Transformational Government and Assistive web base technologies

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Abstract

Transformational government has been on the European agenda for several years. However, progress towards realising the full potential of ICT to transform public services for older adults with age related cognitive impairments has been very limited. Highlighting such limitations this paper demonstrates how assistive web base technologies can be developed to improve the public services for older adults with age related cognitive impairments. However the paper argues that these transformations can be obstructed if there is no strong leadership and political commitment from people at many levels in public sectors and governments.

Keywords: Transformational government, older adults, Age related cognitive impairments, Assistive web base technologies, online forms, leadership, political commitment

1 INTRODUCTION

Transformational government has been on the European agenda for several years. As a result, a focus towards transforming central and local government in the Europe is now seen to be a priority (European Commission 2005). The European perspective of the transformational government (t-government) goes beyond the objectives of e-government. It is therefore concerned with the effective improvement of governments' services using information and communication technology (ICT), combined with organisational change , increased citizen participation, enhanced public policy making and cross-border involvement (ibid). Indeed, this shows that the European Commission aspires to look at this transformation in holistic way considering technological, social and political aspects of deployment and implementation of t-government projects.

Most of the previous research on ICT-enabled organisational transformation, focuses on private enterprises, although the application of ICT to transform governments is becoming increasingly popular in developed and developing economies (Tan 2003). As a result there is very little description on what t-government means, in the academic literature. However if we take a look to the European Commission's and UK government's views on t- governments, there is a clear indication that t-governments are in many respects, campaign to transform government services in fundamental way using ICT. This transformation is not just a mater of getting better at what governments do for their citizens. It is an issue of doing new things in new ways using ICT to serve citizens that cannot be effectively done through more conventional channels of service delivery (EU 2005; HMSO 2007a) . Consequently, this vision is about effective and efficient use of ICT to deliver public services and policy outcomes that improve the lives of citizens, through grater choice and personalisation(HMSO

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2007b). While both the European Commission and the UK government have been promoting t-government projects, the UK government appears to have spelled out their strategy more clearly to achieve its vision on t-government. In this strategy there are three key transformations that are required to achieve the vision of the t-government (HMSO 2007a):

1) Services need to be designed around citizens, not the provider, to ensure effectiveness of delivery to citizens, to achieve policy goals, and release savings by reducing duplications and streamlining process.

2) A new shared services approach is needed to release efficiencies across the system and support delivery, focussing on citizens' needs. These shared services are intended to provide public service organisations with the prospect to trim down waste and inefficiencies by re-using assets and sharing investments with others.

3) It is necessary to broaden the governments' professionalism in planning, delivering, managing, and governing ICT enabled change.

These requirements are well fitted with the European Commission's i2010 e-Government Action Plan (EU 2006)that is designed to make public services in Europe, more efficient and more modern in order to target the needs of the general population more precisely. However reviewing all the given progress of t-governments in the UK, Sharif (2008) claims that to materialise the government vision to tangible services still remains a huge challenge. While the precise natures of such challenges are not properly researched the history shows that governments are more likely to experience more problems with ICT projects than other organisations (Craig and Brookes 2006).Previous experience of governments' ICT projects that ran over budget, brought few cost savings, or even failed, work altogether to shapes the approaches of managers and staff in governments generally towards ICT and to the development of web-based technologies in particular (Margetts and Dunleavy 2002). For example, many UK NHS managers became increasingly reluctance to spend money on ICT projects even if budgets are already allocated (ibid). Margetts and Dunleavy (2002) argue that such environment is unlikely to encourage managers in governments to explore possibilities of transformations through web-based technologies although web-based technologies tend to be cheaper and easier to develop. Consequently, managers and staff in government may show reluctance to appreciate the new possibilities for developing improved government-citizen relationships that web-based technologies provide. So the upgrading vision of transformational government poses significant challenge as the vision is not just about transforming government through ICT but also about making people in the government to transform public services through the use of ICT(Kolsaker and Lee-Kelley 2007).

However not all challenges to the transformational government come from within government organisations as some people in the society still neither have accesses to the web-based technologies nor capability to use them. They are the "digitally excluded". Unfortunately they are remarkably similar to those that can be characterised as socially excluded or disadvantaged(Selwyn 2003). These people are living in a disadvantage cycle. As they are socially excluded they are more likely to not get the benefits of available web-based technologies or ICT and consequently become digitally excluded. This digital exclusion reduces their chances to have the kind of social relations, social customs and activities in which the great majority of people in the society engage and consequently make them more and more socially excluded(see Haddon 2000; Liff et al. 2002). For example engaging with online world has become of increasing relevance in relation to employability and opportunities to search for an employment as more and more job vacancies are advertised in online job portals. So, reducing individual digital exclusion allows socially excluded people such as older adults achieve their life tasks more easily and economically(EU 2007). Although the reducing digital exclusion is important goal of vision on t-government, achieving it, is a challenging task. These challenges are much more noticed in government services for people with disabilities and older adults as they to be

hindered to engage in online activities due to the simple fact that current web-based technologies and services do not adequately cater for specific physical and cognitive impairments they have (ibid).

Keeping the above challenges in mind this paper reports upon work in progress of an EU research project which intends to transforms EU governments services for older adults with age related cognitive impairments. In Section 2 a brief explanation of age related cognitive impairments and their effects on web usage are presented. Section 3 provides the details of the project. Section 4 deal with the methodology which demonstrates how the project was organised and delivered expected outcomes. Next section provides the details of assistive web-base technology developed by the project. Section 6 shows how this technology can transform the government services for older adults with age related cognitive impairments. Drawing on literature on e-government, information systems and organisational studies, next section argues that in order to achieve potential transformations through developed technology (the DIADEM technology), strong leadership and political commitment at many levels in the government is required. Concluding remarks follow, including ideas for further research.

2 AGE RELATED COGNITIVE IMPAIREMENTS

Many studies demonstrate that cognitive abilities of individuals decline with age (Ardila et al. 2000; Boutet et al. 2007; Craik and Bialystok 2006; Czaja and Lee 2008; Saczynski and Rebok 2004). Main cognitive abilities that decline include the following (see Boutet et al. 2007; Morrel et al. 2000; Park 1992; Newell et al. 2008). These declined abilities and their effects on usage of web services are discussed below.

Working memory

Research shows that that working memory capacity declines with age and is especially strained when task complexity is increased. Working memory is usually conceptualized as "the temporary storage of information that is necessary for such activities as learning, reasoning, and comprehension"(Bradeley 1986). The usual tasks carried out by working memory are those in which the individual must hold a small amount of material in mind for a short period of time while at the same time performing further cognitive operations (e.g. comprehension), either on the material held or on other incoming materials (Morris et al. 1990). The decline of working memory holds a number of implications for the use of web services/applications by older adults. For example older adults can have difficulties in (1) understanding instructions in an online form (2) performing a large number of steps in an online transaction.

Perceptual speed

The age related cognitive impairment make older adults to have a general slowing of perceptual and motor processes involved in perceiving and responding to items. In other words the perceptual speed (the speed at which mental operations are performed) is decreased with increased age. Such slowness is raised, when task complexity increases. As a result older adults have difficulties performing complex tasks on websites which must be done externally imposed time constraints (see Newell et al. 2008). For example older adults may take considerable time to submit an online form after completing it.

Spatial Abilities

Spatial ability refers to skill in perceiving the visual world, transforming and modifying initial perceptions, and mentally recreating spatial aspects of one's visual experience. (Howard 1985). Spatial abilities boost during adolescence, reach their height during the second or third decade of life, and shrink steadily thereafter. Thus older adults have lower levels of abilities in performing tasks which

require spatial visualisations, integration of spatial information, and ongoing information processing (Morrell and Echt 1996). As many websites have complex computer screens which contains complex menu structures, banners, animations, three dimensional presentations etc which demands high degree of spatial abilities, older adults will have difficulties in using existing websites (see Kurniawan et al. 2006). For example older adults may have difficulties in understanding how to move to next page when next page button is available on an online form.

Attention

Gross(2001) shows that there are two major ways of defining and investigating attention:

1. the mechanism by which certain information is registered and other information is rejected, whether or not the latter enters conscious awareness. This mechanism is generally referred as a *selective or focus attention*.

2. the process which enable individual to allocate cognitive resources when two or more distinct cognitive tasks. This process is referred as a *divided attention*.

Although there is some debate as to whether older adults exhibit a general decline in selective attention, Roger(2000) reviewing the evidence up to that time, notes that there is no concrete evidence to suggest that selective attention declines with age. On the other hand several studies demonstrate that there is a significant difference between younger adults and older adults in their ability to divide their attention between tasks when such tasks are complex and demand cognitive resources. However evidence suggests that for relatively simple tasks younger adults and older adults can divide their attention equally well. These studies demonstrate that age related difference in divided attention depends on the complexity of the tasks (ibid). As existing web pages present scenarios where users require doing more than one thing at time older adults will have difficulties in using them. Further more walking, blinking, flashing objects and multiple frames in web pages demand high cognitive resources and consequently divided attention become mandatory rather than optional. As a result older adults using such web pages will have problems in allocating their attention appropriately. For example older adults can have difficulties in (1) understanding where they are in terms of physical location on the online form (e.g. page number, a section of an online form) (2) prioritising what the person is asked to do on an online form, allocating their attention appropriately.

From the above discussion, it is clear that age related cognitive impairments have detrimental impact on how older adults use web services. As a result older adults continuously face more difficulties than younger adults when using web services. Although there is very little research examining how such difficulties can be minimised, some research suggests that age related cognitive declines can be mediated by the manner in which web services are designed. Such research demonstrates that designing web services that take into consider age related cognitive impairments would consequently enhance the usage of web services and other computer applications by older adults (Holt and Morrell 2002; Sharit et al. 2003). For example Holt and Morrell(2002) demonstrate that efficiency of text comprehension by older adults is improved when the text is well organised and clearly presented in short segments on web pages. Consistent with cognitive aging literature, these results suggest that in order to design web services so that they are usable and useful for older adults, it is important to consider their age related cognitive impairments.

3 THE PROJECT

Although the above discussion present that older adults with age related cognitive impairments face challenges when using existing web services, the literature generally suggest that older adults are receptive to services based on new technologies (Czaja and Lee 2008). However the nature of their experience with existing technological applications such as web services is not pleasant. One major

reason seem to be that developers do not appear to pay important attention to older adults' declined cognitive abilities and impact of such abilities on use of web services by older adults(ibid).

Consequently this project, Delivering Inclusive Access to Disabled and Elderly Members of the community (DIADEM), used systematic effort to understand older adults' needs related to web services that are shaped by their declined cognitive impairments and incorporate them into design solutions. The DIADEM is currently being undertaken in the UK, Norway and Italy and funded by the European Union (EU). It aims to develop an assistive technology in to help the older adults with age related cognitive impairments, to use the web services more effectively. The project focuses on the problem of accessing services online where older adult users need to fill in online forms (e.g. housing benefits applications).

The research has very applied characteristics and developed through collaboration with the older adult users of web services, the developers of assistive technology and the web service providers. The project brings together seven research teams from three EU countries, each of which has a complementary expertise necessary for the proper progress and success of the project. The details of the research teams and their role in the project are presented in the Appendix 2.

4 METHODOLOGY

In line with the vision of the European Commission's transforming government (see European Commission 2005) that promote the active involvement of all key-stakeholders of e Government project, the DIADEM project allowed the older adult users, the developers and the service providers involve at the every step of the development process. Key-stakeholders comprised not only the developers and the service providers but also representatives from government agencies, private care/medical agencies and charities that support the older adults in each partner country (the UK, Norway and Italy).

The methodology consists the key stakeholder focus group interviews, the older adult user interviews and the older adult user trials. To enable work to proceed on as many fronts as possible, ethical approval was sought independently for each study by first going to the Brunel University's ethics committee and then locally by each partners. Furthermore the Mini Metal State Examination (MMSE) was employed to choose and recruit older adults who have appropriate age related cognitive impairments. The MMSE is a commonly used instrument for screening cognitive functions that has been standardised for use in all three countries (the UK, Norway and Italy). The MMSE provides a brief screening test that quantitatively assesses the severity of cognitive impairment and documents cognitive changes occurring over time (see Tombaugh and McIntyre 1992). As a result 50 female and 30 male older adults were selected. They ranged in age from 57 and 81 years, with a mean age of 67.1

From the analysis of the key stakeholder focus group and the older adult user interviews, core functional and usability requirements was identified for all applications as they are presented and accessed through DIADEM (some of the main requirements are listed in the Appendix1). The software specification is the main output from the gathering and analysis of the functional and usability requirements. The main focus of this software specification was a description of what all the functions of the software of the DIADEM are. These were defined in grate length to ensure that the developers understand what the older adult users require from the DIADEM and prioritise the requirements to pay considerable attention to the items that were perceived by the older adult users as very important. The DIADEM technology was developed using these specifications. In the second phase of the research the older user trials were employed to evaluate the efficiency, effectiveness, usability of the technology developed and the older users' satisfaction with it. Using the various results from these older user trials the DIADEM technology is being further improved.

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5 THE DIADEM TECHNOLOGY

The DIADEM technology was the main outcome from the above discussed activities (see DIADEM Architecture).
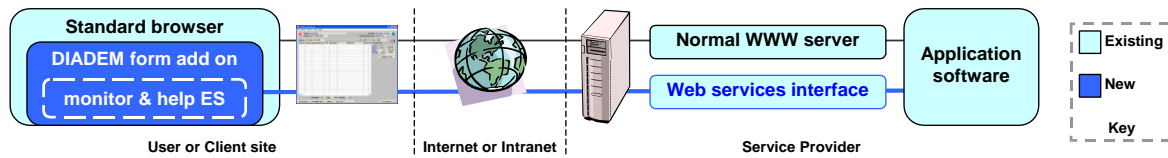
DIADEM Architecture

To respond to the challenges faced by older adults with age related cognitive impairments DIADEM employs Expert System techniques to analyse user behaviour and adapt the presentation of the transaction dialogue to mitigate the cognitive problems exhibited by the user. To ensure that a single user sees every online form in a consistent and personalised style this client component is data driven. It takes XML control files, which contain an abstract transaction description from the server, and generates an appropriate user interface using a rich set of multimedia devices (e.g. sound, video, document scanning and smart cards) to reduce the cognitive load on the user.

All user interaction with DIADEM takes place through a web browser. DIADEM is responsible for providing immediate help functionality in a consistent way across all services. In addition, if the DIADEM system fails to provide adequate "on screen" assistance it has access to external means of help desk support as indicated in the thematic analysis above.

To provide a specific response to each user's needs DIADEM uses Expert Systems (ES) technology to monitor usage and control personalisation or intervention strategies. The ES records the user's behaviour with respect to their interaction at the user interface. Based on an analysis of the user's interaction profile DIADEM infers the user's cognitive characteristics and stores these in the user characteristics profile. Using this knowledge the DIADEM adapts web applications to each user so that he or she is able to use these applications with fewer difficulties.

To respond to the security and trust issues around user identification and profiles DIADEM allows the end-user's computer to have a facility for user authentication that is not password-based (e.g., fingerprint, retina, smartcard, signature recognition). The DIADEM system keeps all user profiles confidential from other parties other than their respective users. It also protects the integrity of all user profiles so that the profile can only be modified by the system or by an authorised individual.

All the above characteristics of the DIADEM will reduce the impact of age related cognitive impairments on older adults' usage of web services. For example consider a case where an older adult filling an online form to buy a train ticket. The older adult may find it difficult to comprehend the text on the web page or to perform a large number of steps in the online transaction due to his declined working memory. He may also have difficulties in finding important information in the online forms that has visual clutter, background images and distracting animation as he has declined spatial abilities and perceptual speed. The above mentioned characteristics in the DIADEM will simply the online form and guide him to fill out the form though simple steps. So the online forms adapted and personalised by the DIADEM technology will be able provide several benefits for older adults with age related cognitive impairments:

- Older adults can access and complete the forms online form 24/7

- Older adults can receive instant online confirmation that the form has been received and accepted. As a result, older adults do not need to contact the government services again and again (e.g. telephone calls) to clarify if the form has been received and accepted

- As there are online help added to the form the older adults do not need to phone or physically contact the government services to get help to complete the forms

- Older adults do not need to understand the organisational boundaries in the government services that are being joined up to provide the services. Their service need will be met at the first point of contact. As a result the time between application submission and eligibility determination will be decreased.

- As the online forms have capability of integrating many services, older adults will have less confusion and distinction between services offered. Moreover they will have reduced requirement to provide the same information more than once as the data can be shared between service providers (government and private).

6 SERVICE TRANSFORMATION ENABLED BY THE DIADEM TECHNOLOGY

The transformation delivered by ICT should be (a) better for citizens (b) better for the staff who works in the government (c) better for the taxpayer (HM Government 2007). However EU or other governments do not seem to have a concrete agreement regarding the extent to which ICT is transforming public services (Castells 2000). One construction contribution to this area was developed by Danzier and Andersen (2002). They assessed the impacts of ICT on public administration and the public by analyzing the empirical research reported in more than 1,000 issues of research journals. Danzier and Andersen (2000) developed a conceptual framework to understand the ICT induced transformation in governments. The framework has four broad taxonomic domains which categorise the transformations. These domains are explained below.

Capabilities
This shows if ICT will have effects on the capabilities of the government bodies. It particular considers, alternations in capabilities associated with the impact of ICT on (1) the quality of information available for governments (2) changes in efficiency or effectiveness of services

Interactions
This considers the effect of ICT on communication, cooperation, control and coordination among public sector units (e.g. between departments, between the central government and local governments). It also consider the effect of ICT on relations between public sector and citizens or private sector

Orientation
This demonstrates whether ICT causes actors in the government to structure problems differently and alter their discretions

Value Distribution

This considers if the government experiences a shift in values that is attached to ICT. This category looks particularly if ICT causes the improvement of the citizen's private sphere, legal rights, health and wellbeing as well as job satisfaction and job enlargement of public sector employees. We adopt the above conceptual framework in this paper to understand the potential of DIADEM technology (when it is commercialised and diffused) to transform the government services to older adults with age related cognitive impairments. Such potential transformations are discussed below under the four domains of conceptual framework developed by   Danzier and Andersen(2002).

Capabilities

The online forms adapted and personalised by the DIADEM technology collects accurate data, as the technology minimise the inaccurate information (e.g. postcode) that can be entered by the older adult. Even if the older adult provided some inaccurate information (e.g. date of birth) which can not be processed automatically, quick manual check by relevant public employee can identify the error and inform the older adult by an email. When compared to the old way of processing paper forms, altogether this signifies not only improvements in data quality but also big savings in time and effort to collect accurate data from older adults who are bound to make mistakes due to their age related cognitive impairments. Consequently anticipated benefit of the DIADEM technology will be the reduction in transaction costs as the online forms can shorten the service delivery by reducing time (e.g. processing, travelling to see the older adult), materials (e.g. paper, postage) and human resources (e.g. less need for back office staff). Such reduction in transaction cost will eventually improve the efficiency of the services to older adults.

 As several government departments (e.g. social service and housing) tend to have separate data base which hold same information (e.g. name, address) separately, they require separate data input, data access and multiple identity management systems. However using online forms adapted and personalised by the DIADEM technology, the government departments can reduce duplication as the data collected through these forms can be easily shared by other departments. With high quality data and the grater access through sharing data can be used to consolidate data and centralise them for easier analysis and reporting. As a result effectiveness of the public services can be improved by taking more proactive decision making and planning by government departments, using shared information to provide better services for older adults. For example housing department can use the data regarding the older adult's cognitive impairments that is collected by the social services, to find appropriate housing, considering not only her housing needs but also her psychological needs.

Interactions

The improvement of data quality and access which could be attained by the DIADEM technology can crate an environment where different units of the government work across departmental boundaries, automating many routing tasks in processing paper base forms. Such collaborative working on issues related to older adults will be able facilitate patterns of communication and cooperation among government departments. Further more the older adult will be able interact with the key person who deals with his/her case without going through several organisational boundaries in the government departments when he/she uses the online forms. For example the older adult will spend less time on phoning and writing letters when he/she need a update about their case related to housing.

The shift to the online forms adapted and personalised by the DIADEM technology can also facilitate the coordination between different units in the government and private sector to provide bundled services (where user interface, transparency and cross service integration is primary electronic) for older adults. For example, when applying for social benefits and housing benefits, in the UK, the older adult needs to complete two different forms, as social benefits come from the central government and housing benefits come from the local government. The online forms can blur these distinctions and enable a bundled service through a combined access portal. Such bundled services can be also achieved through coordination between public and private sectors. For example, car

insurance and road tax can be bundled together. These bundled services would be a fundamental component of transformation of services for older adults as such services will be able to provide a seamless service for older adults.

Orientation

As mentioned earlier the online forms adapted and personalised by DIADEM technology will be able to provide quality data about older adults for the government and private sector. As result these data will be easier to analysis and report. Such data analysis and reporting might be much more difficult in the traditional government administration where different bits of information extracted from paper base forms, are held on separate, often mutually incompatible systems. But using data collected from the online forms more effective decisions and actions can be taken by using associated data mining techniques to extract hidden patterns in data. For example, by identifying right billing code, the local government can discover if they have paid entitled housing benefits to the older adult and improve the personalisation of the service. As data collected from the online forms would be easier to analyse and report, there will be substantial scope for collaborative decision making among groups in the public service regarding needs of older adults.

Value Distribution

The widespread collection and utilisation of personal data about vulnerable communities by the government and the private sector has always invoked issues of privacy (Abrmson and Means 2001). However the online forms adapted and personalised by the DIADEM technology are much more secure as they have strong authentication and authorisation control. The DIADEM technology strikes a balance between increasing data access and privacy/security. On the other hand paper base forms can be easily lost in the post and data extracted from them can be scattered in different locations or systems. Moving on from this position where there is a poor control of the personal data, the DIADEM technology can facilitate the transformation of services to older adults, improving the security of services.

The DIADEM technology will deliver ICT-enabled change. As a result, many government employees will be knowledge workers who will be working in a heavily computerised environment where electronic message is used instead of other modes of communications, where there are workflow applications rather than multiple data entry and multiple handling of paper base forms and other documents, and where there is a technology for computerised storage and retrieval instead of filling cabinets. To ensure that government employees have necessary skills to work in such environment, their existing jobs need to be enlarged. So, they need to be given opportunity to have ICT skills they need to be effective in their roles. In addition to this, existing ICT staff in the government needs to be encouraged to have new and existing ICT skills and necessary managerial skills to deliver the transformation of services enabled by the DIADEM technology. As such opportunities for government employees will be able to help them to identify their own professional development needs and provide routes for their own careers, there will be substantial scope to improve the productivity of employees and consequently improve the services for older adults.

7 ORGINASATIONAL FACTORS

If t-Government is simply about technology, the transformations discussed in the previous section are easily achievable. But the reality is that all ICT enabled transformation in government, is about organisational change (see Irani and Elliman 2007). The challenges around change management, and the level of commitment to change that will be required to achieve ICT enabled transformation in governments, is enormous (Dunleavy et al. 2006). Several researchers suggest variety of reasons for such challenges. However many claims that complexity of the public service which has several boundaries and rigid organisational culture of the state organisations contribute a lot to these challenges (see Seifert and McLoughlin 2007). When the DIADEM technology will be diffused through the organisational boundaries of the public services, the resistance to the change induced by

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the DIADEM technology can be expected, as people who are working within these boundaries can have different perceptions about the DIADEM technology. These perceptions would not be easily changed as they are shaped by the rigid organisational cultures rooted in these boundaries. Hence, the government units can reluctant to change the way they provide the services to the older adults (see West 2005). Several researchers argues that public leadership and commitment at both political and administrative levels, are central to managing such resistance and reluctance to change induced by technology (see Barrett and Greene 2001; Dunleavy et al. 2006; Eynon and Margetts 2007; Seifert and McLoughlin 2007). Thus, to the DIADEM technology to progress in public services, an effective leadership to manage differences in perceptions about the DIADEM technology is needed. Such leadership need to ensure the differences in perception do not become obstructions to the application of the DIADEM technology to improve the services for the older adults with age related cognitive impairments. Further more the power in terms of political will and capacity to champions the DIADEM technology, is essential to impose change in current service patterns based on paper base systems.

8 CONCLUSION

Transformational government has been on the European agenda for several years. However, progress towards realising the full potential of ICT to transform public services for older adults with age related cognitive impairments has been very limited. Highlighting such limitations this paper demonstrates how assistive web base technologies can be developed to improve the public services for older adults with age related cognitive impairments. The paper also shows how such technology can transform public services to improve the quality of life of older adults. The paper then argues that these transformations can be obstructed if there is no strong leadership and political commitment from people at many levels in public sectors and governments.

However further research need to be carried out to find out (1) whether the assistive web base technology developed (the DIADEM technology) can deliver the potential improvements, the project promised in government services for older adults (2) how the senior managers and politicians mitigated the immediate challenges of buy-in for the DIADEM technology and similar technologies, among stakeholders of the public sector (3) what skills future managers and ICT implementers in the public sector need to develop to identify, articulate and advocate the benefits of innovation such as the DIADEM technology, and overcome the potential resistance to the technology enabled change.

Appendix 1

Functional requirements

1 Use of regular, visual feedback during online form interaction

2 Use of regular, auditory feedback during online form interaction

3 Provide post code address finder

4 Provide an onscreen calendar

5 Automatic send functions when form completed

6 'Tool Tips' – provide examples of a completed field

7 Mark required input fields

8 Mark up fields that have been completed

9 Mark up fields that have yet to be completed

10 Pages / sections of a form should be numbered

11 Impose a standard, online form completion language that older adults can
understand (avoid jargon)

12 Remove distractions e.g. banners and multimedia

13 Use self-populating fields wherever possible

14 Personalise by providing automatic help when needed

15 Use short, simple sentences

16 Allow the user to choose preferred layout, text size and colours

17 Show position and progress within the online form

18 Provide the opportunity to have a trial attempt (i.e. test mode) whereby if
an error is incurred there is no negative consequence, only an opportunity
to learn from the interaction.

19 Provide an opportunity to view a demo of the online form being completed

20 When none of the alternative choices 'fit' allow the older adult to input text

21 Implement an e-dialogue, real – time system so that help can be provided

22 A 24/7 telephone helpline should be available to support difficulties and to
answer queries

23 User behaviour should be recorded / mirrored centrally so that appropriate
advice can be offered when a problem is experienced or a query is raised

24 Timely and relevant feedbacks should be presented throughout the online
form interaction

25 A screen reader function should be available for those who have visual
impairments

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Appendix 2

The details of the research teams and their role in the project

Brunel University (Brunel) in the UK

The School of Information Systems, Computing and Mathematics at Brunel University is one of the foremost research centres in Europe in the area of Information Systems. Within this school the People and Interactivity research group reflects significant international expertise in the area of human-computer interaction, with a focus on the design and evaluation of systems and devices from an interaction perspective.

Role in the project:

- Co-ordination and project management.
- Basic research into the HCI issues for the older or cognitively challenged person.
- Dissemination, test and evaluation of the DIADEM system.

Norsk Regnesentral (NR) in Norway

Norsk Regnesentral (Norwegian Computing Centre) is a private, independent, non-profit research foundation with a scientific staff of around 50 research scientists in computer science and statistical modelling. It was established in 1952 and is the birthplace of the object-oriented programming language Simula. As one of Europe's leading computing institutions, NR brings significant skills and experience in a unique combination of net-based services. This includes multimedia, database systems, security and privacy, e-government and e-learning applications. Several demonstrators for industrial partners have been presented at commercial expositions. Recently NR has been involved in research on use of ICT by groups with little ICT knowledge and weak literacy skills, such as blue collar workers, elderly and people with cognitive disabilities.

Role in the project:

- HCI and Applied technology research
- Software development, requirements analysis and specification and dissemination
- Support to other research teams (MORE and BG) on test and deployment.

Bluegarden (BG) in Norway

Bluegardens' core business is Business Process Outsourcing focusing on Human Resource Management and Salary Services. The services are aimed at enabling first line managers and employees easy access and input of data as well as effective communication of relevant information related to their employment, such as sick-leave, over-time, work planning, wages management, travel reimbursement, etc.

As a key member of the consortium Bluegarden will provide to the project a very solid knowledge base in practical web software development. Through the customers of Bluegarden the Diadem project also gets access to real users for research and testing. Finally, Bluegarden is also fundamental in getting the software solution that will be developed to the market.

Role in the project:

- Exploitation - product and market development
- Support Software development
- Provide user access and test environment

More Optimized Registration Elements (MORE) in Norway

MORE delivers solutions developed to facilitate market research and the use of electronic forms (tools to increase efficiency and simplify tasks performed within the public administration.). The solutions are web-based applications that enable the user to gather and analyse information from customers, the public, co-workers, course participants, and business partners or other potential groups. In particular, it is MORE's unique knowledge in the use of electronic forms in the public sector in Norway, as well as the companies market knowledge that makes MORE a well suited partner in the Diadem project.

Role in the project:

- Expertise in forms development
- Support Software development.

CSI Piemonte (CSI) in Italy

CSI is an ICT consortium founded in 1977 by 52 public stakeholders in the Piemonte Region. Although CSI is owned by public organizations, it benefits from the corporate governance and agility of a private firm. The Regione Piemonte Government, the City of Turin Council and the Province of Turin are the main stakeholders and customers of CSI. CSI builds and develops the ICT infrastructure for these clients making Piemonte one of the largest and most technologically advanced regions in Italy.

Role in the project:

- HCI and Applied technology research
- Integration and Application Software development.
- Online service provision and support
- End user access for user specification

Sheffield City Council (Sheffield) in the UK

Sheffield City Council will provide DIADEM with a unique practical insight into working towards eInclusion enabling it to lead the service management and user support planning activities. Also its past experience developing easy to use kiosks and workstations for public areas will make a valuable contribution to the project.

Role in the project:

- Kiosk, Smartcard and Public access point design
- Application Software development.
- Public sector service provision

Comune di Torino (Torino) in Italy

The City of Turin is the main town in the Piedmont Region of Italy. The Municipality is committed to supporting the development of the digital economy in the region as a strategic goal. The "Digital economy" is meant in a wide sense: it includes not only IT companies, but the whole of IT-based services and activities that are performed by public bodies, local public administration, non-profit organization and the private sector, both as suppliers and as users. The city of Turin's e-strategy is addressed to two main actions. The Municipality aims at improving the administration organization and the citizens' quality of life through e-government service supply. Turin sees the goals of DIADEM as being extremely important in the delivery of services to the population the project represents.

Role in the project:

- Public sector service provision

- End user access for user specification

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