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Web Technologies Supporting Direct Participation in Democratic Processes

Trend report II

Deliverable R14.1

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Abstract:
This Trend Report II presents results of the UN report analysing the approach, progress and commitment of UN Member States in the area of e-government and e-democracy. It describes the current trends, applications and good practice relevant for development of methodology and tools in the given areas. The report also provides an overview of projects and research results in the domain of knowledge management, especially within the IST Programme. This report will be used in on-going evaluation of the project objectives.

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1. EXECUTIVE SUMMARY

The purpose of this document is to describe the current situation in the area of e-government and e-democracy, review trends relevant for development of methodology and tools, and related technologies applicable in the given areas. This report will be used in on-going evaluation of the project objectives. The focus is on current systems, good (best) practices as well as the latest research results. A list of e-government Web sites as well as Internet resources on e-government can be found in Annex I of the report.

2. BENCHMARKING E-GOVERNMENT: A GLOBAL PERSPECTIVE

The United Nations study of the Division for Public Economics and Public Administration (UNDPEPA) and the report of the American Society for Public Administration (ASPA) „Benchmarking E-government: A Global Perspective“ (http://www.unpan.org/e-government/Benchmarking%20E-gov%202001.pdf) analyse the approach, progress and commitment on the part of the 190 UN Member States. This section is presenting some results of this study.

The study's primary goal was to objectively present facts and conclusions that define a country's e-government environment and demonstrate its capacity to sustain online development. This was accomplished by a comparative analysis of fundamental information and communication technology (ICT) indicators and critical human capital measures for each UN Member State. The final measure or e-government Index could be useful tool for policy-planners as an annual benchmark.

In determining what defines an enabling environment, this report analysed critical factors by benchmarking the core areas endemic to national e-government programs. The final measure or E-government Index attempts to objectively quantify these factors, and establish a "reference point" for which a country can measure future progress. The E-government Index presents a more inclusive and less subjective measure of a country's e-government environment. It incorporates a country's official online presence, evaluates its telecommunications infrastructure and assesses its human development capacity. The website research was conducted during two intervals from May to July and October to December 2001 in order to measure progress and ensure accuracy. Each Member State was examined using sites available on the world wide web during these periods.

In 2001, of the 190 UN Member States, 169 (88.9%), of their national governments used the Internet in some capacity to deliver information and services. For 16.8% of these governments, their presence on the Internet was just emerging. The official information offered in these countries was often static in content and limited to only a few independent websites. Countries with an enhanced Internet presence - where users can access an increasing number of official websites that provide advanced features and dynamic information - represented 34.2%, the highest number among the Member States. Thirty percent of the countries surveyed offered interactive online services where users have access to regularly updated content and, among other things, can download documents and e-mail government officials. The capacity to conduct transactions online, where citizens can actually

use the Internet to pay for a national government service, fee or tax obligation, was offered by 17 national governments, or only nine percent of the UN Member States.

Summary of on-line profile of UN member states (190 states):

- with a government website presence: 169
- with a national government website: 84
- with single entry portals: 36
- with sub-national government websites: 84
- with online transaction capacity: 17

National e-government program development among the UN member states advanced dramatically in 2001. Countries whose web presence in previous years consisted of one or two static government web pages began offering content rich, well-designed, citizen-centric sites. But despite creative initiatives, national e-government program development remains overwhelmingly at the information provision stage. The level of sophistication in which countries are using the Internet to deliver quality information does, however, vary considerably.

Full-fledged commitment to e-government implies that a country‘s leadership recognizes the fact that *information has become a social and economic asset just as important and valuable as traditional commodities and natural resources*. Information benefits the most the individuals and industries which have unimpeded access to its acquisition. Key factors such as *the state of a country’s telecommunications infrastructure, the strength of its human capital, the political will and commitment of the national leadership and shifting policy and administrative priorities* play important roles. Each of these factors influence how decision makers, policy planners and public sector managers elect to approach, develop and implement e-government programs.

2.1. The E-government Index

In determining what defines an enabling environment, this report analyses the above issues by benchmarking the core areas endemic to national e-government programs. The final measure or e-Government Index attempts to:

1) objectively quantify these critical factors and
2) establish a reference point for which a country can measure future progress.

The e-gov index presents a more inclusive and less subjective measure of a country’s e-government environment. It incorporates a country’s official online presence, evaluates its telecommunications infrastructure and assesses its human development capacity. The Index identifies, underscores and weighs the importance of the requisite conditions, which enable a country to sustain an e-government environment which ensures that every segment of its population has unconstrained access to timely, useful and relevant information and services.

Not surprisingly, the results of the E-gov Index tend to reflect a country’s economic, social and democratic level of development. Industrialized nations, whose citizens enjoy the benefits of abundant resources, superior access to information and a more participatory relationship with

their governments, rank well above the mean e-Gov Global – see Table 1.

	Country	e-Gov index
High e-Gov capacity:		
	USA	3.11
	Australia	2.60
	New Zealand	2.59
	Singapore	2.58
	Norway	2.55
	Canada	2.52
	UK	2.52
	Netherlands	2.51
	Denmark	2.47
	Germany	2.46
	…	
	Finland	2.33
	…	
	Czech Republic	2.09
	…	
Medium e-Gov capacity:		
	Poland	1.96
	…	
	Slovakia	1.71

Table 1: 2001 The e-government index.

E-government can offer numerous possibilities for improving how a nation's public sector responds to the basic needs of its citizens. There is however a wide variance as to the process in which governments choose to realize such potential.

Below are some of their most important insights resulted from the study:

- A country's overall progress in e-government closely correlates with its social, political or economic composition. The more effective programs prioritise development to reflect ICT, human resources and user capacities.
- National E-government program development remains desultory and unsynchronised. A compelling lack of coordination exists across administrative and policy boundaries. Ultimately this may compromise program effectiveness and performance efficiency.
- Online service delivery should be thought of as complementary rather than accepting the more popular view that it will ultimately replace many traditional channels for service delivery.
- Increased access to the World Wide Web does not automatically transform into increased use of e-government as user interest has been low and indifferent.
- There exists a significant digital divide within national public administrations.
- Single Entry Portals are an accepted and important standard.
- Prioritising online service delivery to the business community is a implementation strategy in several emerging economies at the expense of citizen-centric service delivery.
- National E-gov management teams in 2001 were the exception rather than the rule.

- There is a considerable lack of public awareness campaigns informing citizens that national governments are offering online service delivery.
- Cost Effectiveness: The belief that online service delivery is less costly than other channels is not wholly unfounded. However there exists little empirical evidence to support this assertion.
- With few exceptions funding e-government is tied directly to the level of commitment on the part of the political leadership.

Perhaps the most compelling finding of the survey, however is: for a large majority of countries, national e-government program development is occurring in a swift and dynamic manner and for now change is the only constant.

E-government development is constant and conspicuous. It has received considerable attention through a steady stream of events at the national and international levels. In March 2001, for example, the Third Global Forum on Reinventing Government (www.globalforum.org) chose for its theme: "Fostering Development through E-government". The Third Global Forum articulated the following key points:

- E-government can consistently improve the quality of life for citizens and can create a sharp reduction of costs and time.
- E-government will eventually transform the processes and structures of government to create a public administration less hierarchical, empowering civil servants to serve citizens better and to be more responsive to their needs.
- E-government must be given serious consideration also in the developing countries not only for its potential for stronger institutional capacity building, for better service delivery to citizens and business (thus increasing local social and economic development), for reducing corruption by increasing transparency and social control, but also for "showing the way" to the civil society and business community.

The Principles of E-Government:

- Build services around citizens' choices
- Make government and its services more accessible
- Facilitate social inclusion
- Provide information responsibly
- Use government resources effectively and efficiently

Box 1: UK Government White Paper

When asked to describe the ultimate benefit of e-government, the most consistent response given by decision-makers and public sector professionals interviewed for this report was that it transforms governance like no previous reform or reinvention imitative. E-government potentially empowers individual citizens' by providing them with an alternative channel for accessing information and services and interacting with government. It also gives the individual citizen another choice: whether to become an active participate in the governing process or remain a passive observer. Providing citizens with new choices is a goal that

resonates throughout many of the national e-government strategic plans. Both the intended and the residual outcomes of this objective are considerable: open communication, enhanced transparency, increased social inclusion and citizen participation, democratic enrichment and superior governance.

But perhaps what e-government is ultimately about is opportunity. Opportunity to transform a public sector organization's commitment so it can function as truly citizen-centric. Opportunity to provide cost effective services to the private sector contributing to the development of business and promoting long-term economic growth. Opportunity to enhance governance through improved access to accurate information and transparent, responsive and democratic institutions. The types of services that can be delivered over the internet are still being conceived, developed and improved by both the public and private sectors. Over the next few years expect to see a increased experimentation, innovation and organizational learning in an effort to perfect e-government.

2.2. Government Services

Virtually all government services can be classified under one of three fundamental categories: *informational, interactive* and *transactional*. The first, informational, is by far the most significant. Information is at the heart of every policy decision, response, activity, initiative, interaction and transaction between government and citizens, government and businesses and among governments themselves. How information is collected, processed, analysed, packaged and disseminated is in itself a specialized industry. Successful citizen-centric e-government programs emphasize the indispensable nature of information while balancing its often limited shelf-life and considerable inflationary component.

Since services are the public face of government, the primary objective of all e-government initiatives is to provide the citizen user with an efficient alternative medium for interacting with public sector service providers. This is generally accomplished by improving the flow of information both externally and internally. Information is government's most fundamental output and consequently, transforming ministries, departments, agencies, units and staff to make them "e-ready" is an intense and challenging process. Eighty-eight percent of the UN Member States have made at a legitimate effort to commit to some form of e-government; that is 169 countries have an established online presence with official government websites. However, in 2001, for over 25% of the countries, the content of official websites consisted of static and insufficient information often of a public relations nature and consistently with strong political overtones. Such sites can hardly be described as service delivery or considered citizen-centric since they are not a medium to elicit useful feedback (This trend is predominant in a several emerging countries in Asia, the Caribbean and throughout Sub-Sahara Africa).

However, most countries throughout Europe, North and South America have highly dynamic and interactive official government websites, where content is accurate, specialized and regularly updated.

The capacity to conduct transactions online at the national government level in 2001 was available in 17 countries. There was also considerable activity at the sub-national level, which

would suggest that in countries where e-government is evolving autonomously or without a coordinated national strategic program, transactional service delivery will occur irregularly with, in many cases, local governments demonstrating such a capacity before the national government. Although online transactions are one of the primary features that justify a wide-ranging e-government initiative, it is worth noting, that despite the benefits of technological and the impact of globalisation, the national economies of over 75% of the countries indexed are substantially cash-based. In the majority of these societies, credit-card use is still reserved for a select and privileged minority. Consequently, the necessity for online transactions in such countries may not be as great as the need for reliable information.

Credible information is sine qua non for maintaining a balanced and open dialogue between decision-makers and the civil society. The policy participation process is one example. A higher level of participation that goes beyond just providing feedback and comment is the participation of citizens in the processes of policy development and decision making of government. Traditionally this has been practiced through the use of voting and referenda and again mostly at community and local levels. It goes beyond simply providing feedback; rather it is a process of discussions and negotiations, which often involves personal interaction. E-government potentially increases citizen involvement in the process of governance at all levels by introducing new voices to the dialogue through online discussion groups, thus expanding outreach and influence while enhancing the rapid development and effectiveness of interest groups

In the United States for example, there is concern among academics, activists, and elected officials that government websites might focus more on providing services, and less on facilitating civic involvement. This type of service orientation, they argue, treats citizens as consumers rather than partners in government, and thus inhibits public engagement with the nation’s political environment. While users are certainly taking advantage of all the services and information made available on government sites, a smaller portion are active in using the Internet to monitor public affairs.

Countries vary radically in their approach, level of development and overall commitment to e-government. Critical endemic factors like available resources, political leadership, economic capacity and the character of the civil society deeply impact on the scope and breadth of a government's e-gov policy. How a nation ultimately shapes its e-government commitment ideally should consider these factors and respect the citizen-centric approach rather than being influenced by short-lived trends or what outcomes may be politically expedient.

E-government is new and for the most part a nascent activity. Successes should be kept in perspective, and setbacks to be expected. Many governments continue to "flight test" their programs in an attempt to find the right combination of services, features, content and entry points that are efficient, cost-effective and truly citizen-centric.

2.3. The stages of e-government

The following stages of e-government can be recognized:

- *Emerging*: A government web presence is established through a few independent official sites. Information is limited, basic and static.
- *Enhanced*: Government sites increase; information becomes more dynamic. Content and information is updated with greater regularity.
- *Interactive*: Users can download forms, e-mail officials and interact through the web. Here belong e.g. Slovakia, Czech Republic, Poland, Hungary etc.
- Transactional: Users can actually pay for services and other transactions online – UK, Finland, Germany, US, Australia etc.
- *Seamless*: Full integration of e-functions and services across administrative and departmental boundaries. – No country surveyed has achieved this stage.

2.3.1. Interactive Presence

The Interactive Presence clearly embodies the citizen-centric approach as content, information and services become what the people should expect rather then what governments prefer to offer. The delivery of information and services is aimed at maximizing the importance of the consumer by ensuring that ease of use is priority. Portals are the preferred point of entry; content is critically managed and information is well balanced. Security and privacy features are prominent among sites.

Virtually in all the 55 countries that offer interactive services, governments have demonstrated a strong national commitment to a citizen-centric e-government program and are well advanced technically in their programs. Only ten countries did not have websites for all five target sectors (health, education, labour, social welfare and finance). Each of the ten, did however have a minimum of three target sectors online. Twelve countries (24%) at this stage employ official single entry portals. Thirty-one countries (62%) have official national government sites, which serve as de facto portals, each linking the user with most ministries, agencies departments as well as government and elected officials. Communicating with government or elected officials is available through e-mail and post comments features for each of the 55 countries. Information and content take on a greater significance at this level and are continuously updated. The sites are also upgraded on a regular basis. Although there is always a degree of political information present in the content, it does not dominate a country's official government web presence. In all 55 countries, users have the capacity to download and request either documents or forms from a specific ministry, department, agency or unit.

Single Entry Portals Are Standard: As a gateway or single point of entry to government services, portals are becoming the standard. In 2001, 36 countries provided easy access through single entry portals. At the regional or state level the number is much higher. Serving as much more than a simple gateway, however, a portal offers an opportunity to reorient services around the needs of citizens while consolidating back office responsibilities. The United States (www.firstgov.gov) and the United Kingdom (www.ukonline.gov) are excellent examples.

Several Excellent Examples of Single Entry Portals:

- Australia www.fed.gov.au/KSP
- Brazil www.redegoverno.gov.br
- Canada www.canada.gc.ca
- Finland www.eduskunta.fi
- France www.service-public.fr
- Germany www.bundesregierung.de
- Ireland www.irlgov.ie
- Mexico www.precisa.gob.mx
- New Zealand www.govt.nz
- Norway www.norge.no
- Republic of Korea www.kois.go.kr
- Singapore www.gov.sg
- Spain www.la-moncloa.es
- United Kingdom www.ukonline.gov.uk
- United States www.firstgov.gov

2.3.2. Transactional Presence

Although online transactions are one of the primary services that demonstrate e-government's utility, the point must be reiterated, that despite daily advances in information technologies and the inescapable impact of globalisation the national economies for the large majority of UN Member States are predominately cashed based. Credit-cards, online banking and other paperless forms of e-commerce are, for the present, available to those who have the means to access such services.

At the completion of the UN online research (2001), 17 countries offered complete transactions online. Each of these countries is a member of the OECD. All 17 use single entry portals

There are a finite number of services that citizens and businesses can transact online with national governments. Transactional services vary depending upon the type of political system. Highly centralized governments will retain jurisdiction over many transactions that decentralized and federal systems will devolve to sub-national levels. Driver's license is one example.

Australia, the UK, Ireland, Brazil and the United States all present a concise, easily navigable portal to its transactional services. Perhaps the most frequently cited online national government transaction is the filing and payment of taxes. Online taxation payment is technically in the pilot program stage for nearly all 17 countries at the transactional level. Spain, (www.aeat.es) has one of the most sophisticated online taxation programs in Europe. Citizens can pay income taxes online, and businesses can pay income, property and sales taxes online as well. Spain also features the use of digital signatures. Germany and Finland have successfully launched payment programs for citizens as well as businesses. The Republic of Ireland (www.ros.ie) has introduced online VAT payments. Ireland also provides services like paying one's utility bill, which is available at most General Post Offices throughout the

Republic, now online. Norway (www.skatteetaten.no) is the site of the Norwegian Revenue Service offers several transactional services, including the payment of income, property and sales taxes. The United States (www.irs.gov/e-file) improved its online taxation payment program from a year ago, though the number of those filing e-returns has remained below expectations. France has used a variation of electronic tax filing for several years. However the transition to online taxation has been slow to gain acceptance as those wishing to use the service must negotiate several administrative steps. Mexico has instituted a similar system. Canada has perhaps one of the most comprehensive e-government programs. In addition to offering a bi-lingual portal, it provides citizens with a wide range of services in a highly efficient and user-friendly manner. Content and services reflect the government's unremitting commitment to improvement and to providing the best product to Canadian citizens and international users.

2.3.3. Seamless government

Level Five or Seamless government represents, for some countries, the ultimate goal. However, very few countries have publicly acknowledged it as a final policy objective. The United Kingdom and Singapore are two examples. Seamless government is not as easy to qualify as the four previous levels. It is characterized by the objective of having all online services, information, websites, etc available to the user through a single entry point that is driven by a super-search engine. But that's only half the equation. It also presupposes a reorganization of internal administrative structure of government's responsibilities to process these services: in effect eliminating administrative boundaries. It is sound strategic thinking, however it is a perfect world scenario. A more futuristic vision of service delivery based on the presumption that both technology and human nature will be so compliant that the administrative procedures will transverse organizational boundaries and become one simple seamless process. Attaining this level would necessitate a considerable degree of political, administrative and managerial cooperation. Before the government's time and the public's resources (both of which will need to available in abundance) a specific set of environmental conditions must exist. These include:

- A realistic political vision and plan that completely grasps the strengths and weaknesses of its public sector's capacity.
- A fully committed national leadership secure enough to sustain the political opposition to such a reform program.
- A confident and professional administrative culture willing to relinquish some degree of organizational and administrative territory.

For the majority of countries, attaining the goal of seamless government may be an abstract or remote objective.

2.3.4. Ensuring an Enabling Environment

To ensure that a national e-government program realizes its maximum potential, the existence of a favourable or enabling environment is paramount. By regularly assessing the core areas that are requisite for sustaining an information society - *institutional capacity, cultural and human resources conditions, ICT strengths and the political commitment* - governments would be in a position to carefully evaluate performance opportunities and challenges while candidly appraising their strengths and weaknesses.

A national governments strategic "e-vision" can include greater citizen participation, improved service delivery, increased efficiency, administrative modernization, enhanced transparency and increased foreign investment etc.

2.4. The e-government index leaders

2.4.1. United States

Historically, the **United States** (3.11) has been an innovator and leader in digital government initiatives. Between 1993 and 2001, the Federal government launched over 1300 independent initiatives that may eventually morph into a truly comprehensive national e-government policy. An abundance of economic, technical and human resources, account for the US's global dominance in virtually all the infrastructure and human capital measures.

The challenges for the US are in improving performance, coordinating policy and programs, and encouraging increased citizen participation. Challenges, which Firstgov (www.firstgov.gov) are responding to with creativity and a total commitment to the customers' needs. In the US, citizen acceptance of e-gov has taken on a quiet momentum. Increased use, however, is due more in part to an Internet savvy population rather then any official government promotion. (Although, urls for many local and state governments are appearing with greater frequency on public service announcements, television ads, and vehicle license plates as with the State of Pennsylvania (www.state.pa.us).

Perhaps in more than any other federative system, the autonomy that exists among the US federal, state and local governments is most evident through the delivery of services. The greatest number of services that are provided to citizens are done so by local and municipal governments. State governments provide less services with the Federal government providing the fewest amount of services directly to citizens.

To address this issue, a pilot project "Government Without Boundaries" which will develop a directory of government services available from all governments to citizens has been developed and is under implementation. The test program in 2001 was the purchasing of national and state park user and camping permits through one combined service, available on the Firstgov.gov site. The Bush Administration had been supportive of e-government, appointing a federal "e-gov czar" and initiating a policy that will migrate to the internet by 2003, all government procurement.

Yet, it remains information provision where the US is the strongest. No government offers

greater online access to official information than the United States. Whether this improves government performance, increases citizen participation and enhances the policy making process, only time and a commitment to improvement will tell.

2.4.2. Canada

Possibly more than any other country, **Canada** (2.52) has demonstrated intrinsic understanding of e-government's potential and reality. Like the United States, Canada's strong infrastructure and human capital measures are the foundation of a solid enabling environment and a High e-gov Capacity. Where the Canadian government excelled in 2001 was in its ability to implement upgrades and improvements, particularly in the area of customer relationship management. Coordination among departments is perhaps stronger than in any other industrialized nation. This could be attributed to the leadership demonstrated by the Treasury Board, which is the focal point for the national e-gov program and promotes cross departmental communication and coordination through the presence of ad hoc and permanent task forces. Canada's portal (www.canada.gc.ca) focuses on the requests most likely frequently made by three groups - citizens, businesses and non-Canadians. Each major government ministry and agency websites are linked by theme. Canada's fidelity to its strategic plan has also enabled individual agencies to keep pace with each other's development and maintain a consistency in site presentation. Canada benefits from an uninterrupted confluence of technology, human capital and government resourcefulness, suggesting that Canada will be a case study on e-gov success for years to come. It is, however, the citizens who will determine the success of "e-Canada." In 2001, public acceptance of e-government was still "reserved."

2.4.3. Europe

Throughout Europe e-government is a major administrative and political priority. Regionally, Europe has emerged as a global innovator and leader in strategic planning, program development, information access and citizen participation. With a regional e-gov index of 2.01 and 32 of the 36 countries researched achieving an index above the global mean of 1.62, Europe's E-government capacity in 2001is classified as High.

In providing online services, only four countries rank below the interactive presence level. Seven countries offered online transactions in 2001. This figure should more than double in 2002 as an additional eight countries are poised to upgrade services. In 33 of the 36 countries, all the key ministries targeted as benchmarks (health, education, social services, employment and finance) offer interactive sites and provide regularly updated content. Currently, 20 countries use single entry portals. There is also a considerable local government presence online. In both the ICT and Human Capital measures, Europe scores higher than all other regions with the exception of North America. Throughout most of Europe political commitment and leadership are extraordinarily supportive and are key motivating factors, as is a keen competitive spirit among nations. This is reflected by the content of the sites and the official information made available. The United Kingdom, **Sweden,** (www.sverigedirekt.riksdagen.se/) Norway, **France** (www.service-public.fr/) Germany, the Republic of Ireland, Estonia, **Belgium** (www.belgium.fgov.be) and **Italy** (www.governo.it/)

are particularly advanced in policy regarding official government information and content available to their residents. Well educated citizens who take government participation seriously and fewer official boundaries impeding information access contribute to an energetic e-government environment. Also activity the European Union in the policy area by developing a set of guidelines will ensure that the 15 member states' e-government programs complement each other. Europe's technological proficiency, innovative approaches to providing online services and a history of active civil participation would suggest that Europeans should take to e-government enthusiastically. However, such was not the case in 2001, as citizen acceptance was modest. This could be attributed to among other factors, the cost of the internet provider service and the cost of telephone service to name just two. Despite an online population index of 24.9 %, which is more than double the global average, the internet has not been the phenomena in the majority of European countries as it has been in the United States or Canada. France, Austria and Germany are examples as each have a surprisingly lower than average Internet use than that of the rest of Europe despite scoring high in key ICT measures. **Norway** (2.55) (www.norge.no/), **The UK** (2.52) (www.open.gov.uk/), **the Netherlands** (2.51), (www.overheid.nl) lead the region.

Although competitive in most key sectors, The Netherlands lags behind in the area of online revenue payment and information. **Spain,** (2.30) (www.la-moncloa.es/) has become an innovator in the area of online taxation through its Agencia Estatal de Administracion Tributaria (www.aeat.es/). There is however, no middle ground with Spain's e-government experience. Programs and agendas are traditionally developed along departmental or regional lines with little coordination and open communication. Consequently the service is either exceptional, as in the case with taxes or deficient, as with the social services sector. **Poland** (1.96) (www.poland.pl/) is an example where a comparatively weak ICT measure contributes to an index lower than the regional medium. However this has not deterred the country's overall development as Poland has a prominent web presence. **Demark** (2.47), (www.danmark.dk/) ranks fourth overall and like its Nordic neighbours offers exceptional social services sites. Also, official information is abundant. Where the Danes are weak is in the area of online revenue and taxation, as the service was limited and inconsistent in 2001. The United Kingdom, Ireland, Italy (before the change in government) Spain, Estonia, and the Nordic countries are examples of where elected officials have ardently supported e-government initiatives.

The Nordic countries are particularly specific in their approach in a region where the use of the internet is the highest in the world. The steady progress being made by the Baltic States, particularly Estonia, are excellent case studies and models for NICs. **Estonia** www.riik.ee/et/valitsus/ (2.05) has from the start of its program respected the citizen-centric approach.

In the areas of strategic development, planning and sharing information with the public the overall strategic leader must to be considered the **United Kingdom** (www.ukonline.gov.uk) The UK's Office of E-Envoy (www.e-envoy.gov.uk) has approached the vast project of digitising government with a level of professionalism that deserves to be praised and emulated. This is reflected in the results attained thus far. The UK also has taken several innovative steps in the direction of performance measurement of online services. However, despite prescience planning, meeting the deadline of all services online by 2003 is questionable due to unremitting interoperability issues. Convincing an indifferent public to

use e-gov may be considerably easier than persuading a recalcitrant Ministry to surrender administrative responsibilities to one central entity.

In the **Republic of Ireland** (www.irlgov.ie/) resources and political commitment are not a problem. Like UK Prime Minster Tony Blair, the Taioseach Bertie Ahern, www.irlgov.ie/taoiseach/ pledged his full support in making Ireland a global e-gov leader and his commitment is reflected in the coherency of its program. However also like the UK, advances hit numerous walls in 2001, because of interoperability issues. Ireland excelled in developing an online revenue system and made the service a showcase of its E-Ireland Program. Revenue On Line (www.ros.ie) allows citizens to pay all types of tax obligations online and is one of the governments most popular and user-friendly sites. Close coordination typifies the collaboration between the national government and the 26 counties in administrating the programs. A national council, consisting of central and local government representatives was established and interacts directly with county managers. The council's purpose is to facilitate communication of the central government's goals and the local governments concerns. County managers retain broad decision making powers, which can produce innovative results. An example is County Meath, where the county manager applied DHL's package tracking system and software to track every document that comes out of his and his staffs' offices. Throughout the Irish public sector there is a strong commitment to hiring physically disabled workers. This is particularly true of e-government as demonstrated by County Meath.

As a federal system, **Germany's** (www.bundesregierung.de) e-government initiative**s,** innovations and practices were driven by the Landers. The Federal Government has, however, expanded its e-government presence by providing citizens with greater ease of access to the sites and services of the national and local governments, and by offering superior content and information. This is especially true in the education sector, as the federal sites are exceptional.

2.5. Public Administration and e-Government

Information age governing presents an entirely new set of challenges for decision-makers, public sector professionals and citizens. How individuals and businesses interact with government is being fundamentally altered by the technological advances driving e-government. This transformation has public sector professionals considering questions like:

- How will e-government affect the performance of public organizations?
- What are the structural effects of e-government and information technology on the public organization?
- What skills do public employees need in order to maximize their performance in an information age?
- What new leadership skills will be needed in the e-governing age?
- Will e-government empower individuals in public sector organizations with a greater degree of autonomy, enabling them to re-think conventional administrative practices?

Developing an effective online public administration or *e-administration* means balancing the needs of two constituent groups: one external - the citizens or the customers, and one internal – staff and management, or the administrative back office. These two obligations are neither conflicting nor mutually exclusive. In both situations the internet has become essential in

augmenting the administrative system in support of its mission.

For a number of countries there exists a propensity to centre their e-government projects and budgetary resources on the output of services provided to external users before ensuring the administrative capacity exists to support such initiatives. The reason for this choice, as a recent EU report found, is, "the need to catch-up that prompts governments to go as fast as possible giving priority to matters of direct interest to citizens, before being fully capable of providing such services."

The obvious result is that there is limited back office capability to handle the new responsibilities created by e-government, thus potentially compromising online service delivery efficiency. In developing countries the chronic lack of qualified staff and inadequate human resources training has been a problem for years. The new e-government programs that many developing countries feel compelled to launch further compounds this problem.

Countless official guidelines and methodologies have been published to help countries implement e-government initiatives more successfully. While these tools have been used with some success, many e-gov programs are underachieving and falling short of their initial promise. Implementation problems exist because too many organizations conceive of, organize, and implement e-government programs first and foremost as generic information technology projects. Table 2 identifies the most common organizational obstacles encountered at the Institutional, Managerial and Planning areas. Several can afflict more than one area.

Institutional / Operational	Managerial	Policy / Planning
Technology and infrastructure costs / factors	Lack of capacity to manage large scale IT projects	Lack of Coordination and or Strategic Planning
Lack of resources to support 24 / 7 operations	Lack of conviction of top or middle mangers	Lack of comprehensiveness and continuity of policies / programmes
Lack of innovative incentives in the public sector - particularly regarding IT	Management Expectations vs. Management Realities	Absence of Policy guidelines
Organizational / cultural dichotomies	Doubts and resistance by leadership	Organizational / cultural dichotomies
Lack of institutional support	Opposition by professional or union interests	Local governments and municipalities if left far behind become bottlenecks
Information mismanagement. Reluctance to share among depts. Misuse of sensitive data	Obsolete legal frameworks to innovate and incorporate private sector	Lack of comprehensiveness and continuity of policies and programmes
Absence of Policy guidelines	Information mismanagement. Reluctance to share among depts. Misuse of sensitive data	Opposition by professional or union interests

Table 2. Barriers to e-government

The most perplexing problems, however, are almost always the ones created as a result of the politics of organizational change. If change-related issues get the kind of consideration they warrant, then implementing e-government programs will be a much less complicated exercise.

The most effective back office e-gov applications are not used simply to facilitate existing workflows but, to reorganize assignments and planning in ways that fundamentally transform government operations - integrating work-flow across (and outside) government in recognition that citizens interact with government as a single enterprise. Sceptical decision-makers and reluctant public sector managers need to understand and appreciate the value that can be created when technology is used to redesign workflow from an enterprise perspective. While such changes will often be difficult to implement, the potential benefits may very well justify the risks involved. The goal should be to balance risk against return - not merely to minimize risk.

For the aforementioned sceptical decisions-makers, a first step is to recognize and understand the patterns of confusion and conflict that can be associated with a particular e-gov project. Different paradigms will require different types of decision-making – "thinking outside of the box" is a start.

2.6. Administrative Issues

Quite frequently *national e-government program development lacks coordination*. There are four fundamental approaches to e-government program development:

1) A nationally coordinated or top-down approach, which is driven by the central government and often features a national strategic plan that coordinates all e-gov initiatives, spending and implementation, among ministries, departments, agencies and units.
2) A nationally autonomous or parallel approach where ministries and agencies develop their own e-gov initiatives with less formal strategic planning, support or coordination from the central government.
3) Sub-nationally or vertically up where local and state governments tend to be the drivers and initiators of programs that rise up and are eventually adopted as policy by the central or federal government.
4) Sub-nationally autonomous approach, where again the innovations and programs are developed at the local levels, but have modest influence on the national governments e-gov activities.

Predominately across ministries, departments, agencies and units e-government development has been autonomous, with only a limited number of countries coordinating national efforts. This could probably be best attributed to the newness of the medium and technology and to the fact that there are few existing policies and strategies to act as guidelines. Although the success of a coordinated e-gov approach cannot be overemphasized, only 35 countries, in 2001, developed a comprehensive official national strategic e-gov agenda and translated it into a government wide policy.

A majority of decision and policy makers choose to proceed from the point of view that e-government should remain part of existing government information technology programs. But developing e-government independent of existing government IT programs has been a key to successful development: the United Kingdom, Ireland and Singapore are examples. Although coordination from the top down is a strategically sound initiative, in practice actual program development is autonomous and spontaneous in character as most ministries department and

agencies go online as their capacity and resources permit.

One important factor impacting all countries, but particularly those where resources are scarce, is the change in thinking required within the public sector, particularly among the administrative culture, when transitioning to web-based service delivery. This actuality is more likely to create a greater sense of unease than most other policies or new programs because of the imposing nature that the technology can project. For example, the decision to assign content-managers the responsibility of keeping information topical and responsive to constituent needs requires an extensive organizational commitment. Also, the delegation of authority that must accompany increased accountability, individual ministries and departments will need to interact more intensively with their clients and the community at large. Traditional processes where material being made public was confined to a specific unit or individual will now need to yield to managerial empowerment, with greater accountability.

2.6.1. In 2001, E-gov project management teams were the exception rather than the rule.

The creation of specialized units or divisions mandated with the responsibility of coordinating and implementing the government wide e-gov strategic plan rather than delegating the responsibility to individual agencies remains the exception rather than the rule. E-gov management teams are a significant organizational change and a tangible sign that governments are serious about implementation. They recognize the challenges and realize that the success of projects of this scale depends upon inter-governmental cooperation of an unprecedented scope. These units are usually not an independent agency, fall under the administration of the executive branch and can be ad hoc.

Over 100 countries have official Chief Information Officers, many of Cabinet Rank. Special e-gov offices or task forces appear to be more effective when independent of the CIO. They mandated with the difficult task of launching the e-gov initiatives usually under extremely tight deadlines. Team composition is often an eclectic combination of talent from the policy areas, IT, management and public affairs areas. There are several management models that warrant further study. These include the UK, Ireland, Italy, and to a lesser degree Brazil, Singapore, Australia.

A prevailing belief, which exists among non-IT government staff, is that e-gov, especially web-based activities, is merely another policy administrative approach to providing generic public affairs type information. Outside of the ICT community there seems to be a limited sense of e-gov as a major driver of change, administrative reform or reengineering.

The one weakness of e-gov teams: They tend to be isolated and self-contained generating limited acceptance on the part of the rest of the government. They may also attach a quasi-messianic message and posture to their mission.

2.6.2. A considerable digital divide exists within public administrations.

Lack of connectivity to the web, inferior technology, limited e-mail capacity, absence of intranets all need to be addressed within national, regional, state and local public sectors,

before governments can realistically expect online service delivery to be effective. At the same time there is a need to *educate* all governmental agencies on the level of effort, capacity, coordination, citizen focus, and most of all, commitment needed to transition to digital government.

2.6.3. The issue of funding e-government is tied directly to the level of commitment and prioritisation on the part of the political leadership

Despite its growing importance, in a majority of countries decision-makers tend to view e-government as a decentralized IT issue allocating funds accordingly based on individual department, ministries, IT budgetary needs. There are of course exceptions among the national leadership and it is reflected in the level of development in several national programs. UK Prime Minister Tony Blair is one example, as is the Republic of Ireland's Taioseach, Berti Ahern. President Fernado Cordoza of Brazil has also demonstrated a strong degree of public support for e-government. Does this guarantee success? Not necessarily. Does a lack of political leadership mean limited success or slower development? Not necessarily either. Supportive political leadership, however, is more likely to accept the complexities and tolerate the setbacks that are encountered throughout all phases of development. Several OECD countries have established independent funding initiatives or arrangements through the executive branch.

2.6.4. Cost effectiveness

The belief that online service delivery is less costly than other channels is not wholly unfounded. Currently, there is very little reliable data to support or refute this assertion. What research or data that does exist is likely to come from local or regional governments. Savings can translate into a source of additional revenue, but most likely this will take several years to realize in both developed and developing countries. E-services require investments in IT hardware, software and staff. Most e-gov savings expected or anticipated by the transferring and upgrading of service delivery will not be realized in the fiscal year in which the project is launched or the services are upgraded. 35 In fact it will more than likely be several years before an agency or government can show appreciable savings. Planning web-based service delivery programs should include a scheme that automatically collects unit cost data, analyses and projects costs. Logically, the unit cost of web-bases services will be reduced, as there is an increase in citizen use. Accordingly citizen use will increase, as more people become web proficient. Analysis should factor in increased speed and accuracy of online service delivery and increased customer satisfaction.

2.6.5. The Digital Divide

There is growing concern that e-government will only exacerbate the digital divide and further marginalize the have-nots. Among the reasons for this are, governments prioritise program development based on limited or contracting resources consequently targeting sectors that are more likely to use e-gov. There is a cynical perception on the part of some decision-makers that those without access will never have the motivation or desire to accept and take advantage of e-government programs regardless of what services, hardware or incentives are provided. Competition among other programs for resources is keen and can result in the more proactive sectors or programs winning out. The question, How long will innovative attempts to bring access to rural poor remain viable and cost manageable? is embedded in most planning agendas.

Effective citizen-centric programs prioritise development to reflect a country's ICT capacities, no matter how weak, and user capacity, no matter how limited. If most businesses are connected, the priority may be towards e-commerce service delivery. This is not to suggest that there should be a zero sum attitude toward strategic deployment of e-government programs or that decisions are based on less than equitable factors. It is intended to emphasis the reality that governments face when it comes to allocating resources in choosing the approach that is the most cost-effective and beneficial.
Service delivery programs should be built around current technological strengths no matter how limited these strengths may appear to be.

2.7. E-Governance

Governance is not necessarily government as a physical entity, nor is it the act of governing through individuals. It is more realistically understood to be a process: the process by which institutions, organizations, and citizens 'guide' themselves. Governance is also about the interaction between the public sector and how society organizes itself for collective decision-making, and provides the transparent mechanisms for seeing those decisions through.

E-governance is the public sector’s use of the most innovative information and communication technologies, like the Internet, to deliver to all citizens improved services, reliable information and greater knowledge in order to facilitate access to the governing process and encourage deeper citizen participation. It is an unequivocal commitment by decision-makers to strengthening the partnership between the private citizen and the public sector.

Digital government has the potential to connect every citizen with elected officials and decision-makers like no previous innovation or activity. It offers individuals new and greater access to information and knowledge, subsequently redefining personal freedom. Introduction and acceptance of e-governance is a way to ensure that every citizen has an equal right to be a part of the decision-making processes which affect them directly or indirectly, and influence the process in a manner which may best improve their conditions and the quality of their lives.

E-Governance has the potential to ensure that citizens are no longer passive consumers of services offered to them by allowing them to play a more proactive role in deciding the kind of services they want and the structure that could best provide them. The core disciplines, which form the framework of E-governance, are:

E-Government: Inter-organizational relationships
- Policy coordination
- Policy Implementation
- Public Service Delivery

E-Administration: Intra-organizational relationships
- Policy Development
- Organizational Activities
- Knowledge Management

E-Governance: Interaction between citizens, government organizations, public and elected officials
- Democratic Process
- Open Government
- Transparent Decision-Making

E-government is characterized by ***inter-organizational*** relationships including policy coordination and policy implementation and by the delivery of services online or through other electronic means to citizens. This includes:
- Developing citizen- centric programs
- Promoting and enhancing citizen participation
- Perfecting Online service delivery through analysis and evaluation; measuring efficiency and
- Benchmarking against other forms of service delivery
- Country Indexing (performance measurement benchmarking): portal analysis; website analysis

E-administration defines the ***intra-organizational*** relationships or the internal and public sector management component and includes:
- Strategic planning in transitioning to electronic delivery of services
- Quantifying cost effectiveness of electronic service delivery
- Benchmarking and performance measurement
- Human resource management issues like training and recruitment, deployment of staff and maximizing existing resources.

E-governance facilitates the ***interactions between citizens, government organizations and elected officials*** and how the Internet can improve the governing and policy making process. The core are:
- How technology (particularly the web) is transforming the governing process
- E-federalism; the changing relationship among the levels of government
- Social implications - the digital divides
- Administrative professionalism: e-ethics; increased transparency
- E-democracy: Enhancing citizen participation; online voting; issues of ethics, security and privacy; fundraising for the e-campaign; increased transparency
- Legislative and policy-making environment framework: policy initiatives

governments are taking; the regulatory framework; implications of initiatives like recognizing the legality of e-signatures; greater citizen participation in the policy-making environment (e-democracy)

- International implications: Lowering of borders through information exchanges - impacts and consequences; International standards and best practices; Information and knowledge management and e-government.

2.8. Mobility in e-Governance

This section provides some information on trends towards mobile solutions, since it seems that the future of governance and democracy on the web is towards a more flexible and mobile way of doing things. There are new generations growing up that see the use of the Internet and telecommunications as a normal everyday event. These new generations will demand more from their local communities and authorities in the form of accessibility. Already the use of e-mails is a common way for people to communicate with each other as well as with their governing bodies. Politicians need to be more active since they are in a way always monitored by the citizens through telecommunications. Access to public government material such as reports, protocols and various records is easily made online to the general public. Gone are the days when the general public was held in ignorance simply by the fact that the authorities did not give the information of the whereabouts of documents. With the emergence of a vigilant public on government affairs along with a direct line of access to their members of parliament and other elected officials, the need for new legislation is necessary. E-mail registers and other electronically transmitted material needs to be protected by the law against misuse, destruction and tampering. On the whole the way governments work needs to be rethought and remolded according to the new demands of the information society and a more vigilant public. For more look at http://www.publicus.net/articles/future.html

2.8.1. E-poll project in Italy and France

The E-poll project is run by the European Commission for information technology and began in September 2000 and ended in August 2002.

On October 7, 2001 the Italian town of Avellino held a pilot E-poll in which citizens could use an electronic polling card to cast their votes in a national referendum. Although the electronic voting took place at a polling station to which citizens were obliged to take their electronic voting card, the pilot phase of the project has shown the future trend of voting electronically. Another town chosen was the French town of Mérignac near Bordeaux. Up to 8,000 people have so far taken part in the E-poll project. The project aims to create a flexible and easily accessible alternative to traditional voting by the use of ballot boxes. For more look at http://www.e-poll-project.net.

2.8.2. Future trends

In addition to providing people with more interactive ways to handle tasks, such as different

types of e-cards, mobile interactive handsets etc., they also have to be able to undertake those tasks. The 3G telecommunications networks, which are being planned, with their interactive mobile services, will greatly facilitate this. Whether these networks will succeed in the enormous expectations on them remains is still to be seen. There have already been projects within which people have had the opportunity to vote online, such as in Italy and France (see 2.8.1). Voting online can have huge impact when trying to turn the tide of the declining voting trends. As people get more and more used to mobile services an online voting system would make voting easier and more user friendly. The journey to a polling station, perhaps seen by some as an obstacle for voting, will no longer be necessary. With a system for voting online it simply would not matter where you are on a particular voting day.

Even if the future trends for e-government seem to be towards a more flexible and accessible government, there are also problems ahead of us. There might be too much flow of information, making it difficult to handle relevant issues. As the information society progresses and more and more people get access to the Internet and become used to handling computers, there might also be the question of digital gap, i.e. between those who have access to modern technology and those who have not. Be that as it may, in the end it is the will of the individual governments that decides the pace by which the infrastructure of the information society will progress, along with the necessary legislation and education of its citizens. Here one might take a more cynical approach and say that the progress will be slow in coming times since the more information the citizens have, the more it will undermine the power of the governments. For more look at http://www.publicus.net/articles/future.html.

3. PAN-EUROPEAN BEST PRACTICE IN SERVICE DELIVERY – PRISMA PROJECT

One of the objectives of the IST Project IST-1999-29088 PRISMA (http://www.prisma-eu.net) is to research best practice in public e-service delivery in the EU and selected Newly Associated States (NAS) using selected reference cases. The selected cases are described and evaluated from the point of view of a number of cross cutting themes - user centred design and involvement; multi channel delivery; organisation, work and skills; social inclusion; financing; trust, security and privacy; regional development; technology; and governance. Some of the results relevant from the point of view of the Webocracy Project will be presented in this section.

E-administration represents a key component of e-government and overlaps in many points with the other service fields described and analysed within the PRISMA-project. The general focus of e-government is on services delivered by *public* agencies even if there is a tendency in all member states (but with different intensity) to look at public tasks very critically and to outsource former public services either to public-private partnerships or to privatise them altogether. The PRISMA report is looking for services delivered by public authorities, mainly governmental authorities on the local and national level in general and financial services in particular. The first includes internal relationships between administration and politicians as well as “inputs” to the political-administrative system in the form of discussions and elections (e-democracy).

The following summarizing conclusions are made in the PRISMA report based on the survey done:

- Use of IT in combination with re-engineering of the workflows provides new opportunities for improving access to administrations; the "life-event" approach is seen by many e-government suppliers as a user-friendly way of service supply.
- Many of the cases studied offer a number or even an extensive list of forms for the citizens to download. But this development remains limited as long as there is a media-break with many transactions still based on paper and traditional mail and not available electronically.
- Sophisticated transactions (e.g. with use of digital signature) are mainly offered to professional intermediaries because they have the biggest advantage (compared, for instance, to citizens) by using the same links to administrations many times. The added value of using digital signatures is rarely to be seen for citizens who have to make strong efforts (time and money) obtaining the necessary hardware (e.g. card readers and smart-cards) and software.
- The effort to restructure the workflows reaching one-stop-government constellations with multi-channel service delivery (from face-to-face, via e-mail, SMS, to telephone or to the Internet) is necessary to reach "victims" of administrative actions and "long-stay clients" and to reject social exclusion. The efforts for implementation are still under-estimated; main obstacles are missing financial resources and re-inventing-the-wheel efforts because of small overview over the supply side and non-transferable solutions.
- This is often the case due to the government structure of most countries. They carry out two types of services; decentralised tasks (with autonomy of the local authorities) and deconcentrated/co-governance tasks (here every municipality applies the same rules). Within the first, large differences among municipalities can be obvious, but not within the latter and it should be more efficient to develop these services centrally (or in federal states on the state/province/regional level).
- A lot of examples gathering new financial resources and opportunities to employ skilled personnel have been found; they range from foundations to sourced-out companies in public ownership to the building of public-private partnerships.
- In terms of security and privacy, there is still a clear difference observable at present between services already introducing digital signatures, on the one hand, and the technical and organisational standard solutions to implement digital signatures, on the other hand, which still lag behind legislation. Smart card solutions are hardly accepted all over Europe, even whether it is a single digital signature card (problem of critical mass of applications and users) or a combined solution (digital signature chip on a bank card or citizen card don't have the problem of the single-use card but another that users are afraid of misuse).
- Special e-democracy-tools, such as the opportunity to access public (planning) documents and processes, or the enabling of consultation fora and the provision of information on voting procedures, usually don't gather opinions of citizen groups that are normally not involved (like the younger or not well-educated citizens) but still sometimes do result in discussion contributions of high quality (if they are embedded into the political and organisational context).
- First steps with good experience in online-elections can also be seen at some cases but broader use (e.g. on the level of elections to national governments) still don't work

because of administrative and legal obstacles (and the costs resulting of these problems) and will take some ten more years.

- Last but not least, IT-applications are cost-intensive because of investments especially in hardware and software as well as in training for employees in the mid-term view although there are (rare) examples that public administrations can save transaction costs, e.g. those for PR and other communication services to inform people about the service offered. Also, the public administration sometimes save money because people have not to come to public agencies, but can obtain information, communicate or make a transaction, for example, over the Internet. Often, however, lacking resources prevent further development.

Some more detailed issues discussed in the PRISMA reports will be presented below.

3.1. European cultural realms in the service field

The understanding of the role and the term of "administration" strongly differs in the European member states. So it's hardly possible to describe "best" practice for the CEC in general but necessary to keep the differences in mind when judging among various examples. We can describe "cultural realms" in several respects, e.g.:

- Relationship between central, regional and local governments;
- Suspicion vs. trust in state activities;
- Understanding of privacy;
- Comprehension of "freedom of information";
- Business needs as "drivers" in IST use.

These differences in (political) cultures within the EU are reflected in different issues being focused on and in different priorities of national IST policies.

EU-member states have different political systems with different *competencies of governmental levels* (national, regional, local, etc.). E.g., the status of local communities (according to their administrations) in Europe differs strongly; in real life this is the first access-point for citizens' demands (in virtual life, it doesn't have to). But in more centralised states (like France, Italy, Cyprus) they have hardly to decide important topics, in other states (like Germany, Austria and Sweden) there are strong municipalities with sometimes strong tax revenues of their own, for instance. Centralised states have the advantage of being able to develop a vision and articulate targets as well as a national concept (including funding) for all municipalities or provinces. Focussed development of special technologies seems to be easier as well. More federalised states run the risk of reinventing the wheel on each single municipal Web site but can establish a strong competition among each other and initiate new applications.

In southern European states like the Mediterranean and Portugal, the central government only plays a role in standardisation and funding but not necessarily in development.

The notion of a "pro-active" role of government is not necessarily viewed with *suspicion* the

Scandinavian countries or in the Netherlands where governments want to of their own initiative, offer products and services to the citizen that tie in closely with the wishes and profile and use for this purpose the data supplied by the citizen (thereby sparing him the trouble of visiting the office). But in Germany it conflicts with the citizens' interests in *privacy and data-protection*. "Customer (or citizen) relationship management" therefore can be translated in the Netherlands as an improvement of public services whereas Germans usually are interpreting it as a violation of individual data-protection.

We have open governments on the one hand with a strong tradition of *freedom of information*, like the Scandinavian states and the Netherlands, other states with a more authoritarian role of government, like Germany and Austria, and selected Newly Associated States which should be grouped into former centrally planned economies of Central and Eastern Europe and Mediterranean states with a western-democratic history (Turkey is not covered by the report). However, since Sweden has a long tradition of open government – dating back to 1766 – the model may not be easy to imitate. The availability of state information through electronic forms presents no major cultural-political problems in Sweden whose provision of information on Web sites at the local and national level is almost complete. Against that in Austria authorities are legally obliged to answer questions put to them by the public, but they do not have to open source information. This could render the implementation of e-government in Austria more time consuming than in other EU countries with more advanced FOI laws. No doubt, the FOI conditions in the northern states will not be as easily obtained in EU countries with stronger traditions of secrecy instilled in government processes.

Whereas in the Anglophone countries e-local initiatives and e-governance are seen as a response to the "New Economy" and hence driven by business needs, northern European countries stress e-society and e-local as part of "informed democracy".

3.2. Description of reference cases

3.2.1. Bremen

The Free Hanseatic City of Bremen (550,000 inhabitants) together with the city of Bremerhaven (130,000 inhabitants) forms the smallest federal state of Germany. In recent years, it has undertaken major efforts for modernising its public administration. Serious financial deficits put the implementation of new public management tools on the top of the internal reform agenda. Recognizing the importance of customer-orientation, an elaborated public administration information system has been developed since 1996 as part of Bremen's online presentation, "Bremen.online" (www.bremen.de), and new, decentralized citizen's offices bundling some of the most sought-after public services were established. Also BOS / bremen online service GmbH & Co KG (www.bremer-online-service.de), since 1999 developing electronic transactions including the digital signature and the "Bremen Government Services" (www.bremen-government-service.de), re-engineering the administrations' workflows, are described because together they form the three pillars of Bremen's e-government service.

In Bremen's unique position as a city-state which combines the function of local and state government on one administrative level, it was possible to include public services offered only by state governments in Germany. As these are tax-, law- and education oriented, these

services are very attractive for prospective customer groups, for example lawyers, taxpayers, and students, who are likely to adopt and use electronic services most easily. In addition, it is easier to adopt and change the necessary laws, as these can only be framed by federal state legislations at many times.

When the German federal government announced the MEDIA@Komm competition in 1998 to provide systematic support for the development and application of multimedia in towns, cities and local communities, Bremen applied for with a persuading concept of implementing the digital signature and online services and became one (of three) winners. With the award (some 20 MEUR for three years), it has been possible to combine re-engineering of the administration with implementing innovative online services.

With the project "Bremen Government Services", the Free Hanseatic City of Bremen merges two major strands of current public administration reform: re-organizing department-based administrations into function-based, citizen-oriented service providers. The re-designed processes are supported with state-of-the-art technology in e-commerce and electronic signatures. Its online transaction components are provided by the *bremen online services GmbH & Co KG* (bos), a joint public-private partnership owned 51% by the city and a main result of the winnership of the MEDIA@Komm-award. The *bos* portal (www.bremer-online-service.de) addresses a broad range of transaction-services (foreseen to support 70 processes, 30 of which are currently fully implemented). The present version includes two-way online interaction as registration at the university and colleges or legal procedure to acquire outstanding liabilities and full transactions including electronic payment in a secure environment insured by smart cards, encryption and feedback to the user. A new implementation was launched in June 2001 that adopted up-to-date technologies (smart card, e-signature, OSCI protocol) with a specific attention to standards and reusability. Its portal is the first comprehensive service in Germany, which offers public and private services on the basis of the electronic signature, which is distributed to Bremen citizens on smart cards. Thus, it allows highly secure and trustworthy services.

The overall administration project received awards (Speyer 1997), was presented in various contexts (Council summit in Lisbon 2000); Bremen.Online received the "eGovernment label of the European Commission" in 2001 and has been at the top in benchmarks (e.g. Accenture, 2001). Various new services have been planned for 2002 and there is the intention to distribute 10,000 cards by the end of 2002 and to reach 50% of the population through an agreement with the local savings bank to include e-signature in the banking card.

Description of the site according to cross cutting themes

User-centred design

In the development line of e-government from information via one-way and two-way interactions to transactions Bremen is advanced for the latter. 6.5 mio hits per months (probably 1.5 Mio. visits a month) illustrate that people make good us of the information available. The Web site www.bremen.de provides comprehensive information-bundles for three target groups (tourists, business, citizens):

- About public and commercial institutions, for example functions and opening hours.

- Guides, which answer questions about where the institution is where one wants to go to and how one get there (including interactive maps and public transport schedules).
- Bulletin Boards and discussion fora, which collect and present commentaries specifically for each referenced institutions in the system.
- Links to all web sites offered by the referenced institutions. The service works as electronic yellow pages, but with a lot more added functionality.

On the left side, the homepage provides buttons for "homepage", "event-calendar", "bulletin-board", "communication", "city-map" (search according to streets and house-numbers), "publisher", and "search". This search function according to common language keywords comprises on the basis of a special thesaurus, links to more than 10,000 agencies, companies, SME's (e.g. hotels), professionals (e.g. doctors), associations (like sport-clubs) and third-sector organisations as well as the related part of the city-map and information about public transport relations. "The 'mess' known as answer-outputs from many other web-engines, which almost always hide the sought-after information, are unknown in Bremen. If you are capable of German, you might try yourself under www.bremen.de/suche and use 'Auto', to find both information where to register automobiles and where to purchase them The technical basis of the system is the database which holds all information and references it with keywords."[1]

Communication demands are served through the just mentioned button on the left of the overall design (it's the address of the tourism centre and of the webmaster of Bremen.online who tries to reply or to forward every request; he is a member of the city administration). Direct contacts to numerous corresponding partners in the institutions (via e-mail and traditional media) are available.

Bremen.Online provides a small amount of transactions like online-purchase of tickets for events (e.g. theatre, cinema), online hotel reservations with credit card payment but not with the administration (example: downloadable forms). Through use of the digital signature provided on smart cards delivered by BOS, Bremen citizens (or companies) can:

- Receive personalised information provision by administration (searchable from databases of current public tenders and of current job openings).
- Provide information about themselves for provision of offline administrative service (like notification of lost or stolen cars, registration of students at the university, application for construction permit).
- Make two-way online-interactions e.g. when changing their address within Bremen with the administration as well as with (public-) private institutions like the utility company, the public transport authority, the postal service and the local savings bank, or if they would like to receive extracts from the official journal of registered companies. Students can make their enrolment and other applications at university and two technical colleges.
- Besides, full transactions (including payment) in applications like change of address in central citizen's register, ordering birth certificates, marriage licenses etc., ordering monthly public transport card, or payment of city ordinances and fees, are available.[2]

Currently, 150 real online transactions per month are done with a steady increase-rate, most

[1] See: http://www.bremen-government-service.de/bremen_online.html.

[2] See: http://www.bremen-government-service.de/bremer_online_service.html.

of them involving professional users (e.g. architects) who have the biggest cost-savings from the new technology. Providing secure online transactions through the usage of electronic signatures and necessary card-readers to the public is thus a crucial area of action of bremen online service (bos). It will distribute 10,000 cards/card-reader units to the public for a symbolic amount of money (15 €). Of these, more than 10 % have been provided and are used actively. It is foreseen to cover 50% of the population thanks to an agreement with the local savings bank to provide e-signature with the banking card. From 2003 on, the local savings bank will include these signatures on their banking cards, providing effectively half of Bremen's population with the possibility to conduct online-transactions without applying for a new card.

Online transactions are available through a life-situations approach: If the user leads the mouse to the "menu"-button on the top left side, a list with life situations (moving and housing; family, singles and Co; transport; studying; leisure time; money; building a house; economy; justice) as well as "how to do" and "service" - buttons with advice how to use the digital signature and how to get necessary hardware and software are appearing on the left.

The application bundle *leisure time*, for instance, includes transactions like booking or purchasing of tickets for sport events, theatre, cinema and continuing education as well as an electronic ticket for public transport as an additional application on the chip card. Cooperation has been agreed with one or two institutions of each category, e.g. with the famous soccer club Werder Bremen, with a tennis club, a theatre and a cinema. Even if a signature is not required for buying a cinema ticket via Internet, this application increases the value of the chip card because its holder is not required to be at the cinema half an hour before the movie starts if an electronic ticket is loaded on the car. The Bremer Straßenbahn AG (public transport company) and the Sparkasse Bremen (local savings banks) recently realized the electronic ticket for public transport as an additional application on the charge card.

Multi channel delivery

Changing customer demands and the need to balance Bremen's budget make it mandatory not only to reorganize the internal structures of Bremen's government, but also to redesign the way how public services are delivered. "These reforms have to fulfil needs of legitimacy, efficiency and effectiveness." (Bremen Government Service, 2001). The delivery mechanisms are the crucial interface to citizens. They are responsible for shaping the public's perception of the public sector. Especially among those who have rarely contacts with the public administration, these have a long-lasting impression. If the quality here is bad, this will lead to a loss in legitimacy. The services are available through various delivery channels (see table 3.4).

Delivery channels	*Administration services*	*Bremen.online (www.bremen.de)*	*BOS (www.bremer-online-service.de)*
in-person office	Yes	-	-
online at home, office or at assisted usage points	-	Yes	Yes
telephone	Yes	Yes	Yes
e-mail	Yes	Yes	
e-mail to fax	Yes	Yes	
agents specifically trained	Yes	-	Yes

Table 3.4: Service delivery channels of the Bremen services

Bremer-online-service and Bremen.Online www.bremen.de can be accessed any time via every PC at home or at the workplace via an Internet connection.

The online-offer is also available at so-called "assisted usage points". Unlike kiosk-systems that don't attract Internet-inexperienced users so that most of these projects have been cancelled because of small user-acceptance, bad choice of location and non-realised sustainable financial implementation, Bremen prefers these assisted usage points which use standard PC and internet technology, but are distinguished by their organizational embedding in the context of various types of in-person service agencies, such as the city hall, libraries, and social centres. Especially trained personnel can help those who need assistance in using the online service and electronic signature. They can also help with questions regarding the content of the applications. The first attended user places to register for the signature card and to get help are operational since

Organisation, work and skills

The official Web site www.bremen.de currently is hosted by the municipal government (re-structuring planning see "finance" below). The Senator for Finance and the Senatskanzlei are responsible for the project-leadership and the media-political presentation of the Free Hanseatic City of Bremen. The Senate agency as well works as webmaster and routs the mails sent to their address to the responsible agency. Besides, they publish and update the "agency guide" (Behördenwegweiser) and supervise the whole process.

Introducing technology-based electronic services is not only the crucial key for increasing citizen orientation, but also the precondition for internal reorganisation within the administration,[3] re-designing processes and enabling employees to cope with the new tasks and demands. Because it is mandatory for a successful implementation strategy to include the employees, special emphasis is being put on their involvement. Bremen administration has started the development from a department-based administration into a function-based, citizen-oriented one-stop-government simoultanously with inventing IT-usage. Besides horizontal integration (through life-event-approach an integration of both public and private services), the service applications are dealing with integration from various points of view: integration of back and front office functions, coverage of both citizens, businesses and administrations, co-operation between administrations. It implements co-operation between the providers of 27 regional and nation-wide public and private services forwarding information to all the involved authorities. In such a way the user activates one single transaction for multiple usage.

All services developed by the Bremen effort started with the formulation of a vision by the involved employees on where they want to see effective and electronic service delivery in the future. Subsequently, the existing processes have been documented, analysed and streamlined, before the electronic applications have been realised. A comprehensive Human Resource Management System was established.

[3] For consultation and follow up: http://www.bremen-government-service.de/ (overview of general re-organization/eGovernment-effort)

An own software, PuMa, was developed to enable and support the Human Resource Management System. PuMa allows the decentralisation of Human Resource Management competence while ensuring central strategic planning functions

Usage of IT for re-structuring internal administrative processes, also offers new perspectives for employees: Beside "new models of job time", employers and employees aggree upon an official regulation ("Dienstvereinbarung") called "model trial "alternating tele-working" which means that employees can work part-time at home under special circumstances: Jobs must be defined by a high degree of data procession, definable results and technique-supported settlement of tasks.

Social inclusion

The main objectives of IT-policies in Bremen are:

- to enable "accompanied" access to the Internet – that means not only to widen the number of public kiosks but to have people in the near who can consult users, and
- to refuse digital divide by offering access points for senior citizens, for girls and women, widespread over the city.

Financing / public-private partnerships

There are two points of interest regarding the financial background of the projects launched in Bremen besides the general aspect that re-structuring of administrative structures (local service centres) shall improve citizen access to governmental services as well as relieving government from administrative costs through enabling better efficiency of public service delivery :

- The conceptual framework and the business model of the company responsible for the developing and operating company bremen online services GmbH & Co KG (bos), and
- The planning for transferring the public Bremen.Online organisation into a public-private partnership (with major shareholdership of the City of Bremen).

The Bremen BOS-project is not a pilot for a limited amount of time, aimed to provide its champions with some knowledge on which to base further business decisions. Rather, its basic principles are oriented to develop and run a platform for authentic, legally binding and secure electronic transactions which should support itself, at least in the middle run. These three principles sound self-evident at first sight, but they can only be put in practice by innovative approaches:

- Electronic transactions must be less laborious than current used methods of service delivery like face-to-face, phoning or writing a letter – for suppliers in the administration as well es for users like professional intermediaries, companies and citizens. It must be possible to save time and ways and to decrease the telecommunication costs.
- The electronic transaction must not require burdens like additional ways, technical equipment, new skills, costs, and change of habits. But these must be minimized, e.g. by combining as many service sectors as possible to drastically decrease the overall expenditure of time and money.
- It is important to gather a critical mass of users in a limited period of time.

The business model to realise e-government transaction through application of the digital signature in Bremen is not being implemented within a project limited in time; but rather from

the start, it has been aimed at a steady and medium-term profitable operation in public-private partnership. For this purpose, BOS in the legal form of a GmbH & Co KG (limited liability company with limited partnership) was founded. Partners of the Free Hanseatic City of Bremen which shares 50,1% of capital, are the Deutsche Telekom and the Sparkasse Bremen (local savings bank), as well as BreKom, a local telephone carrier and operator of the public administration's telephone network, VSS and Signum (two software development companies), the Bremer Straßenbahn AG (local public transit authority), and Multimedia Centrum Bremerhaven, who represents the City of Bremerhaven in the project.

Trust, security and privacy
Bremen is among the first cities to adopt and use in practice qualified electronic signatures as they are defined in the EU directive on electronic signatures. BOS provides smart cards for citizens and professionals. Starting in 2003, the signatures will be distributed on the common banking card of the local savings bank, thus making it very easy for citizens to acquire such a card. The Bremen public administration has been a know-how leader in critical issues such as separation between signature keys and encryption keys; group certificates and rules regarding who answers in case of the absence of the original communication partner when using electronic signatures in the public sphere, thus raising awareness across Germany regarding these issues.

For using the digital signature, Bremen citizens and professionals have to fullfil the following preconditions:

- They have a PC with Internet-access with a standard browser.
- They have filled out (long) forms to receive personalised signature cards that were certified by one of the certification agencies (e.g. the German Telecom and other trust-centres), that means it contains a chip (a single-function signature card is deployed only in the beginning of the project - the TeleSec card, but the focus will be laid upon the charge card of the Sparkasse Bremen, the local savings bank with its signature application (nowadays usually an annual fee of 30 to 50 EUR have to be paid, but BOS subsidies its signature cards and distributes them for a symbolic amount of 5 EUR per year). According to the German signature act, the form has to be signed personally at the certification agency or one of its branches.
- Besides, they need a smart card-reader (class 3) (Bremen distributes these readers for a fee of 10 EUR, also subsidised).

The Bremen case shows that the introduction of the digital signature is not only a technical problem, but arises also challenges of adaptability as follows:

- Financial problems on the suppliers' side as well as on users' side: Digital signatures solve a security problem. But this problem is not the first one for most citizens. And in addition, to solve it, they have additional expenses. Instead of sending or bringing an application to an office, they have to go first to a certification authority, apply for a digital signature, pay for the certificate and have to mail in the application from home, paying for telecommunications costs all by themselves. Citizens will only do so if the additional value from choosing this procedure outweighs the extra expenses.
- Trust and privacy problems: A home banking solution requires another model of relationship between customers and the banks than secure e-government transactions between citizens and administration: Whilst in the first case, the bank knows all data

saved on the chip, in the latter case it's not foreseen that the administration knows all information. The two-step encryption regards privacy.

- Adaptation of legal provisions: Legal provisions for administrative procedures (not only in Germany) often stipulate the written form, a hand-written signature. In principle, freedom of form is permitted for administrative procedures. The German Verwaltungsverfahrengesetz (federal administrative procedure law) and the mostly identical law of the German "Länder" already include regulations, which allow electronic transmission.

Technology

In order to serve the great variety of applications, the technical infrastructure BOS had to develop to provide governmental transactions, has to be modular and scaleable. If possible, already existing products and standards are to be used. These must, however, meet the requirements of the applications. It has been planned to adopt products and standards from the financial business and service sector. This applies to the integration of the signature function in the charge card of the German banks and to the general application of the HBCI standard for banking transactions to online services, which will be called Online Services Computer Interface (OSCI).

Components of the Online Infrastructure:

- User Interface / Client: The following Java applets can be downloaded from a form server:
  - Form applets representing the individual business transactions,
  - Integration applets for the intermediate storage of certain generally required data,
  - OSCI applets following the new home banking standard HBCI which take the data from the form, transfer them into the defined data format and ensure the signing and coding of the data record.
- Telecommunications Network and Services
- Chip cards as Security Media
- Payment Procedures
- City Information System
- Form Server
- Security Server (OSCI-Server)
- Payment Server
- Certifying Agency (Trustcenter)
- Service Provider Interface

Governance

With the term "governance", new forms of partnership and cooperation among the state, the private and the third sector (e.g. public-private-partnerships) are covered as well as public support for articulation of citizens' opinions, open information policy of state agencies to the whole public (not only to selected associations), and consideration of citizens' contributions to policies.

The basic premise of Bremen.Online is its motto "Everybody can participate". Bremen.online belongs to the citizens of Bremen. It's goal is to reflect all venues of social and commercial life. So everybody can be registered with their information, be it public authorities, shops,

service providers, doctors, lawyers, sport or theatre clubs. Four specific editors in the areas of administration, business, tourism and '3rd sector, e.g. clubs, initiatives etc.', decide under which keywords everybody can be found. This guarantees that all institutions and events can be found very easily, with high precision and recall.

3.2.2. eVienna

Description of test site

- The City of Vienna inhabits 1.6 million residents, of which 18% are immigrants. The Municipal Administration of Vienna orients its e-government strategy along the programme *eVienna* (a follow up to the earlier strategic programme *WELCOM* which had been created as a basic platform for innovative e-government and e-commerce transaction services for citizens and businesses since January 1999). Specific strengths of *eVienna* are user-centred design, social inclusion, multi-channel and innovative service delivery.
- In early 2002, *eVienna* offers the following major categories of electronic services:
  - E-government: a growing body of information, communication and transaction services is offered, e.g. via the *Virtual Administration Guide* of *wien.at.*
  - E-education: the Viennese Education Network – Youth to the Net [4]. Through the project an infrastructure for Internet access for schools and youth organisations has been built up. Also, the youth gets educated in using PC and networks.
  - E-health: the Vienna Health Network. Through this network physicians and other medical as well as social institutions are networked to support the electronic communication and procedures to allow for better medical services for patients.
  - E-transport: the Graphic Information System of *wien.at* provides a route planner, address location on a virtual city map and other relevant information, e.g. an automated schedule request of the Viennese traffic system.

An important part of *eVienna* is *wien.at*, the main Web portal of the Municipal Administration. This Web portal comprises about 500 services. Though information services are the core, *wien.at* also offers communication and transaction services. Within the framework of *eVienna* almost 90 transaction projects are to be realised until 2003.

Existing studies show a significant interest in e-government services of *wien.at* but also a gap between interest and actual usage: A study by *Unisys Austria* and the Vienna University of Economics and Business Administration (IMM 2001) found that almost two thirds of the companies in Vienna and almost every second citizen would welcome online interactions with public administrations. The study also said that 65% of all Austrian businesses know the Web site *wien.at*. However, according to this study only 3% use the web offerings already actively for transactions.

[4] See: http://www.wbn.wien.at.

Description of test site according to cross cutting themes

User-centred design

User-centred design is a specific strong element of *eVienna*. *Wien.at*, the first entry point to the services of *eVienna*, is organised in a user-centred way so that users can find the information they need quickly. A style guide provides the layout rules of this site to be realised by the employees of the Municipal Administration. *Wien.at* entails above all information, but also communication and transaction services:

- Information Services: 16 main links on the portal *wien.at* are the main tool to guide the user through the site. The links are general themes: education, leisure time, health, culture, media, people, politics, social security, city planning, tourism, environment, events, transport, economy/business and residency. Besides this list of theme-links, the link *Virtual Administration Guide* is an important organising element because it entails full transaction services, too. For foreign citizen and tourists, *wien.at's* English edition is an important tool. Similarly to the German edition, it provides theme-links, like business, administration, and culture as well as a graphical information system offering fast address location, pedestrian routes and railway routes by providing a real time online map. But services in other languages, especially Turkish and Serbo-Croatian currently are not offered.
- Communication Services: A variety of communication services are provided by *wien.at*. One link is *Contacts to the City* entailing several contacts to departments of the Municipal Administration, the Municipal Council, municipal district representatives, the political parties represented in the Municipal Council and other institutions. Additionally, the *Virtual Administration Guide* provides links to other departments, like the revenue offices, registry offices, Viennese police offices, and the city treasuries. Another link to access a list of links to all municipal departments, also including district departments, of the Municipal Administration is "administration". Besides addresses, which can be found by opening a real-time city map of the *Graphic Information System*, phone number, fax, and a general e-mail address (post@m31.magwien.gv.at) are provided. Additionally, *wien.at* entails an e-mail feedback function at the end of every page. Also, feedback functions are often to be accessed through the homepages of e-government Web sites. Finally, chats with, e.g., members of the Municipal Council are also offered from time to time.
- Transaction Services and Other Interactive Services: They are still limited in number but shall grow quickly, especially between 2002 and 2003. To increase user-friendliness of forms, the application tells the user immediately if a form is filled out correctly. Additionally, a good orientation for the user is that fields including a red star are absolutely necessary to be filled out (see the list of transaction services of reference case *eVienna*: service delivery below).

The services of *eVienna* are organised along life-events for citizens and businesses as well. The web portal *wien.at* offers principally two paths (see figure below):

- Theme links are an important help to citizens to find what they need by orienting themselves along life-events. For example, the life events links "birth" and "marriage" can be accessed through the link "people". This is an indirect way to life events via a shorter and structured list of themes on *wien.at's* homepage. Another explanation why such an indirect approach was taken by *wien.at* is that through the theme list as many technical departments as possible were enabled to participate.

- *The Virtual Administration Guide* is a useful tool combining life events with administration procedures and is organised along five key links: Firstly, administration procedures offering eleven sub-links, like employment, constructing and residency, family and education, finances (fees, taxes, etc), health and social security, and others. These further links offer services that are related to these themes/life events: forms including PDF forms for download and electronic forms, too. Secondly, a number of forms can be downloaded. Thirdly, documents are offered including information on certain administration procedures. Fourthly, contacts to administration, and, fifth, services for businesses including a mixture of information and transactions services, like Viennese real estate acquisition for foreigners; public tendering; factory equipment permit; business founding; register of companies; licensing of business, etc. are offered. Additionally, a direct link to pay bills online via the service www.bezahlen.at is provided.

Multi-channel delivery

eVienna is also especially outstanding in its realisation of multi-channel delivery. Such an approach is especially important to assure the social inclusion of special user groups (see also social inclusion below). The access to the single *eVienna* services is provided through:

- Public Access Points (kiosks),
- Call centre/s,
- One-stop shops in municipal district administration departments,
- De-centrally established Citizen Services,
- Alternative electronic media options – phone, fax and e-mail.

Organisation, work and skills

The one stop government idea to offer all public administration services through one single portal is defined by the municipal administration as an important goal for e-government. Two dominant pre-requisites are necessary to achieve this: a secure electronic identification and the possibility of administration departments to connect certain data of the citizen with each other. If these possibilities are not given at all in the future, the realisation of e-government will be hindered. But as they are sometimes in contradiction, both need to be balanced.

Concerning the development of IT-skills, the Administration Academy of the Municipal Administration offers to public servants education in EDP, like html coding. From autumn 2001 on, the Administration Academy started an e-learning digital television project (via the intranet) by using streaming technology.

Social inclusion

Social inclusion is, together with user-centred design and multi-channel delivery, a specially prioritised aspect of *eVienna*. Actually, its multi-channel delivery approach through the Public Access Points initiative and its follow-up projects, the planned Call Centre and the One-Stop-Shops are also a part of social inclusion because these projects allow social groups that do not have easy access to PCs and the Internet from home, work, or another place to access the Internet from public places. Also, the user-centred design and social inclusion concepts go hand in hand. For example, contents on the net must be written in a way that they consider the W3C criteria meaning, for example web sites get accessible to blind people by being translated into voice by a screen reader. Additionally, content must be offered to special groups, like to women, senior citizens, youth, foreign citizens, handicapped people, etc. With *eVienna,* the Municipal Administration tries to realise social inclusion using the following

instruments as major components:

- Public Access Point Initiative and its follow up initiatives: City terminals, MultimediapayStations and Techno-Points (see chapt. 3.3.2: multi-channel, 3.3.4: social inclusion, and 3.3.5: financing),
- A Call Centre (see theme: multi-channel-delivery),
- Vienna for special groups: senior Citizens, youth and children, women, handicapped people and foreign citizens (see theme: social inclusion).

Financing/Public-Private-Partnerships

E-government projects are financed from the general budgets of the technical departments and the EDP-Department/Municipal Department 14 as well as a special budget for e-government. The *Wien.at*-Division of the Press and Information Service's budget is about 109,000 EURO (payment in kind) without personnel costs (the Department of the Press and Information Service, as an own unit, has a budget of approx. 22 M Euro).

Outsourcing of certain functions plays an important role. The EDP-Department tries to keep outsourcing limited but about half of the 20 positions have been created as a consequence of the e-government projects. This re-organisation also resulted into more efficiency of work in general.

Trust, privacy and security

The applications of the Municipal Administration of the City of Vienna meet the requirements of the Austrian data protection law (DSG 2000) and are reported to the Austrian data security commission. For example, this implies that the Municipal Administration is not allowed to collect user data in order to connect them with each other without the explicit permission of the user to do so. Such permission will be also necessary, in order to offer an improvement of a user-centred service on the basis of such data.

eVienna transaction services (see below service delivery) include secure authentication methods. Depending on the specific application they offer:

- PIN and user word: current applications are central complaint management (in the first quarter of 2002), real estate acquisition for foreigners, e-procurement, e-tax filing, transmission of bills, real estate duty, garbage collection duty, bill presentment to pay bills by *bezahlen.at*.
- Provision of register number of user's case plus Austrian business register number or social security number (for six forms of the online filing of business procedures),
- Verification of address through insight into the central electronic residency register (e.g., parking sticker),
- Verification through insight into the car registration numbers (parking sticker).

Further measures providing data security are:

- SSL encryption: SSL is about to be used for all applications in early 2002;
- strict division between operational data and log files;
- fire wall: a fire wall as a main bastion against harmful material coming from the Internet was built up by the EDP-Department in 1994;
- no cookies are used, unless it is technically absolutely necessary;

- internal municipal administration information is given through a print magazine and the intranet provided by the EDP-Department.

With regard to the introduction of electronic signatures, the Municipal Administration takes an observant stance. Although there is a principal readiness to participate within the process of implementing e-signatures, the EDP-Department waits for ready usable products from the market.

Regional development
The modernisation of the public administration through offering advanced e-government services is seen as a basic contribution to improve Vienna's attractiveness as a business location and, as a consequence, its development prospects. For regional development under an e-government perspective, SMEs are an especially important target group for the Municipal Administration. In fact, it offers a variety of Internet services to SMEs through *wien.at*, like several transaction applications in regard to issuing of business administration procedures, e-procurement, and the special list of links for businesses included into the virtual administration guide.

Technology trends
The technical infrastructure for *eVienna* is a distributed system of various layers of web applications and Internet as well as Intranet services. The system consists of multiple Web servers, Linux with Apache, Microsoft Windows 2000 with IIS5, ALX4.3 with Apache and Oracle 8.1 as well as zOS 2.8 with self-coded middleware. Open source (so Linux) and the Apache server have been used from the beginning because this is the most common practice. Generally, the developers try to avoid Microsoft products. Not only static data, but also dynamic applications of legacy systems are used. Those services get combined with each other over a portal, which integrates a style layout (style guide) of the sites. All mentioned configurations are obtained for the Intranet (Vienna intern), too and through 7x24x365 service offered with a bandwidth of a minimum of 100 Mbit. The main operating figures of the system are gained automatically, proved and are offered to the information disseminators. Processors that are also maintained externally are large enough to guarantee a high level of availability, fast reaction and hence high stability of software and hardware. Principally, there are no particular problems with legacy systems.

The Public Access Point Initiative provides public kiosk systems to access the Internet (including e-government services) via touch screen for free or for a small fee concerning specific services. Alternative stations such as City Terminals, MultiMediaStations (payphones) and Techno-Points (for postal services) are especially interesting under a technical point of view. Each of the last two solutions, which offer Internet access for a fee, provides their own payment system.

For internal use, streaming technologies for digital television were introduced by the end of 2001. A streaming channel shall serve for e-learning (see theme: technology trends below). Also, the Municipal Council Correspondence can be read through WAP-mobile phone.

Governance
The three dominant goals of *eVienna* defined by the Municipal Administration are:

- Citizen orientation and the fulfilment of service demand by the citizens: *eVienna* is already very user-orientated, above all, through its user-centred design, multi-channel delivery and social inclusion approaches. As has been showed, one can say that there is a clear demand for *wien.at*. It is visited by an estimated number of 650.000 users in an average month (Vienna inhabits appr. 1.6 million people).
- Support of the economy: through maintenance and improvement of the ability to make the business location site Vienna more compatible. Especially specific IT-education-programmes, like the *Viennese Education Network*, help the ability to compete for the business location site Vienna in the future. Also, a couple of services are offered especially for SMEs through *wien.at*.
- Administration simplified, internal enhancement of efficiency and cost reduction: A couple of simplified online administration procedures are already offered by the Web sites *wien.at*. Also, as planning steps have been taken, the number of simplified online administration procedures will increase quickly throughout the year 2002. The internal enhancement of efficiency will need the enhancement of workflow systems (e.g. the Electronic Act).

Additionally, three reform goals were formulated that should be achieved in regard to e-government:

- To provide an extensive offer of interactive life events: related information and service of the administration. This goal has been achieved by *wien.at* to a high degree. Though life events in a narrow sense are not the primary entry points from *wien.at's* portal, they can be found easily through the *Virtual Administration Guide* and the list of theme-links accessible by *wien.at's* homepage.
- To make all administration procedures as transparent as possible: to take the chance to build up citizens' trust in the Municipal Administration. Though citizens get information on departments about steps to take to realise a certain procedure, still missing is, for example, the time a specific administration procedure needs to be issued by a municipal department. Security measures taken will increase trust, but they have to be balanced with the user-centred design goal.
- To include the citizens into decision and planning processes of the bodies of the Vienna Municipality: by offering electronic information accessible by the Internet and through the enabling of participation by offering discussion forums on the Internet. Firstly, though there is some information provided, for example, about the strategic plan of the Municipal Administration to realise e-government solutions in the context of *eVienna*, there is still not enough information given about the specific e-government services citizens and SMEs can expect in the near future. Secondly, although discussion forums are planned, they are not provided until now.
- To motivate citizens to overtake tasks and responsibilities: that have been fulfilled by the Municipal Administration until now. Many of the services offered on *wien.at* allow citizens to save time and money, for example, they are able to access information through the Web or they send an electronic form online themselves. As e result, the Municipal Administration can save a lot of time and money, too. But this is not necessarily the case as, a lot of citizens will need to contact the Municipal Administration in order to ask, for example, how to send an online form. Therefore, a multi-channel-delivery approach is necessary.

Service Delivery and Transactions

Service Delivery is the focus of *eVienna* as shown by a number of transaction services already offered via *wien.at* both for citizens and for businesses. The required fees of 50% of these service deliveries were also paid online, either via credit card or online banking, the other 50% were paid via a traditional payment sheet at a bank.

The following list introduces the most important transaction services provided to citizens:

- Ordering and Extension of Parking Sticker for Residencies
- Request of Voting Card for the National Elections
- Service Online Shop: Since October 2000, the Municipal Administration offers graphical and statistical data for sale via its online shop.
- Bill Presentment/Paying Bills Online: allows to pay bills online through the payment platform *bezahlen.at* of the P.S.K, a bank service provided by the Austrian post in a secure way via SSL and VeriSign Webserver, and user word and pass word solution.
- Central Complaint Management (CCM)

Business transaction services are also already realised and for most of them XML and a secure SSL-connection is provided. The most important of them are:

- Issuing of Business Procedures: A number of forms to process business procedures has been realized only recently including business licensing/-application, appointment or resignation of the executive, change of business location within Vienna, licensing of a further business location in Vienna, change of company name, and closure of a business. The business founders need to fill out an electronic form. All other necessary documents need to be added by scanning them in (or to be sent via fax). For some of the procedures the register number of users case needs to be provided plus the Austrian business register number (of the Austrian business register) or, instead, the Austrian social security number (only if the business owner is a natural person). Data security is provided here by SSL only. Through this procedure, users save themselves only one administration, but they still need to visit the office to sign the business license and to pick it up (stage 3 of EC model).
- Application under the Vienna Law and Land Acquisition by Foreign Citizens: The complete procedure for "foreign citizens for permission to acquire land in Vienna are submitted to the Municipal Department by electronic upload" [5]. SSL is provided and a user id and password is required, which can be received by online registration.[6] All documents that are additionally necessary (office copies of the land register entry, map of the estate, sales contract, passport, etc) have to be added by scanning them in or uploading them as file. The Municipal Department for Foreign Matters has to prove the application. Then the Municipal Department asks other departments, like the police, and the Chamber for Commerce, to comment on the case file through the inner-organisational workflow system. When ready, the user can download the notification directly from the Internet. For payment, the user either needs to go to the Municipal Department for Foreign Affairs to pay directly, or he/she receives a payment sheet through mail to deliver money to the account of the Municipal Department. This application has been awarded by Brussels conference E-government: From Policy to Practice in November 2001.
- E-Procurement, Transmission of Bills for Business Partners of the Vienna Municipality, Real Estate Duty, Garbage Collection Duty, Garbage Collection, Notification Water and Waste Water Notification E-Tax Return Filing (of municipal tax returns and employer's

[5] http://europa.eu.int/information_society/eeurope/egovconf/projects_selected/index_en.htm#Austria.

[6] http://www.wien.gv.at/fremde/auslgrd5.htm.

duty for trustees of commerce): These applications all include the following procedure: The user needs to send a written compliance via mail to the Municipal Department for Financial Services. Afterwards, a notice including the individual user name and password are sent to the customer, with which he/she gets access to the e-commerce server. The Department sends the necessary data to the customer' s PC, which integrates and processes the data in its EDP-system. An informative e-mail tells the customer that the data were transmitted to his or her PC. The customer finds in the added attachment the address information, to pick up the data. The data transmission is pursued via XML technology and is encrypted by SSL. Some current contract with the Vienna Municipality needs to be valid. The services are for free (for all these services Stage 4 of EC model). Where necessary, billing can be made by automated procedures via the bank account).

Especially important future applications are:

- General Payment Solution for Fees of the Municipal Administration: General administration fees shall be able to be paid online through credit card and online banking by mid 2002. Therefore, the payment system of the Municipal Administration needs to be centralised first.
- Online Registration of Change of Residency: This procedure has being issued by police offices until now. Soon, the responsibility for registering of change of residency will be overtaken by the municipal district's departments. From then on an online form will be available through *wien.at*, too.
- Other Applications: Municipal construction procedures, electronic issuing of grave administration services, applications for: kindergarten, music conservatory, and fashion school, and others.

3.3. Good practice

3.3.1. User-centred design and involvement

Interesting aspects evaluated under this theme are:

- "life event approach",
- "target group orientation",
- "usability studies / feedback opportunities"
- "navigation/search functions".

The various life-event approaches can be broken up into the following categories:

- governmental level (federal, regional, municipal – vertical integration),
- inclusion of various public and commercial suppliers (horizontal integration),
- target group orientation,
- degree of interactivity: information, communication, transaction (incl. forms that can be sent back electronically),

3.3.2. Multi-channel delivery of services

Examples of good practice under this theme are:

- Public Access Points (kiosks),
- Call centres shall be built,
- One-stop shops in municipal districts administration departments,
- De-centrally established Citizen Services,
- Different electronic media – phone, fax and e-mail to contact the municipal departments, municipal district departments and other institutions of the Municipal Administration.

3.3.3. Organisation, work and skills

- Re-engineered organization: Re-engineering of public administrations is one of the most important pre-requisites to realise electronic services for citizens and businesses.
- Workflow systems: A major factor to expand e-government services concerns the workflow systems of the suppliers of the service. Workflow "refers to group activity automation by task sequencing and information routing. In other words, a workflow is an activity involving the coordination execution of multiple tasks performed by different members of a team (group of people collaborating by jointly executing work items).
- New forms of skills: New forms of skills of civil servants are a decisive pre-condition to introduce IT-applications for e-government to public administration departments. Two measurements must be distinguished here: training for staff through personal contact and training provided by using mainly new technologies.
- Improvement of human working conditions: The improvement of human working conditions is another necessary pre-condition to motivate public employees to work on and with e-government solutions.

3.3.4. Social inclusion

- Public Access Points
- User centres/Access Points including support
- Special programmes for target groups

3.3.5. Financing / public-private-partnerships

Financing of public IT-services is a problem. The following solutions can be observed on the suppliers' side:

- Receiving public funds for support of technological development (mainly from the national governmental departments responsible for economy, research and technological development);
- Contributing to European developments and receiving funds from European (RTD) projects;
- Realizing revenues from advertisement and from fees for services or technical equipment (software and hardware);
- Outsourcing or forming public-private partnerships for public service delivery to include strong partners who can invest money;

- Looking for win-win solutions with private companies to realize synergy effects by combining public with private services.

3.3.6. Regional development

Under this theme, two aspects should be highlighted:
- Collaboration between central and local government bodies
- Economic development for remote areas

3.3.7. Trust and security

To allow advanced solutions of e-government and e-commerce trust will be besides usability one of the most important categories (both elements can contradict the other element). Especially affected are here transactions between public authorities, on one hand, and citizens and businesses on the other.

The definition of trust implies
- Availability: Guarantee that information and processes are available as soon as the user needs them.
- Integrity: Guarantee that data are reliable meaning not incomplete or inaccurate.
- Authenticity: Guarantee that information and data are not changed during the transmission and securing that the addresser is clearly identified.
- Confidentiality: Guarantee that data are treated confidentially.
- Non-contestability: Guarantee that the sending and receiving of data and information are non-contestable (central for legal and commercial applications).

Security concepts for the definition are
- Availability and Integrity: The goal is here to prevent during actual disturbances the interruption of the availability or that data are lost or manipulated.
- Authenticity and Confidentiality: Both entail techniques for the statement and evidence of identities. They are the foundation for further security measures. Authenticity is especially important for interaction. Here authentication is necessary for both sides for the security of the communication partners. Also, for Net-communication with commercial background the user must know with whom the interaction is in fact taking place. The authentication or evidence of one's identity can be achieved through:
  - Knowledge: the user is asked to provide information, e.g., through pass word.
  - Ownership: the person to be identified must be the owner of an object, like a key, smart card, etc.
  - Biometric: measuring and analysis of an unchangeable, biologic characteristic like finger prints, voice, etc

Another measure to secure trust or secure data transfer is the encryption of a message. Thereby, symmetric, or "one-key procedures", and asymmetric procedures, or public-key procedures with two keys: one private and one public key, are in use. Through encryption, authentication and access control for interaction authenticity and reliability can be provided.

Non-Contestability: If non-contestability is lost, the liability of the transaction is in danger. The consequence can be that the sending or receiving of messages can be contested. Therefore, non-contestability means to have evidence that the transaction really took place. The focus for non-contestability is the securing and provability of the results of a transaction. The digital signature is again one of the most important security measurements for the guarantee of non-contestability (and authenticity and integrity of data).

Authentication methods used by the studied government services were for example:

- Digital signature/digital certificates through software codes
- Fully digital signature/certificates on a chip-card (hardware and software)
- Fully digital signature/certificates on a chip-card with encryption and signature keys and supplemented encryption for secondary providers
- User word and pass word solution for certain applications that require authentication of users,
- Provision of register number of user's case plus Austrian business register number or social security number,

3.3.8. Technology Trends

- Use of smart cards
- Digital TV (e.g. for e-learning)
- Mobile phones
- Different forms of payment
- Standards - the basic premise of *Bremen Online Services bos* is that any e-government solution should not be a proprietary product.

3.3.9. Governance

- New forms of partnership and cooperation
- Public support for articulation of citizens' opinions
- Open information policy of state agencies
- Consideration of citizens' contributions to policies

4. KNOWLEDGE MANAGEMENT SYSTEMS

4.1. IST projects on knowledge management related to the Webocracy Project

The main purpose of this chapter is to provide an excerpt from the considerable body of work that has been undertaken in knowledge management domain within the IST (Information Society Technologies) Programme. Many projects were (or are if they are still running) funded by the IST Programme under the Fifth Framework Programme – RTD projects database of CORDIS[7] contains records about 2248 projects, 438 of which are returned when giving word 'knowledge' as a search term.

This chapter presents information only about a few from those projects. Only those projects were considered which are related with the Webocracy project – which address some problem(s) from problems tackled by the Webocracy project (e.g. intelligent content management, content-based retrieval, annotation and text classification, domain modelling and ontology engineering, etc.). As a source of information for the following presentation of projects we used the CORDIS database, home pages of particular projects, project presentations, and public deliverables produced within the projects (when available). All presented projects are given in an alphabetical order.

4.2. BINDEX – Bilingual Automatic Parallel Indexing and Classification IST-1999-20028

The project (1 November 2000 – 30 April 2002) addresses a problem how to access information with reliable recall and precision employing smart indexing processes. The aim of the BINDEX project is to adopt the prototype of the AUTINDEX system for indexing and classifying bilingual documents automatically. This project aims also at the integration of the AUTINDEX system into the workflow of two different information providers involved in the project playing the role of user partners.

AUTINDEX is an NLP application, which operates on the morpho-syntactic analysis of a document. It provides two types of indexing at the same time, namely free indexing, which is purely based on the linguistic analysis, and controlled indexing which includes additional checking against a thesaurus for the calculation of key words. It supports a human indexer by indexing and classifying documents by producing a list of possible terms using sophisticated language technologies and already existing special purpose language resources such as thesauri, classification schemes and large lexicons. Based on this term list, a list of descriptors, as well as a list of classificators, are calculated.

In addition to monolingual indexing and classification, the tool can also operate multi-lingually. In this case it provides the result lists (term candidates, descriptors, classifiers) in the document as well as in the language selected by the indexer.

The approach is based on a controlled vocabulary and advanced natural language processing technologies. The controlled vocabulary is provided by a classical thesaurus together with a

[7] http://www.cordis.lu/ist/projects.htm

specialised bilingual dictionary which presents a merge of the German-English respectively English-German transfer dictionary and a so-called conversion dictionary which maps different descriptor types in one language into the other. The linguistic processing provides all the information necessary to assign the thesaurus concepts to words including multiword units of the documents, i.e. the indexing, by performing a morpho-syntactic analysis, a term recognition component based on a shallow parsing combined with statistical techniques. Classification of documents is also based on the output of the linguistic processing and the classification schemes already in use on the users' sides.

For more look at http://iaisun.iai.uni-sb.de/bindex/.

4.3. DECOR – Delivery of Context-sensitive Organizational Knowledge IST-1999-13002

The project (2 May 2000 – 1 May 2002) aims at developing tools for business-process oriented knowledge management (BPOKM) based on integration of methods and tools for active, context-sensitive and self-adaptive delivery of organisational knowledge at the process level. The focus is on (i) knowledge archives organised around formal representations of business processes to facilitate navigation and access, (ii) active information delivery services which offer the user in a context-sensitive manner helpful information from the knowledge archive. In order to model business processes formally, an ontology is employed. It can be used to specify the creation, or the potential usage context, or both, for a given knowledge item. In addition, strong and weak business process models are employed as a structuring element to represent the context of information creation.

As a result of the project, the DECOR toolbox has been implemented, which supports design and implementation of systems for BOPKM. The toolbox consists of several modules, some of them are as follows:

Basic Archive System stores knowledge items plus metadata and links between knowledge items. Knowledge items are documents (or links to documents), or links to tacit knowledge (concretely, e.g., a homepage for each employee in a yellow page system as a summary of his skills and experience). Metadata are represented in terms of underlying ontologies.

Business Knowledge Modelling Tool supports in an integrated manner all modelling activities related to the project: (weakly-structured) processes, task-specific information needs, domain knowledge structures, process specific context variables.

Annotation Interface represents a tool for easily attaching semantic categories (in terms of modelled ontologies) to knowledge items in order to feed them into the process-oriented structured archives, index them, and establish the required links. The module has a form of a generic interface to automatic text classification software.

The purpose of the DECOR *Context-aware Knowledge Agents* is to co-operate with workflow engine and modelled information needs, thus proactively offering information from the process-oriented structured archive to the user in charge of a certain task.

In order to deliver information automatically, it is necessary to know what users are actually doing and to exploit this information for autonomous information management services. To achieve this goal, DECOR employs a workflow management system as the host, which is aware of the specific tasks to be performed by the user at a given point in time. Enriched workflow models describe information flow between and information needs for specific tasks. An information assistant observes the running workflow and interprets modelled information needs to offer active support from the process-oriented structured archive.

For more look at http://www.dfki.uni-kl.de/decor/index.html

4.4. E-COGNOS – Methodology, Tools and Architectures for Electronic Consistent Knowledge Management across Projects and between Enterprises in the Construction Domain IST-2000-28671

This project (1 July 2001 – 30 June 2003) aims at specifying, developing and deploying an open model-based infrastructure and a set of tools that promote consistent knowledge management (including capturing, organizing, mining and disseminating) within collaborative construction environments. This should allow the integration of and access to available information and (explicit or implicit) knowledge.

Main goals of the project include:

1. Understanding the semantics within and across heterogeneous construction documents as well as their complex interdependencies leading onto the development of an ontology and model-based adaptive mechanisms that can organise documents ranging from unstructured (black-box) to highly structured according to their contents and interdependencies. A high level ontology of the construction domain can serve as a basis for knowledge indexing and retrieval.
2. Specifying a web-based infrastructure, including Internet-based services allowing to create, capture, locate, index, retrieve, disseminate and share knowledge. The infrastructure will enable user profiling and encourage personalised information discovery.

For more look at http://www.e-cognos.org/.

4.5. HARMONISE – IST-2000-29329

The aim of the project (1 July 2001 – 31 December 2002) is to eliminate an interoperability gap still existing in the tourism market by creating the adequate platform to enable conceptual consensus between tourism stakeholders and deploying the appropriate tolls to allow transparent information exchange between systems. The focus is on development of a semantic reconciliation approach to solve the interoperability problem. A semantic interoperability platform is used to translate data between two systems with different data schemas – it automatically generates data translations from descriptions of the data in the source and the receiver schemas, allowing users to keep their proprietary data formats and simultaneously allow interaction among their data.

This approach depends on a shared, conceptual reference schema, the ontology of the domain. To allow a scalable interaction among different systems, mediation ontology – *the Interoperability Minimum Harmonisation Ontology (IMHO)* - is introduced. The users must make reference to this ontology build up through a consensus process by a panel of tourism experts. IMHO defines concepts commonly agreeable and shared among the participating systems.

In order to deal with ontologies, *SymOntox* tool is used – it represents an ontology management system of Harmonise. It is based on adopting OPAL methodology (OPAL is seen as a domain extension of an XML-based knowledge representation formalism, such as DAML+OIL).

According to OPAL, ontology is constructed by defining a set of concepts and establishing semantic relations among them. OPAL supplies a set of predefined concept categories (referred to as meta-concepts) and semantic relations that form the OPAL framework. The definition of a domain concept takes place by filling a concept template (conceived according to a frame-slot-facet approach), supplying first the OPAL category it belongs to, then the filling of the specified slots.

The concept categories of OPAL are organised in two groups. The first group of OPAL meta-concepts concerns the primary concepts*;* they are Actor (an active entity of the domain, able to activate or perform one or more processes), Object (a passive entity, on which processes operate), and Process (an activity, that is performed to achieve actors' goals).
The second group concerns complementary concepts, that are strictly related (and must be defined in connection) to the primary ones; they are Information Component (a cluster of information items representing relevant aggregated properties of a primary meta-concept), Information Element (an atomic information item), and Subprocess, Action, and Elementary Action (activities that represent process components, at different levels of granularity).

In addition to ontology development, the project addresses a few more tasks, relevant for the integration process for example semantic annotation (referencing data to their corresponding ontologies) and semantic mapping.

For more look at http://www.harmonise.org/.

4.6. ICONS – Intelligent Content Management System IST-2001-32429

The goal of the project (1 January 2002 – 31 December 2003) is to develop a prototype of an Intelligent CONtent management System (ICONS) supporting a uniform, knowledge-based access to distributed information resources available in the form of web pages, pre-existing heterogeneous databases (formatted, text, and multimedia), business process specifications and operational information, as well as legacy information processing systems.
The system is focused on knowledge bases comprising large collections of facts, rules, and heuristics pertaining to a specific application domain. Such knowledge bases are typically divided into two principal parts – a content base comprising repositories of multimedia information objects and ontologies representing formal knowledge pertaining to a corresponding application domain.

From technological point of view, project partners concentrate their effort on three areas namely on knowledge management technologies, human/computer interaction, and distributed architecture technologies. ICONS architecture model comprises many modules providing requested functionality. Some of these modules are as follows:

Content Repository Manager provides an implementation platform for a XML based object oriented content repository, controlled by an enhanced RDF schema, and comprising complex XML objects with embedded multimedia objects. Structure of the repository objects is determined and controlled by the DTD statements comprised in the RDF schema.

Content Semantic Model Manager enables to access auxiliary data structures, which are constructed from selected fields of XML objects, as well as from the contents of text-oriented multimedia object types. These structures serve to support the representation of content semantics with the use of such structural constructs as binary N:M relationships, N-ary N:M relationships with attributes, taxonomy hierarchical trees, and dictionaries. All structural semantic constructs are named and are used to reflect the application semantics to be implemented in the Content Repository. The auxiliary data structures are also used to support property-based selection operations as well as full text search operations

Ontology Model Manager comprises formal knowledge representation pertaining to a particular application domain. The declarative knowledge may formally be represented by the structural knowledge representation constructs, such as SDM relationships or Semantic Net links, or by rules supported by an inference engine. The module is to provide functions to create, maintain, and use the knowledge representation structures and to make those functions available to other modules.

Structural Knowledge Navigator is to provide an ontology structure manipulation language, to provide navigation and selection facilities supporting the graphic object selection and graph navigation features available to users.

Datalog Inference Engine is to be based on the DLV system, which is a deductive database system, based on disjunctive logic programming, which offers front-ends to several advanced knowledge representation formalisms. Disjunctive Datalog combines databases and logic programming.

The proposed architecture is expected to be completed by adopting existing modules providing required functionality (with preference given to open source solutions). An example is *Content Categorisation Engine* which is expected to be based on evaluation of property values with straightforward SQL-like queries and/or on full text queries supported by appropriate full text indices constructed on-the-fly by full text search engines.

In addition to representing descriptive knowledge, ICONS architecture focuses on procedural knowledge as well. The project aims at developing extensions of current workflow engines capabilities. Procedural knowledge based on workflow specifications is to extent the Workflow Management Coalition model with the time modelling features and the Critical Path Method modelling capabilities. Such extensions allow for enhanced support for knowledge management processes usually unsuitable for the WfMC-based process modelling

approach.

In order to support distributed nature of ICONS, the project concentrates on scalable distributed data structure, distributed workflow communication, and load balancing algorithms.

For more look at http://www.icons.rodan.pl.

4.7. LORE – Leveraging Operational Resource Expertise IST-1999-12645

The project's (1 February 2000 – 31 July 2002) goal was to deliver an Integrated Knowledge Management Technology and Human Resource Management System for exploiting Human and Knowledge Capital Value. The system integrates people competencies, processes, projects, document information and financial data in a common Knowledge Portal in order to enhance the teamwork inside the enterprise. When someone makes a search in the portal one will not just get a number of documents but also receive the information on people with competencies and knowledge within the area that is being searched.

In order to simplify information retrieval process and to extend width and depth of information retrieved, a single multiple taxonomy Knowledge Map is build, maintained and accessed. This map grants homogeneous access to people, processes, projects and knowledge objects. The integrated view of processes, projects and people makes it possible to construct a complete Knowledge Map.

The system facilitates the automated corporate knowledge sharing through a dynamic taxonomy and a linguistic analysis of the documents. It allows the organisation of the unstructured information: semantic-based and cross-lingual search tools, assessment and extraction of information and knowledge.

LORE posses an Automatic Feedback Layer powered by linguistic techniques and language technologies that enable the knowledge base to be automatically updated from different sources. The AFL maintains linguistic profiles of knowledge objects like people, skills and documents, performing comparisons between new information and existing knowledge. This feature enables an automatic feedback from information flow to people competence data base, understanding of what people in the company know. The tool within LORE monitors the expertise as staff exhibits it in their writing and provides services based on what it finds. In this way the system is able to keep track of staff expertise demonstrated in day-to-day work.

For more look at http://lore.cezannesw.com/.

4.8. ON-TO-KNOWLEDGE – Content-driven Knowledge-Management Tools through Evolving Ontologies IST-1999-10132

The goal of the project (1 January 2000 – 30 June 2002) is to support efficient and effective knowledge management. The project focuses on developing tools and methods for supporting knowledge management relying on sharable and reusable knowledge ontologies. The

technical backbone of the project is the use of ontologies for the various tasks of information integration and mediation. They can be used to explicitly represent semantics of semi-structured information. This enables sophisticated automatic support for acquiring, maintaining, and accessing weakly-structured online information sources.

In order to support these three processes, a three-layered tool environment has been developed. At the lowest level (the information level), weakly-structured information sources are processed to extract machine-processable meta-information from them. The intermediate level (the representation level) uses this meta-information to provide automatic access, creation, and maintenance of these information sources. The highest level (access level) uses advanced push ad pull techniques to lower the thresholds for accessing this information. At all levels, ontologies are the key asset in achieving the described functionality.

A prerequisite for widely using ontologies is the existence of a joint standard for specifying and exchanging ontologies. The project produced a proposal for such a standard. First, it was OIL – a modelling language based on frames inheriting its formal semantics from description logic with a web compatible syntax based on XML and RDF. Then it was DAML+OIL – a truly international standard backed up by a strongest defence department of the world, developed by a joined EU/US initiative.

In addition to this standard proposal, several tools were developed. Some of them are as follows:

OntoEdit – Ontology Engineering Environment supporting the development of ontologies using graphical means. The tool is built on top of a powerful internal ontology model. It enables inspecting, browsing, codifying and modifying ontologies. Several graphical views onto the structures contained in ontology support modelling different phases of the ontology engineering cycle. The tool is multilingual and uses a flexible and expandable plug-in framework enabling to extend easily its functionalities.

OntoExtract takes care of unstructured textual information sources, extracts ontologies and represents them in XML/RDF/OIL. It is based on CORPORUM software for lexical, syntactic and semantic analysis of texts and their interpretation. The tool can play the role of an annotation engine that analyses e.g. a single web page and augments it with ontological information. *OntoWrapper* is able to tackle structured documents.

Sesame represents a generic architecture for storing and querying RDF and RDF schema. It is implemented on top of a wide variety of repositories (relational or object DBMSs, existing RDF stores, RDF files) and includes a RQL query engine. Sesame is available as open source.

Bor provides reasoning capabilities over ontology representation. Most of classical reasoning tasks for description logics are available. A strategy called pre-reasoning was used to implement workarounds for a number of logical problems proven to be computationally intractable for languages as expressive as OIL.

For more look at http://www.ontoknowledge.org.

4.9. ONTO-LOGGING – Corporate Ontology Modelling and Management System IST-2000-28293

The main objective of the project (1 July 2001 – 31 December 2003) is to develop a set of tools to pave the way for next generation distributed Knowledge Management systems, able to support different independent ontologies and knowledge bases and providing the basis for transparent interoperability and knowledge exchange and, thus, the entry level to future knowledge markets.

The project is based on research activities of two academic partners in the areas of ontology formalisation and user modelling. This targets development of a distributed ontology formalisation system, built over the existing W3C standards and Semantic Web activity (http://www.w3.org/RDF/), like RDF (Resource Description Framework), RDF-Schema, or upcoming standards like OIL (Ontology Inference Layer) and DAML (Darpa Agent Markup Language).

The main expected result of the project is an ONTO-LOGGING technological and functional platform that could be used for the building of new generation of knowledge management products. Special consideration is given to the ontology and knowledge repository system that different tools can use to interoperate and to store corporate content. The platform is composed of a set of component modules:

Ontology definition tools: Ontology Editor, Ontology Evaluator, Category Extractor
Knowledge population tools: Knowledge Editor, Document Crawler, Knowledge Extractor/Annotator, Inference Engine, Conflict Detection Agent
Knowledge query and distribution tools: Query Interface, Knowledge Push Distributor, User Profile Editor.
Knowledge market tools: Knowledge Request Broker, Ontology Reconciliation Agent.

Within the project an ontology editor will be developed that (i) allows to build multiple, interrelated ontologies, that (ii) supports various, current standards (RDF, XMI, etc.) and that (iii) uses experiences from the actual use of ontologies in order to extend their scope. A suite of tools will allow the common user to provide knowledge via various ways, as there are: (i) direct provisioning of facts through a Knowledge Editor, (ii) provisioning of facts through a tool that allows to annotate documents with concepts and relations from the ontology, and (iii) provisioning of facts through everyday processes, e.g. through the definition of XML/RDF-templates that adhere to a particular ontology and just by using these templates the workers contribute knowledge in semi-structured forms. In order to provide these templates an XML/RDF-based editor will be build in order to define a set of DTDs, adapted to a particular working task, from a given conceptual model.

Knowledge Request Broker allows mediating between cooperating clients based on existing ontologies. Thus, it offers ontology-based knowledge sharing and exchange. The Ontology reconciliation agent mediates between different ontologies by letting agents negotiate about their conceptual structures. Based on research focused on metric systems that allow the comparison of conceptual structures and the estimation of their value will be possible to build a tool for ontology and knowledge evaluation.

For more look at http://www.ontologging.com.

4.10. ONTOWEB – Ontology-based Information Exchange for Knowledge Management and Electronic Commerce IST-2000-29243

OntoWeb (1 June 2001 – 31 May 2004) is a thematic network. The aim of the OntoWeb Network is to bring together researchers and industrials coming from the research and applications areas, promoting interdisciplinary work and strengthening the European influence on Semantic Web standardisation efforts. It is the delighted goal of the network to bypass communication bottlenecks between various and heterogeneous interest groups.

The main long term goals of the network include but are not limited to (i) representation and co-ordination ontology-related research being carried out in different research areas, such as: Web Markup Languages, Knowledge Acquisition, Knowledge Engineering, Knowledge Representation, Information systems and database integration, Information Retrieval, Language Engineering, Digital Libraries, Software Agents, and Machine Learning, (ii) dissemination information, research and application results about ontologies and related fields, and (iii) distributing results and stimulating applications in all areas, with special emphasis on Web-based applications, electronic commerce, and information integration.

In order to support cooperation among different groups and/or individuals, five special interests groups have been established:

- SIG1 on Content Standards
- SIG2 on Ontology Language Standards
- SIG3 on Ontology Environment
- SIG4 on Industrial Applications
- SIG5 on Language Technology in Ontology Development and Use

To provide an information service for scientists, practitioners and students, a community web portal for OntoWeb has been established. The portal features a comprehensive Content Management System allowing participants to provide up-to-date information in a comfortable way. A special OntoWeb ontology is applied to structure domain-specific knowledge among project partners.

The portal offers an overview of current research and development activities and an outline of main technical and scientific issues to be addressed in the near future. It makes information available about scientific events and developments, companies, and research institutions, material for supporting research such as a survey on ontology tools, scenarios for ontology-based applications, state of the art in related standards, ontology language proposals, and various standardisation efforts, etc.

For more look at http://www.ontoweb.org/, http://ontoweb.aifb.uni-karlsruhe.de/.

4.11. WONDERWEB – Ontology Infrastructure for the Semantic Web IST-2001-33052

The project (1 January 2002 – 30 June 2004) is related to the development of the Semantic Web, which will provide data not only for human consumption but in machine processable form as well. This will enable a wide range of intelligent services such as information brokers, search agents, information filters etc. The crucial role in enabling content-based access, interoperability and communication across the Web is played by ontologies. Therefore, the project aims at developing an infrastructure required for large-scale deployment of ontologies as the foundation for the Semantic Web.

This involves several activities, such as establishment of a Web standard ontology language, development of the ontological engineering framework, proposing foundational ontologies, and creating required technological infrastructure.

The development of a family of *ontology languages* that extend existing Web standards while maintaining maximum backwards compatibility. The resulting layered architecture (e.g. ontology language layer, extensional rule language layer, etc.) will provide the necessary flexibility (standardising on a single language is unrealistic in the Web environment) while maximising interoperability. The activity is based on close cooperation with the DAML programme (e.g., via the joint EU/US committee on agent mark-up languages) and with the W3C (e.g., via participation in the anticipated W3C standardisation process).

Within this activity an ontology language OWL has been developed. The language is based on DAML+OIL – it extends it in some ways while some reduction are present as well. In addition to this, a sub-language called OWL-Lite was introduced – as a language to be easy enough and useful enough to use.

The development of a *framework* of techniques and methodologies that provide an engineering approach to the building and use of ontologies. In particular, techniques will be developed for the semantic integration, migration, reconciliation and sharing of ontologies, their versioning, modularisation, and support for adaptation and reuse.

The development of a library of *foundational ontologies* covering a wide range of application domains. Each of these ontologies will provide a carefully crafted taxonomic backbone with a sound high-level structure that can be used as the basis for the development of more detailed domain ontologies. The integration of existing ontologies with foundational ontologies will also provide a principled mechanism for the semantic integration and harmonisation of existing ontologies and metadata standards.

The development of the comprehensive *technical infrastructure* and tool support that will be required by real world applications in the Semantic Web. In particular, an ontology server architecture will be developed in order to link new and existing components in an integrated and extensible tool suite. This will include tools for editing, integrating and extracting ontologies, for their development and maintenance, as well as services such as persistent storage and reasoning support. A set of existing clients (e.g. Triple client, SiLRi client, OntoEdit client, FaCT client, etc.) will be adapted in order to cooperate with the ontology server.

For more look at http://wonderweb.semanticweb.org/, http://wonderweb.man.ac.uk/.

4.12. Conclusion

Results and of these projects can serve as an input to the Webocracy project on several levels. On the level of used formats and representations, it seems that the projects On-To-Knowledge and WonderWeb are heavily influential in the field of current and future (de-facto) standards used within knowledge modelling and semantic web communities. This fact requires the Webocrat system to support such formats for representation of ontologies as DAML+OIL and OWL. On the level of different tools produced within these projects, it would be valuable to incorporate the functionality of some of them into the Webocrat system (e.g. reasoning capabilities over ontology representation) or to prepare an interface to some of them in order to extend the functionality provided by the Webocrat system or to be compatible with some of them in the future. On the level of disseminating project results, OntoWeb thematic network represents a valuable forum for exchanging ideas.

References

Benchmarking E-government: A Global Perspective, http://www.unpan.org/e-government/Benchmarking%20E-gov%202001.pdf

PRISMA (2002) Pan-European best practice in service delivery, deliverable D3.2 of IST-1999-29088 Prisma Project, 2000-2003. http://www.prisma-eu.net/.

5. ANNEX I: E-GOVERNMENT LINKS

5.1. Governments in individual countries and governmental institutions

Austria
http://www.austria.gv.at/e/

Australia
www.australia.gov.au - National Office for the Information Economy

Belgium
http://www.belgium.fgov.be
http://www.dma.be/MIDA/ - Digital City Antverp

Bulgaria
http://portal.government.bg - Bulgarian Government Portal, includes public information and electronic payment.

Canada
www.canada.gc.ca
www.egovlinks.com - Other links to e-government

Czech Republic
http://www.uvis.cz/ - Office for public information systems
http://www.statnisprava.cz/ - State administration

Denmark
www.denmark.dk
http://www.danmark.dk - Service pages for citizens
http://www.indberetning.dk - Service pages for business
www.gotzespace.dk/demokracy/ - Information for citizens on democracy, discussion fora on political issues
www.folketinget.dk - Danish Parliament

Estonia
http://www.riik.ee, http://www.gov.ee - Estonian National eGovernment site

Finland
http://www.vn.fi/vm/kehittaminen/tietohallinto/portaali.htm - Portal for public services

France
http://www.service-public.fr/ - Public services portal (central level)
http://www.fonction-publique.gouv.fr/tic - French e-Government pages
http://www.senat.fr/english/somm.html - French Parliament

Germany
http://www.bund.de - The central gateway to Web content of the German administration
www.government.de, www.bundesregierung.de

Italy
http://www.paforum.net - Italian government's public administration forum

Luxembourg
http://www.eluxembourg.lu - e-Government website

The Netherlands
http://www.overheid.nl - e-Government website

New Zeeland
http://www.nzgo.govt.nz

Poland
www.egov.pl - Official page of Poland government

Portugal
http://www.infocid.pt - Portugal's public services portal

Singapore
http://www.gov.sg/

Slovakia
http://www.government.gov.sk/english/ - Government Office

Slovenia
http://www.gov.si/mid - Ministry of the Information Society

Sweden
http://www.statskontoret.se/egov - Swedish national eGov site

Switzerland
http://www.admin.ch - Federal Authorities of the Swiss Confederation

Turkey
http://www.bybs.gov.tr - National e-Government site

United Kingdom
www.ukonline.gov.uk, http://www.gateway.gov.uk, http://www.govtalk.gov.uk,
http://www.egov-online.co.uk - eGov sites

USA
http://www.egovlinks.com/ - Official U.S. gateway to all government information
American project which could be example what and how to build e–democracy in practice:

- Apply for student financial assistance, http://www.ed.gov/offices/OSFAP/Students/

- Compare Medicare options, http://www.medicare.gov/MPPF/home.asp
- Renew your car tag, http://www.workers.gov/child1.asp?IntCategoryId=4&IntSubCategoryId=71
- Buy coins, http://www.usmint.gov/index.cfm?flash=yes
- Apply for Social Security benefits, http://www.ssa.gov/top10.html
- Check flight delays, http://www.fly.faa.gov/flyFAA/index.html
- Find government jobs, http://www.usajobs.opm.gov/
- Get passport information, http://www.travel.state.gov/passport_services.html
- Write school reports on any subject, http://www.ed.gov/free/index.html

Overviews with links to the individual countries:
http://www.gksoft.com/govt/en/world.html - Worldwide Governments on the WWW
http://www.gksoft.com/govt/en/europa.html - European Governments on the WWW
http://www.gksoft.com/govt/en/america.html - American Governments on the WWW

Some categories of institutions:
http://www.gksoft.com/govt/en/multi.html - Multi-governmental Institutions
http://www.gksoft.com/govt/en/parliaments.html - Parliaments
http://www.gksoft.com/govt/en/statistics.html - Institutions in the area Statistics
http://www.gksoft.com/govt/en/tourism.html - Institutions in the area Tourism

5.2. e-Government Resources

http://www1.worldbank.org/publicsector/egov/
The World Bank's e-government page includes information and case studies from developing countries on e-government organized by country, sector or objectives as well as links to external studies on e-government.

http://www1.oecd.org/puma/pubs/
The OECD's Web site offers downloadable reports (in PDF format) on various aspects of government, public participation and ICT.

http://www.egovlinks.com/world_egov_links.html
This portal offers resources on e-government including reports, news and links sorted by category.

http://www.man.ac.uk/idpm/idpm_dp.htm#ig
Two online reports that offer a framework and training materials on e-governance for development from the University of Manchester.

http://www.excelgov.org/techcon/index.htm
The Web site for the Intergovernmental Technology Leadership Consortium of the Council for Excellence in Government has information on e-government, including public surveys from the US and an award competition.

http://www.digitalgovernance.org
Digital Governance is a project that explores and disseminates innovative models by which

ICT can be used in developing countries to lead to better governance.

http://sosig.esrc.bristol.ac.uk/roads/subject-listing/World-cat/polcom.html
Links to numerous papers, reports, news, governmental and non-governmental organizations addressing e-government.

http://www.egovlinks.com/world_egov_links.html - A lot of national web sites and other links