibility, quality and privacy. This paper reports the results of an evaluative study of a cross-section of e-Government portals from these three perspectives, using a common set of performance metrics and Web diagnostic engines. Results show that not only are there wide variations in the spectrum of information and services provided by these portals, but that significant work still needs to be undertaken in order to make the portals examples of 'best practice' e-Government services.

Keywords: e-Government, accessibility, quality, privacy

1. Introduction

Within private sector organisations, the penetration of the Internet and opportunities involving Information and Communication Technologies (ICTs) has occurred at an escalating rate. This has caused governments and public sector organisations around the globe to take notice of this phenomenon, become aware of its potentials and consequently utilise them, thereby triggering investments into e-services. However, the e-services offered by governments are much more than simple automation. E-services are meant to dramatically improve all areas of government activities-from democratic participation using online voting to improving the efficiency of citizen interaction with government by providing online government services (Barc and Cordella, 2004). Through the years, there has been much cynicism of government services and the resulting outcomes in terms of government and citizen relationships. This has often led to a low public participation and trust in government services (Northrup and Thorson 2003). In more recent times, governments, both, in developed and developing countries have started to view online government services as being a solution to this problem. As citizens become accustomed to the advancements on the Internet via the emergence of ICTs, their expectations of and relationship with the government is changing. Governments are following suit and adopting information society tools and working practices to remain responsive to citizen needs. The utilisation of ICTs and other such technologies in providing improved services and products to external and internal stakeholders can be broadly referred to as E-Government. Since e-Government is still in its infancy stages of development there are varying definitions of it (United Nations, 2003; Borras, 2003), each emphasising the importance of citizens and government interaction using various means (Caldow, 1999). For instance, some apply e-Government in the context of e-commerce, whilst others use it to describe the online relationship between governments and citizens. For this paper, we are using the definition by UNDPEPA (2002): Broadly defined, e-Government includes the use of all information and communications technologies from fax machines to wireless palm pilots to facilitate the daily administration of government. However, like e-commerce, the popular interpretation of e-Government is one that defines it exclusively as an internet-driven activity that improves citizen access to government information, services and expertise to ensure citizen participation in, and satisfaction with the government process." (UNDPEPA, 2002).

The impact of e-Government at the broadest level is simply better government by enabling better policy outcomes, higher quality services, greater engagement with citizens and by improving other key outputs (OECD 2003). There are many

 ©Academic Conferences Ltd

substantial benefits of e-Government initiatives including, improving efficiency by reducing the time spent upon manual tasks, providing rapid online responses, and improvements in organisational competitiveness within public sector organisations (Yttersad and Watson 1996). Furthermore, it helps in building and strengthening trust between governments and citizens (OECD, 2003). Since the benefits of e-Government became apparent, the number of worldwide e-Government projects has increased since 1996 from three to more than five hundred national initiatives (Al-Kibsi et al. 2001).

One conduit of offering online products and services both to the private and public sectors are e-Government websites or portals. As the potentials of websites have become apparent the positions that they have in the business environment is changing. For a long time websites were assumed to be the outlets that display information in an attractive and entertaining manner to members of the public. However, this no longer holds true and organisations, whether the public or private sector ones have to revaluate the strategic position of this tool. As Benjamin and Whitley (2004) noted, *"No longer can a website justify itself merely by being a website-the bottom line is merely is apparently clear: web pages must reach concrete goals and prove their investment*". The justification of websites as a strategic tool has emerged increasingly in the private sector and subsequently complex benchmarking methodologies have been developed (Barnes and Vidgen, 2000).

As in the instance of previous studies on the development and evaluation of web sites (Jarvenpaa and Todd 1996; Palmer and Griffith 1998), the question that drives this and other recent e-Government research (Gant and Gant 2002) is to determine and increase the understanding of how usable an e-Government portal is. Specifically, the purpose of this paper is to describe the issues related to the accessibility, quality and privacy of state government web portals of countries that have been considered to be benchmark measures of good e-Government practices. Accordingly, the structure of this paper is as follows. Section 2 offers a theoretical understanding of the main issues in e-Government and the technical issues surrounding it. Thereafter a discussion of the research methodology and selection for the web portals is offered in section 3. Section 4 discusses the results of this research and section 5 concludes the paper.

2. Research context

Our research is concerned with the key issue of *quality.* The concept of quality is multi-faceted: one could distinguish, for instance, as many quality perspectives as there are stakeholder groups. Indeed, the World Wide Web is no exception to this rule; accordingly, depending on the perspective adopted, we have a Quality of Service perspective (Chen et al, 2001; Kurose, 1993), a user perspective (Ghinea and Thomas, 1998), a content perspective (Dholakia and Rego, 1998) or indeed a usability perspective (Rose et al, 1999). In this paper, we consider the latter in the context of e-Government portals.

While the concept of e-Government is rapidly gaining momentum, the various e-Government web portals and the services offered by them are being continuously assessed and 'leagues of tables' are being produced (Greenspan, 2003). For instance, the consultancy firm Accenture has compiled a report of countries that have been accredited for their e-Government initiatives, which include Canada, Singapore, the United States, Denmark, Australia, Finland, Hong Kong, the United Kingdom, Germany, and Ireland (Accenture, 2002).

A unique issue afforded by e-Government is that although it offers online services to citizens, it is also being considered to be a special case of ICT enabled business process change and therefore is worth investigating (Dittrich et al, 2003). This is being attributed to the way that government departments will have to change how they operate. When business process change occurs, it is not only a technologically focused imperative; it also involves the co-operation of people (Weerakkody and Currie 2003). Dittrich et al., (2003) found that services, technology and people need to work together to achieve their objectives, thereby supporting previous claims of business process change theorists. This viewpoint assisted this research as it allowed the

 ©Academic Conferences Ltd

researchers to consider not only the technical aspects of the web portals, but also the way that various users use the portals.

The emergence of e-Government started with initial efforts by governments to form online relationships with citizens using static web pages that disseminated various isolated pieces of information. However, as citizens became familiar to the web, they became 'web savvy' and governments have now begun to form web portals. Web portals allow visitors to enter a state government web site and obtain online services delivery (Gant and Gant, 2002). A more intensive description is that web portals offer an integrated gateway, or main user interface into a website. "It provides both external constituents and internal government personnel with a single point of contact for online access to state information and resources" (ibid, 2002).

Empirical evidence is also being produced within government agencies and industrial organisation domains offering a practical slant to e-Government initiatives around the world (West, 2003). While such research is invaluable for the further development, understanding and promotion of e-Government initiatives, the success of web portals offering e-Government services will largely depend on their usefulness, efficiency and usability (Holden et al., 2002). Similar concerns were also raised in other online areas such as e-commerce as their development occurred. Moreover, there is little published research on the evaluation of government web portals on a global scale (Araujo and Grande, 2003). West (2003) is one of the few academic researchers who has conducted research into e-Government web portals on a global scale whereby, a large number of web portals were assessed for features such as, information availability, service delivery and public access. West (2003) found that international websites were slow when downloading pages; there were no privacy policies; there were links to non-existent e-services and services; and did not offer disability features for citizens. On a smaller and national scale, Araujo and Grande (2003) found from their examination of e-Government web portals of local authorities in Spain that the Spanish municipalities are still at the initial stage of web development and little consideration is given to the citizens needs. Lastly, Kuk (2004) took a network perspective and analysed hyperlink information of two of e-Government portals, Singapore and Taiwan, to determine the cohesion between governmental agencies and third parties.

Using Kling's (1978) reasoning, this research followed a path whereby particularly the role of citizens and government, groups that are considered major stakeholders of any e-Government initiative, are considered. Since the view of governments and the services they offer are often negative, governments are keenly pursuing ways of eliminating that image by offering online services through e-Government web portals (Bertelsmann and Booz Allen Hamilton, 2001). The Internet revolution on the other hand has produced an information culture in which individuals (citizens) have access to, and hence, expect access to a great deal of data and information (Shapiro, 1987). This research aims to develop studies on quality, accessibility and privacy issues of e-Government web portals and, subsequently raise awareness of and demonstrate the current advantages of online services offered by the government to citizens via their pursued e-Government initiatives.

The functioning of an e-Government initiative, whether the system upon which the initiative is undertaken or the web portal that provides and assists the citizen with the required information, are all examples of the implementation of an information system (IS) and thereby offers ample support for research that determines its success or failure. Conversely, evaluation is a method that can be used in various ways within the Information Systems area. It can be used to measure Information Technology and Systems (IS/IT) that are used for a system as in the case of Irani (2002). To establish the success of an IS, not only are the technical aspects an important factor to consider, but the social and political factors as well (Kling, 1978).

Within the IS area, issues such as quality have been explored and described in general terms, whilst the context is focused upon e-commerce. Issues explored include accuracy of information,

completeness, relevancy, security, reliability, customisation, interactivity, ease of use, speed, search functionality, and organisation (Liu and Arnett, 2000). Other means of determining this have been described as content design (Huizingh, 2000); information, friendliness, responsiveness and reliability (ibid) and one of the most renowned research that examines the technical impediments of web sites is that of Rose et al. (1999). Specifically, Rose et al. (1999) found that factors such as download speed, web interface and search functionality are key measurements that define web success. In the following section, we are going to take this research a step further by undertaking an analysis of Web portals using ranked Web diagnostic tools.

3. Research methodology

3.1 Web diagnostic tools

To prevent a biased opinion from emerging in our research by using only one web diagnostic tool we utilised a number of widely available and used web diagnostic tools. Thus, *WebXact* (**http://webxact.watchfire.com**), from the same team that produced the *Bobby* software tool was used in order to gauge accessibility, quality and privacy. WebXact divides the accessibility needs of a page into three main categories (or *priorities* in Bobby-lingo) – Priority 1 Accessibility problems seriously affect a page's usability by people with disabilities and passing these is equivalent to the portal passing Conformance Level A of the World Wide Web's Consortium (W3C) Web Content Guidelines. Priority 2 Accessibility problems, whilst not as critical as those of Priority 1, are nonetheless considered to be important from an accessibility viewpoint, while Priority 3 Accessibility issues represent the last tier of criteria which must be passed in order to get an AAA conformance level for the Web Content Guidelines. Quality issues reported by *WebXact* include typical download times on a 56.6kbps connection, availability of information such as metadata and date of the last update, as well as the portal's use of stylesheets, server-side image maps and inline multimedia elements, which might prove to be a problem to users accessing the portal without appropriate plug-ins. Lastly, the *WebXact* privacy report examines issues such as P3P (*Platform for Privacy Preferences*) compliance, cookies set by the portal designers, the number of HTML GET forms, as well the encryption level of the portal, if any.

Other tools that we used include *Netmechanic* (**http://www.netmechanic.com**), which was utilised in order to monitor broken links in the HTML code of the portals, while the W3C's *HTML validator* (**http://validator.w3.org**) was used to validate the HTML code of the portals. The last tool to be employed in our study was *vizcheck* (**http://www.vischeck.com**), which simulated how the colour schemes used by the respective portals impacted upon people with various forms of colour blindness. Three types of colour blindness are simulated: deuteranope and protanope (both of which are forms of red/green deficiency), and tritanope (a rare blue/yellow deficiency).

3.2 Choice of portals

The main issue that this research focused upon was to understand and examine issues such as quality, accessibility and privacy of a select number of web portals. The web portals were not randomly selected, but a careful process was undertaken. Rather than selecting any generic e-Government web portal this research attempted to evaluate the web portals of governments that are considered to be leaders in the area of e-Government. By pursuing such an approach it was felt that measures of 'best practices' could emerge. In turn this can offer lessons to countries that are still in the process of improving and developing their e-Government strategies.

In order to obtain the data for this research, as explained before, we examined the national web portals of a select number of countries (ranked as 'best practice' countries by Accenture, 2002) and their web addresses are provided along with the names-Singapore (http://www.gov.sg), Finland (http://virtualfinland.fi), Canada (http://canada.gc.ca), Hong Kong (http://info.gov.hk) and Australia (http:// australia.gov.au). This strategy is similar to the one that follows a multiple case study approach. The case studies were sampled across geographies in order to prevent a biased opinion from emerging and offering

 ©Academic Conferences Ltd

a holistic overview. Additionally, this method was selected to reflect variability in environmental contingencies (Yin, 1993).

4. Discussion of results

When we applied *WebXact* to examine whether the web portals do have Accessibility errors on their respective web pages we obtained the results summarised in Figure 1. We can see that two portals, namely those of Canada and Hong Kong ranked the best, with no Priority1 Accessibility errors. Moreover, Canada had no Priority 3 errors. All the remaining three had one Priority 1 error, albeit with a varying number of instances.

Most of the Priority 1 accessibility errors picked up by *WebXact* concerned the use of colours to convey information (detrimental to people with vision deficiencies), the lack of alternative text tags for images (with consequent problems for text-to-speech – TTS - synthesisers that visually-impaired people use to access the Web), page flicker, as well as the possibility of pages to be readable and usable without the use of stylesheets. Lastly, all sites with Priority 1 errors did not boast alternative accessible versions.

The main Priority 2 errors flagged up by *WebXact* included the use of absolute (and not relative) sizing, discriminatory towards users with hardware specifications different to those for which the portals were written and the explicit use of a mouse for event handling. Again, we remark that for this category, the Canadian portal was the best.

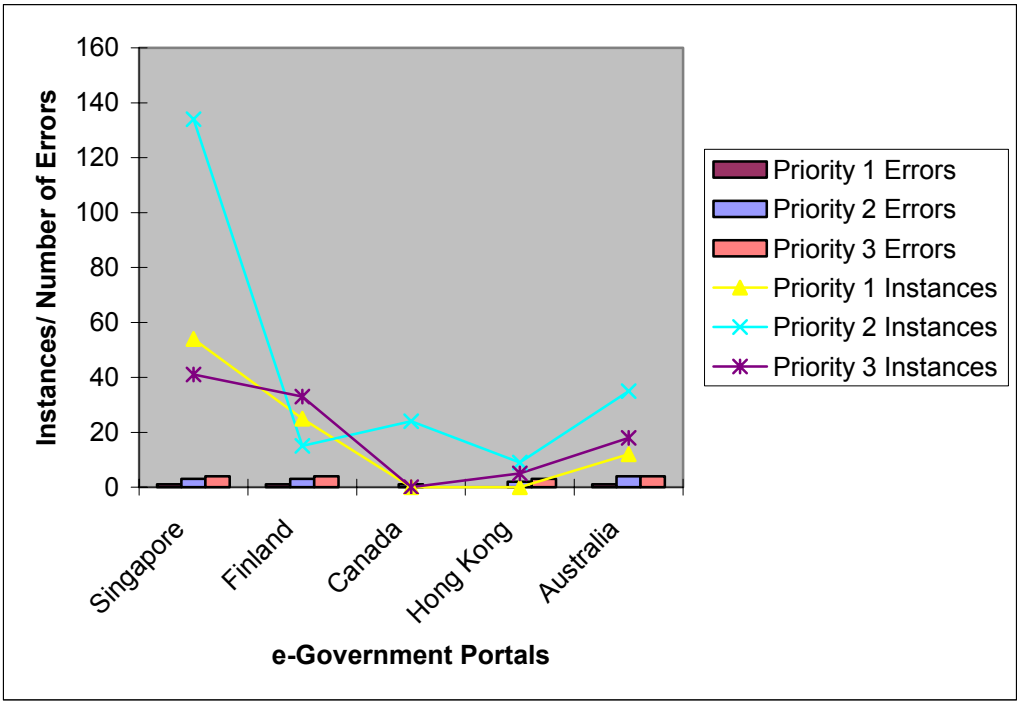

Figure 1: *WebXact* Accessibility Results

Priority 3 errors which were diagnosed by *WebXact* cover the lack of available summaries for tables (a feature working against people using TTS tools) as well as the language of the text not being identified. What is to be remarked though is that no portal is in the position to get an AAA conformance rating, as all violate at least one category of accessibility guidelines.

From a Quality perspective, the portals analysed by us show mixed results (Table 1). On the positive side, none of the entry pages of the portals boasted inline multimedia elements, and neither did they have any server side image maps, eliminating the need for any dedicated plug-ins. Downloading times for the entry pages were varied, with Hong Kong being the fastest, and Canada and Singapore the slowest. What is interesting is that only

for two websites (Singapore and Hong Kong) could the time of their last update be picked up by *WebXact* – whilst this information only applied to the entry pages of the portals (highlighting the fact, for instance, that the Hong Kong portal's entry page had not been updated for 479 days at the time of access), other information contained in the portal had been much more regularly updated. For instance, we examined the page at http://www.info.gov.hk/digital21/e-gov/eng/index.htm on the 2nd of April, and found that the page had been updated on the 15th of March, therefore suggesting regular updates. Similar considerations applied to all the other portals examined in our study.

Of the five portals covered, only three used style sheets. Whilst this is a desirable feature for web page design, none of these portals provided equivalent versions which did not exploit style sheets. Lastly, as far as Metadata goes, only the portals of Canada and Australia have a high level of Metadata content. Indeed, the Hong Kong portal lacks basic Metadata content such as description and keywords. Moreover, the Finnish portal is the only one which acknowledges its authors.

Table 1: *WebXact* Quality Results

	Singapore	Finland	Canada	Hong Kong	Australia
Download times (secs)	14	12	14	2	7
Time Since Last Update (days)	0	N/A	N/A	479	N/A
Style sheets	0	2	1	0	1
Server side image Maps	0	0	0	0	0
Inline Multimedia Elements	0	0	0	0	0
Metadata Elements	3	4	25	1	20

Privacy is the last category which we analysed using *WebXact*. None of the portals examined were encrypted (this might indeed be over elaboration) and none had made and provisions for P3P compliance (this reflecting the relative novelty of this thrust of the W3C). Only the Finnish portal had cookies set by the page; this same portal, together with the Australian one had GET forms, which are a potential security risk.

When applying *Netmechanic* to the portals, it was found that only the entry page of Canada's portal did not have any broken links (Figure 2). However, all of them had potential browser compatibility problems, with Finland being the leader in this category.

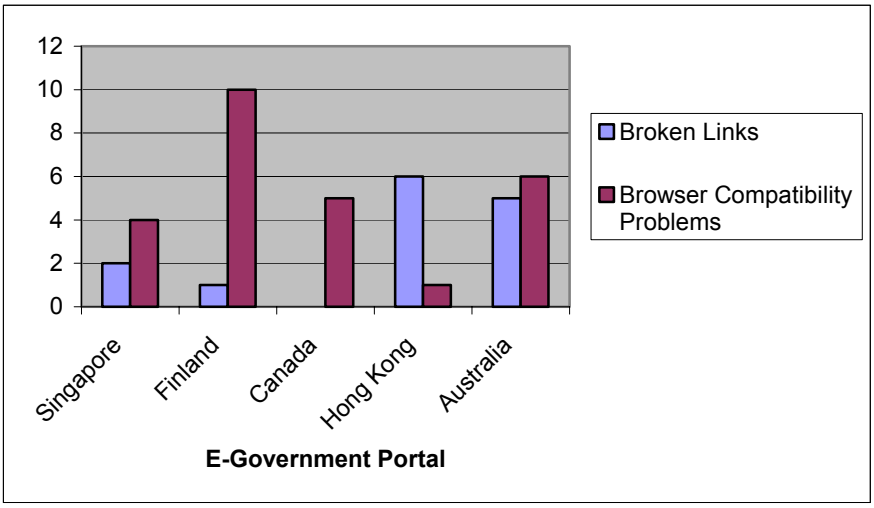

Figure 2: Summary of *Netmechanic* results

 ©Academic Conferences Ltd

Application of the W3C's HTML validator highlighted that only the Canadian portal had HTML 4.01 valid entry page. Of the remaining portals examined, the Singapore and Hong Kong sites did not have DOCTYPE declarations, and therefore did not validate, with the Australian and Finnish portals having a plethora of errors. Whilst strict compatibility with the (X)HTML standards is not a *sine qua non* requirement for the portals to operate properly, this finding demonstrates that although these portals offered a range of e-Government services and products, clean cut HTML design is lacking in most of them, with consequent problems on future portability and development.

Finally, using *Vischeck* on the portals did not reveal any major visual impairment to report for any one of the three forms of simulated colour blindness. This shows that designers were very aware of colour scheme issues when creating the respective portals.

5. Conclusions

The two decades leading up to the mid 1990's witnessed many private sector enterprises embarking on various management innovation and change initiatives (JIT, TQM and BPR) with a view to improving their business processes and IT systems. This helped the private sector to minimise waste, produce better quality products, and resulted in the manifestation of a customer services driven business environment. Although at a much slower pace and often lagging far behind, a similar pattern emerged in the government sector during the same period. While management innovation and technology continued to grow at an impressive speed throughout the 1990's, the late 90's observed the emergence of the Internet and a new array of associated ICT's. This gave birth to a new phase in the business evolution cycle in the private sector in the form of e-business. Not surprisingly, governments across the globe began to respond with their own form of e-business, popularly referred to as e-Government. While we acknowledge the benefits of this pattern of the government sector copying the techniques and technologies used in private sector, we also argue that in a hurry to replicate the highly dynamic e-business environment governments may be overlooking basic *e-customer-service-criteria* (such as quality, accessibility and privacy).

In this paper we have outlined the initial results of an ongoing research study that evaluates the accessibility, quality and privacy issues concerning the first phase of e-business in government, the web portal presence. Using a series of standard web diagnostic tools, we examined the above three criteria in the e-Government web portals of Canada, Australia, Hong Kong, Finland and Singapore. Unsurprisingly, the results of this study (outlined in section 4) confirmed our above stated concern that in a hurry to embrace the first phase of e-governance (the web portal presence) many governments are neglecting accessibility, quality and privacy criteria. While the private sector has continued to improve such criteria in the business-2-business and business-2-consumer e-commerce arena, it is clear from our research that more effort is needed to incorporate these criteria in the context of web portal design for e-Government. This strongly suggests that web designers and policy makers responsible for e-Government should follow and encourage the use of recognised guidelines when designing web portals for e-Government. Results of our experimental research using performance metrics and web diagnostic engines also exemplify the significance of such tools in the design and delivery of web portals. While such tools (WebXact, Netmechanic) are widely used in commercial website/web portal design and delivery, there is little evidence to suggest that they are used in the government sector. Perhaps, a more citizen relationship management (CRM) oriented approach to e-governance would encourage the design of better quality, more accessible and secure web portals.

Although this research reports on a small sample of e-Government web portals in world wide terms, nevertheless, it represents an important sample in terms of best practice e-Government portals as outlined in the previous section. In this context, it is fair to suggest that the lower ranked e-Government web portals (according to Accenture 2002) would perform even worse in the accessibility,

quality and privacy criteria tests that we conducted in our research. In considering these three perspectives, we also recognise that more angles, such as layout, use of scripting languages, security of personal data and availability of citizen documentation, could be incorporated into this research.

Future research directions for this research lie in verifying whether the aforementioned assumption would hold and also whether the issues of accessibility, privacy and quality are observed in a larger sample of countries. In addition, a different stance to this research lies in evaluating the Web portals from a cultural perspective. Since the web portals were of a global nature an impetus for the future lies in determining whether culture has an impact upon the development of such portals. Moreover, lest one forgets that the ultimate determinant of web site quality are the users themselves, and interesting future direction for this research lies in providing a comparison of the subjective and objective views of e-Government portal quality. We have already begun a study of the comparison between the subjective and objective views and interesting results have emerged. However, to make the study worthwhile we have decided to undertake a study that will incorporate other variables such as education and age and their impact upon website quality.

References

Abidan, N. A. Z. (2002). *eGovernment Around the World: Lessons Learnt*. Accenture, March, Powerpoint Presentation.

Accenture (2002). "Technology in Government: Riding the Waves of Change". www.accenture.com. Viewed on March 20, 2004.

Al-Kibsi, G., de Boer, K., Mourshed, M. and Rea, N. (2001). "Putting Citizens Online not in Line", *The McKinsley Quarterly,* 2. pp. 65-73.

Araujo, M. C. R. and Grande, J. I. C. (2003). "Performance in E-Government: Web Site Orientation to the Citizens in Spanish Municipalities". *Proceedings of European Conference on e-Government*, Trinity College, Dublin.

Bailey, J.E. and Pearson, S.W. (1983). "Development of a Tool for Measuring and Analysing Computer User satisfaction", *Management Science*. 29 (5), pp. 530-45.

Barc, C. and Cordella, A. (2004). Seconds Out, Round Two: Contextualising E-Government Projects within their Institutional Milieu-A London Local Authority Case Study. In Proceedings of the *12th European Conference on Information Systems*, Turku, Finland, June 14-16.

Barnes, S. and Vidgen, R. (2000). WebQual: An Exploration of Web-site Quality. In Proceedings of the *8th European Conference on Information Systems* (Mahrer, H. ed). 298-305. Vienna, University of Economics and Business Administration, Austria.

Benjamin, M. and Whitley, E. (2004). Assessing UK E-Government Websites; Classification and Benchmarking. Proceedings of the *12th European Conference on Information Systems*, Turku, Finland, June 14-16.

Bertelsmann and Booz Allen Hamilton (2001). *Balanced E-Government: E-Government-Connecting Efficient Administration and Responsive Democracy.* Fall.

Borras, J. (2003). E-Government Challenges and Perspectives-the UK Perspective. Office of the E-Envoy.

Brancheau, J.C., Janz, B. D. and Wetherbe, J.C. (1996). "Key Issues in Information Systems Management: 1994-95 SIM Delphi Results", *MIS Quarterly*, 20 (2), pp. 225-42.

Caldow, J. (1999). "The Quest for Electronic Government: Defining a Vision". Institute for Electronic Government, IBM Corporation.

Chen, X., Mohapatra, P., and Chen, H. (2001) *An Admission Control Scheme for Predictable Server Response Time for Web Accesses*, Proceedings of the 10th World Wide Web Conference, pp. 545 – 554, Hong Kong, China.

Cuddy, I. (2003). *New moves for European eGovernment***.** Viewed at

 ©Academic Conferences Ltd

http://www.egovmonitor.com/newsletter/yzdqasd86/talrln02.html

Denzin, N.K. and Lincoln, Y.S. (1994), *Handbook of Qualitative Research*, Thousand Oaks CA, SAGE Publications.

Dholakia, U.M. and Rego, L.L., (1998). "What makes commercial Web pages popular?", *European Journal of Marketing,* 32(7/8), pp. 724-736.

Dittrich, Y., Ekelin, A., Elovaara, S. and Hansson, C. (2003). *Making E-Government Happen Everyday Co-Development of Services, Citizenship and Technology*, in Proceedings of the 36th Hawaii International Conference on Systems Sciences (HICSS).

Fogg, B.J., Marshall, J., Larkaki, O., Osipovich, A., Varma, C., Fang, N., Paul, J., Rangnekar, A., Shon, J., Swani, P. and Treinen, M. (2001), *What makes Web Sites Credible? A Report on a Large Quantitative Study*, CHI 2001, 3 (1), pp 61-68.

Gant, J.P and Gant, D.B (2002), *Web Portal Functionality and State Government E-Services*, Proceedings of the 35th Hawaii International Conference on Systems Sciences, 2002.

Ghinea, G. and Thomas, J.P. (1998), *QoS Impact on User Perception and Understanding of Multimedia Video Clips*, Proceedings of ACM Multimedia '98, pp. 49 - 54, Bristol, U.K..

Greenspan, R. (2003). Around the World with E-Government. www.nua.com. Viewed on August 21, 2003.

Hart Teeter. (2002). *E-Government: To Connect, Protect and Serve Us.* http://www.excelgov.org/techcon/0225poll/report.PDF. Viewed on August 10, 2003.

Hinnant, C.C. and Welch, E.W. (2002). Managerial Capacity and Digital Government in the States: Examining the Link Between Self-Efficacy and Perceived Impacts of IT in Public Organisations. In Proceedings of the 36th Hawaii International Conference on Systems Sciences (HICSS).

Hochheiser, H. and Shneiderman, B. (2001), "Universal Usability Statements: Marking the Trail for all Users", *ACM Interactions*, 8 (2), pp. 16-18.

Holden, S. H., Norris, D. F. and Fletcher, P.D. (2002). *Electronic at the Grass Roots: Contemporary Evidence and Future Trends*. Proceedings of the 36th Hawaii International Conference on Systems Sciences.

Huberman, A.M. and Miles, M.B. (1994), *Qualitative Data Analysis: A Sourcebook of New Methods*, California, SAGE Publications.

Huizingh, E. K. (2000). "The Content and Design of Websites: An Empirical Study", *Information & Management*, 37, pp. 127-134.

Irani Z. 2002. "Framework for the evaluation of information systems", *The International Journal of Information Technology Management,* 1(2), pp. 143-167.

Ives, B., Olson, M. H. and Baroudi, J. J. (1983). *The Measurement of User Information Satisfaction*. Communications of the ACM, 26 (10), pp.785-93.

Jarvenpaa, S.L. and Todd, P.A. (1996). "Consumer Relations to Electronic Shopping on the World Wide Web", *International Journal of Electronic Commerce*, 1 (2).

Kling, R. Naumann, (1978). "Value Conflicts and Social Choice in Electronic Funds Transfer Developments", *Communications of the ACM*, 21 (8), pp. 642-657.

Kuk, G. (2004). "Network Analysis of Disconnect in the Hollow State: the Case of e-Government Service Portals". *Proceedings of the 12th European Conference on Information Systems*, Turku, Finland, June 14-16

Kurose, J.F., (1993) "Open Issues and Challenges in Providing Quality of Service Guarantees in High-Speed Networks", *ACM Computer Communications Review*, 23(1), pp. 6 – 15.

Liu, C. and Arnett, K.P. (2000). "Exploring the Factors Associated with Website Success in the Context of Electronic Commerce", *Information & Management*, 38, pp. 23-33.

Lucas, H. C. (1978). "Empirical Evidence from a Descriptive Model of Implementation", *MIS Quarterly*, 2 (2), pp.27-41.

Moretti, G. and Lyons, P. (2002). Tools for the Selection of Colour Palettes. *Proceedings of the New Zealand Symposium On Computer-Human Interaction (SIGCHI 2002)*, University of Waikato, New Zealand, July 11-12.

Morton, J. (2001). Colour Voodoo for E-commerce. COLOURCOM. Honolulu.

Naumann, Kling, R. (1978). "Value Conflicts and Social Choice in Electronic Funds Transfer Developments", *Communications of the ACM*, 21 (8), pp. 642-657.

Nielsen, B. (2001), "Online Internationalism: e-Government projects in the UK and US aim to Benefit Citizens and Government by Increasing Efficiency, but are Current Goals to Parochial", *ITWeek*, www.m12g.co.uk.

Nielsen, J. (1993*), Usability Engineering,* Academic Press Limited.

Northrup, T.A. and Thorson, S.J. (2003). *The Web of Governance and Democratic Accountability*. Proceedings of the 36th Hawaii International Conference on System Sciences (HICSS).

OECD (2003). The E-Government Imperative: Main Findings. Available at: http://www.oecd.org/dataoecd/60/60/2502539.pdf. Viewed on October 14, 2003.

Palmer, J.W. and Griffith, D.A. (1998). "An Emerging Model of Website Design for Marketing", *Communications of the ACM,* 41 (3), pp. 44 - 51.

Pavka, A. (2002), *Accessible by Design*, Digital Web Magazine, www.digital-web.com

Prins, J.E.J. (2001). *Electronic Government. Variations on a Concept*, in Designing E-Government. Kluwer Law International, Netherlands, pp.1-5.

Powers, R.F. and Dickson, G.W. (1973). "MIS Project Management: Myths, Opinions and Reality", *California Management Review*, 15 (3), pp. 147-56.

Preece, J. (1994). *Human Computer Interaction*. Addison Wesley, Wokingham.

Rose, G., Khoo, H. and Straub, D.W. (1999). "Current Technological Impediments to Business-to-Consumer Electronic Commerce", *Communications of the AIS*. 1(16).

Rubin, J. (1994). *Handbook of Usability Testing*. John Wiley & Sons, Inc, New York.

Shapiro, S. P. (1987). "The Social Control of Impersonal Trust", *The American Journal of Social Sociology,* 93, pp. 632-658.

Shim, J.P., Shim, Y.B. and Nottingham, L. (2002). "Retailer Web Site Influence on Customer Shopping: An Exploratory Study of Key Factors of Customer Satisfaction", *Journal of the Association for Information Systems*, 3, pp. 53-76.

UNDPEPA (2002). Benchmarking E-Government. A Global Perspective. New York. Available at: www.unpan.org/egovernment2.asp.

United Nations (2003). World Public Sector Report 2003: E-Government at the Crossroads. ISBN 92-1-123150-7.

Weerakkody, V. and Currie, W. (2003), Integrating Business Process Reengineering with Information Systems Development: Issues & Implications, Lecture Notes in Computer Science, Springer, LNCS 2678, pp 302-320.

West, D.M. (2003). Global E-Government, 2003. Available at: www.insidepolitics.org/egovt03int.html. Viewed on August 24, 2003.

Yin, R. K. (1993). *Applications of Case Study Research*, Newbury Park, California, SAGE Publications Inc.

Yttersad, P. and Watson, R. (1996). *Teledemocracy: Using Information Technology to Enhance Political Work*, MIS Quarterly**,** 20 (3).

 ©Academic Conferences Ltd