



My city online

Making the case for municipal web portals

Case studies and strategies for website development
from Smart Cities



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1. Get web-wise

Web portals are a must for the modern municipality. They provide fast, convenient and user-friendly public e-services to business and citizens and deliver high levels of customer satisfaction.

The web has become the single most important communication channel in our society. Every business has a website, and Google has become the place where most of us go to get answers to our questions. Government has gone online, and citizens have their own personal web presences, their Facebook walls and their social media profiles.

But the web is not just limited to communication. It connects people, and lets them interact and share. With this functionality comes a great opportunity for businesses and governments to use the web to provide and deliver services to their clients. E-services promise convenience and flexibility for customers, and greater efficiency and higher productivity for service providers. With the advent of smart phones, citizens and businesses now carry the web with them, everywhere they go. It is their reference library, their legal advisor, their tourist guide and their communication hub. Customers expect first class online service.

Smart thinking

This publication brings together a range of case studies which highlight the work of Smart Cities' partner municipalities to update and improve their websites and transform them into customer-focused e-service channels. Over three years most of the Smart Cities project's municipal partners have made significant investments in their web presences.

Some cities have added online services, often in the form of digital 'e-forms' which allow users to submit service requests at their convenience, without having to visit the town hall or call a service centre during office hours. Some municipalities have revamped their website's navigation to make it easier and faster for users to find the information they seek. Some have changed the back end systems which effectively power the website, integrating the portal into other electronic workflows. Some partner portals even allow citizens to log and see the status of their service requests and access their case files.

We also present the results of a survey which asked the municipal partners of the Smart Cities project about their website strategies and plans. The survey examined the local drivers and ambitions that shape the efforts of cities to develop their municipal web portals and offer online services. Our analysis of the municipalities' responses has highlighted some of the important elements for municipal web portals, some common user demands, and the importance of stakeholder and user engagement in any such web portal project.

We hope that these stories will inspire your own web projects – and help you to plan and execute them so that the web can deliver the services that customers and citizens demand.

About Smart Cities

The Smart Cities project, part-funded by the Interreg IVB North Sea Region Programme, was established to create an innovation network between governments and academic partners. By sharing their ideas and experiences and running new e-service pilots, the project has helped to spread excellence in the development and take-up of e-services in municipalities across Europe.

The work of Smart Cities has taken a unique approach by combining academic rigour, theory and innovation with proven practices and knowledge, all set within the real-world political and practical contexts of individual cities in the North Sea region. The project has also stressed the importance of co-design: e-service development should closely involve every stakeholder, especially the end-users themselves.

This publication was produced with input from the partner municipalities of the Smart Cities project. The case studies were researched and written by Scientia Scripta (<http://scientiascripta.co.uk>).

2. Bremerhaven: web access to geo-services



The city of Bremerhaven was founded in 1827 and is located on the east side of the Weser estuary, at the confluence of the Geest and the Weser. Bremerhaven and the city of Bremen make up the federal state of Bremen, one of Germany's sixteen Bundesland. Bremerhaven is the largest port in the North Sea, home to many maritime industries and attractions and one of the world's largest container terminals.

Bremerhaven in numbers

Population: 115 000

Percentage with internet access: 82%

Website traffic: 130 000 unique visitors per month

Bremerhaven is an important pilot city for a number of geo-based services. Info-terminals around the city use web technology to give citizens access to information about tourist attractions, events in the city and live data feeds on the urban public transport network and other city information.

Bremerhaven is currently using 21 information terminals in and around the city centre to provide up-to-date information to citizens and visitors, including information about local tourist attractions. These terminals were installed as part of the SeaPort Interreg IIIB project. Bremerhaven wants to expand the range of information about the city and region that is available on these terminals, and to provide more relevant information to a variety of target groups including elderly city residents, the business community and young people.

One of the most important additions to these info-terminals is live public transport information. Bremerhaven is working with Bremerhaven Bus and the Bremerhaven Tourist Board in the Framework Seven *European Bus System of the Future* project to develop a vehicle tracking system, which is currently being piloted on one test bus route. Information is exchanged between the information terminal at the bus stop and passing buses via a wireless WiFi connection: the real-time data produced by this system provides an accurate and up-to-date picture of the transport network which can be distributed to users through the info-terminals network or even integrated into Bremerhaven's municipal website.

Ten of the info-terminals are being fitted with Bluetooth technology so that users can download free information about the city directly to their mobile devices. Currently the information that is available focuses on the city's tourist attractions, but this could easily be enhanced in the future to include public transport announcements or even special offers from nearby retailers.

The Smart Cities Bluetooth pilot is seen as a major test case for the use of Bluetooth technology to deliver useful municipal information to people in both outdoor and indoor environments. People will be able to 'download' the information (text, audio, videos and pictures) they get from the information terminals across the city for use on their own personal devices.

Although this pilot is focusing on the technical aspects of using Bluetooth technology, Bremerhaven is keen to make sure that these services are user-driven. Users of the 'Hafeninsel' information terminal in the centre of the city have been asked to answer a questionnaire about the content and usability of the info-terminals and Bluetooth services after they've used the terminal. Although the pilot's services are targeted to tourists and visitors, city residents are also being surveyed about other services they would like to access via the terminals.

"It is important that visitors to Bremerhaven have a very positive experience," says Andreas Weber of Monavista, the consultancy leading the Bremerhaven pilots. "The information terminals of the Bremerhaven Tourist Board are installed at the most important attractions in the city to provide tourists with all the information they need to plan their stay and to navigate between the sights. This is still very much in a pilot stage, but we are now thinking about how this network of terminals can be used to deliver e-services, acting like outdoor web portals for certain types of municipal services and information."

The benefits – in brief			
<p>Customers</p> <p>Access to useful information about attractions and the area direct to mobile phone for later use</p>	<p>Performance</p> <p>Shifting customers to self-service online information and services</p>	<p>Employees</p> <p>More time for employees to deal with more complex visitor/passenger queries</p>	<p>Financial</p> <p>Staff time savings</p>

3. Edinburgh: user-centricity wins the prize

 <p>◆ EDINBURGH ◆ THE CITY OF EDINBURGH COUNCIL</p>	<p>The City of Edinburgh Council is responsible for providing services such as education, social services, housing and culture and leisure to almost half a million people in a city covering more than 264 square kilometres.</p>
Edinburgh in numbers	
Population: 470 000	
Percentage with internet access: 71%	
Website traffic: 186 000 unique visitors per month	

Over the last 18 months the City of Edinburgh Council has revamped its website to provide the city’s residents and businesses with a comprehensive suite of online services. The city’s efforts to involve end-users throughout the process means that Edinburgh now has one of the UK’s best local authority websites.

When Edinburgh launched its strategy in 2008 to achieve excellence in customer service it was not surprising that their website was targeted for major redevelopment. “Our existing platform was just not able to deliver the functionality we needed,” Hilary Coyne, the city’s Web Services Project Manager, frankly admits.

The old web platform was unreliable and often crashed. Its forms were all manually coded in HTML and there was no scope for any integration with social media. And the look, feel and accessibility were poor.

“We wanted to deliver better customer service, but in more efficient ways in response to our heavy budget cuts,” Hilary explains. With a new website promising cost savings there was no problem in getting the massive project approved. The elected council members realised that a better website offered a win-win situation: improvements to the council’s reputation, opportunities for lower volumes of so-called ‘avoidable contact’ with customers, lower running costs and more cost effective communication with citizens.

“Still, our main driver was to improve the customer’s experience,” Hilary adds.

What the customer wants

Before designing on its new website, the council ran a thorough programme of user research. Reflecting the city's customer-centric philosophy, it was important that the new website was designed from the outside in. Janet Johnston from the council's web services team used customer profiling tools to select a sample of residents who would represent different user groups for the website. Around 100 people participated in a series of structured meetings over a period of three months.

Each group had to work as a team and come up with consensus responses to the questions put to them. This group activity helped to remove individual preferences and draw attention to the common expectations shared by many customers. "We were able to find out what people wanted from the website and the sort of functionality they were expecting," says Janet. "We also used people from our representative sample to provide feedback on the new design and branding of the website, showing them different alternatives and asking them about their preferences in terms of the colours, layout, images – the general look, feel and functionality of the new site."

The customer research also asked people to rank the importance of different features that they would like to see on a new website. This exercise helped the council to allocate its resources and budget to develop the website services that the city's residents wanted most.

"It seems obvious," Janet continues, "but it was quite clear that people wanted the site to be 'task oriented'. They wanted to be able to come on the site and do things quickly and easily. We had to make tasks easy to find and complete. They don't want gimmicks. They think the council's website should do its job, give information and facilitate communication. It doesn't need to be cutting edge. It is often the internal staff who have unrealistic expectations. They want to see things like complete personalisation, but this was not high in customers' priorities."

At your service

One reason for having a transactional focus was to encourage as many customers as possible to go online and to use the new self-service facilities. The city's customer contact centre receives some 1.5 million calls each year, not to mention emails and visits to neighbourhood offices and central customer services. By encouraging people to use automated online services and to find answers to their questions on the website, the council could free up staff time to deal with more complicated cases which require support from officers and face-to-face consultation.

"The website must provide a good customer experience," observes Hilary Coyne. "They have to be able to complete a specific task really quickly and easily, without any frustration. That way they'll use the web again, and shift to this channel."

“Our new website, for example, uses dynamic e-forms. Previously we had 12 different forms online and you had to choose the right one and fill it in correctly. Now our forms are smarter and only relevant questions are shown.

“We’ve also put new forms online, for instance our library membership form. This wasn’t available before, but is now one of our most popular website services.

“It is important to divert as much traffic as possible onto the web for its cost savings, but we must never forget that if we are going to be customer-centric then our motivation for doing this should be choice and convenience, not savings.”

Content commitment

Indeed, one of the website’s most important functions – despite the availability of so many e-services – is still to provide citizens with information, covering everything from events and public buildings to benefits advice and bin collection days. In such a big city, keeping on top of all this information and making sure it stays up-to-date is a mammoth task.

As part of its web redesign, Edinburgh also introduced new workflows for content authoring and editing. The customer contact centre is the hub of the operation, but there are representatives in every municipal department who are responsible for writing new content and maintaining their department’s webpages. First the text is written or amended by expert back office employees (or in some cases by customer service agents from the contact centre) who have been trained to write about their services for the general public according to the website’s style guide.

The text is then automatically sent to an appropriate editor. This editor will work in the same department as the original author, so should have reasonable knowledge about the material they are reviewing. Editors can check the revised text for accuracy, consistency and style.

Finally, before the content can go live, it must be approved by a high level web master, who may make final edits so the content complies with style and layout restrictions.

A team of web champions within departments and the contact centre manages the page authors, and also helps develop the council’s web strategy. They identify new content, update text and ensure that the website helps to deliver the council’s channel and customer service strategies.

Dealing with dialogue

An important addition to Edinburgh's new website is the "Comment on this page" feature. It appears at the bottom of every page and takes customers to a comments form where they can rate the page and add any comments or requests.

Edinburgh's top level navigation makes it surprisingly easy for visitors to find what they want online with just a few words: Report it, Request it, Pay it.

"It is an on-going job to ensure that the website remains the way we intended it to be: customer-friendly, customer-focused and task-oriented," says Janet.

Edinburgh Council has given online consultation much greater prominence on its new website, with a "Have your say" tab at the top of the page. Here users can complete surveys and polls or access information about current council consultations, for example a questionnaire about the council's budget proposals, a review of polling districts or just general complaints, compliments and suggestions.

Award winning achievement

The outstanding web redevelopment – which involved more than 30 members of staff across all departments – and its user involvement were both recognised by Consumer Focus Scotland as examples of 'best practice'. The site was also awarded four stars in the Socitm *Better Connected Report 2011*¹. "There is a general acknowledgement that the web is a key - and where possible the primary - customer communication channel," acknowledges Hilary Coyne. "Senior management want to ensure that we continue to maintain and improve upon our web presence, not least to ensure we retain the Socitm 4 stars next year."

The benefits – in brief			
Customers More useful and accessible with accurate, up-to-date information More 24/7 online transactions	Performance Higher Socitm rating Increased customer satisfaction Compliance with guidelines and standards	Employees More efficient publishing tools More efficient intranet for knowledge sharing	Financial Lower annual support costs Staff time savings Enabler for channel shift

¹ Socitm is a membership association for ICT professionals working in local authorities and the public and third sectors and suppliers to those sectors in the UK - <http://www.socitm.gov.uk/>

4 Groningen: demand driven redesign



Groningen is the largest city in the north of the Netherlands and the eighth largest city in the country. A university city, it boasts an impressive array of academic and educational institutes and is at the leading edge in the development of research, innovation and entrepreneurship. It is a young city – half of the population is under 35 years of age.

Groningen in numbers

Population: 190 000

Percentage with internet access: 93%

Website traffic: 135 000 unique visitors per month

Groningen in the Netherlands has been well ahead of the field in its municipal website developments. Keeping up to speed with technological development and increasing user demand for online services, the city launched a new web portal in 2010.

“When it came to the web, Groningen was one of the most advanced cities in the Netherlands – we won prizes and were ranked number one in a rating of governmental websites!” declares Gjil Smit, programme manager for the city. “By 2005 our website was revolutionary. We had some pretty advanced features including geo-based services such as planning permission searches using a map. But since then, while everyone else was catching up, we became complacent.”

“We realised that our website needed a major redesign,” Gjill continues, “not so much the deployment of new e-services – although that’s on-going – but a redevelopment of its look and feel and its navigational structure.”

A visionary approach

Groningen wants to become a user-focused municipality – one that is led by user demand for services rather than by the municipality's ability to supply services. In other words, the city does not want to tell its citizens what it can do for them, but wants to respond to citizens' questions and requests. In particular the city wants to serve its large community of entrepreneurs and make it easier for them to access advice and services to help them set up and run their businesses successfully.

Annual surveys, web traffic analyses and the experiences of other large cities such as Rotterdam revealed that customers wanted to find information quickly and easily; they did not want to read text which was jammed full of government jargon – text which could only be understood by the council's own employees or experts.

"These days people find out answers using Google," notes Gjill, "so we had to make navigation of our site more search-based rather than relying on hierarchical and organisational menus. Although we had some advanced e-services on our website, people struggled to find them. They would have to know which department's webpages they would need to go to find the information they needed."

Groningen launched its new website in October 2010. It relies much more heavily on search-based navigation, through indexing by Google and other search engines (people put their questions into Google and go straight to the right Groningen page from the search results). The website's own search tool is also quite prominent. There are far fewer menus: navigation options that reflected the municipality's internal structure have been replaced with a few simple menu options that focus more on the issues and questions which citizens typically ask.

"On the old website if you wanted to apply for a passport you would have to know that you needed to go to the public administration department. Now you can just type 'passport' into the search tool and you'll see all the information and 'products' related to passports," Gjill explains.

It's what you say and how you say it

It is not just the layout of the website which has changed, however. The content has been subjected to a thorough overview and rewrite – a process which has taken more than a year. “If you want your website to work well with search engines then you really need to write your content in a Google-friendly way. Every department has had to adapt its content and make it more searchable. At the same time they have had to make the language more accessible to the general public. Gjill says: “Previously we talked down to citizens and told them what we thought was good for them – and in the language of government. Now we write to answer their questions using language that they’re used to.”

The business case for all these changes was easy to formulate. The website was a key tool in the city’s strategy to improve its public services. It fits within the context of other developments such as joined-up customer contact. The changes also offered some important cost savings, not least because the 15 different content management systems used by the different municipal departments were scrapped for a single open source application.

Although the website is still less than a year old, Gjill is conscious that it is time to ask the city’s residents and entrepreneurs what they think. They will soon have the opportunity to feed back and have their say. And Groningen will be ready to listen and continue to develop its online presence to meet their demands.

The benefits – in brief			
Customers Simpler, search-based navigation and intuitive website structure	Performance Faster access and tunaround for start-up business applications	Employees More flexibility for staff, freeing them from simple, time consuming administrative tasks	Financial More effective, value-added use of staff time Reduced costs by using single CMS

5 Karlstad: a personal touch to e-service

	Karlstad is located near the Klara River on the northern shore of Lake Vänern, halfway between Stockholm and Oslo. Karlstad is one of 16 municipalities in the Värmland region, and is one of Sweden's 20 largest municipalities with one of Sweden's most modern universities.
Karlstad in numbers	
Population: 85 000	
Percentage with internet access: 84%	
Website traffic: 150 000 unique visitors per month	

The Swedish city of Karlstad is working to transform its website into the citizen's gateway to a suite of exciting new online services.

Karlstad is still very much in the early days of creating a dynamic, user-focused web portal. "The web pages we had up to now were static – complex and stuffed with information – but really basic," admits Martin Hamilton, the city's web master. "There were no complex e-services, no ability for users to comment and no chance of any kind of dialogue with citizens."

"We are now working across all the municipal departments," Martin continues, "to make sure that our new website meets the demands of our users and fulfils the expectations of our target groups."

Interestingly, in this day of social networking, real-time interactivity and 24/7 access to online services, what citizens really want from their local authority is information. "The organisation and target user groups are still both focusing on basic information – how to find it, understand it and answer people's questions," Martin explains.

Question time

To find out more about what users wanted from their city's website, the Karlstad web team added a user survey to its website. Visitors were asked about the pages they were on and what content and functionality they would like to see. The city also plans to run a number of focus groups and non-web-based surveys in the near future.

Along with easy and fast access to useful information, citizens also do expect to see the municipality make some services available online, especially the most common application procedures (e.g. for parking permits and certain licences). More importantly, they said they wanted to be able to track their applications online, rather than having to telephone, wait in a queue and then ask a customer contact agent to follow up a case.

Despite its relatively static website, Karlstad is making great progress in its development of e-services. It already has an online platform for schools where pupils and parents can log in to see class timetables, their child's grades and apply for school places. Real-time information about buses and the city's public transportation system can also be accessed online.

As part of its participation in the Smart Cities project the Karlstad e-office, established to support the city's e-government strategy, has developed a platform for handling e-forms sent via the website. This platform can be deployed to allow users to complete a wide range of form-based transactions online. "There is no integration of the e-forms with existing back end systems, so it has been easy to build and implement new forms," says Martin. Yet despite this lack of integration, the e-forms still speed up case handling. Front office staff no longer have to spend their time filling out and completing forms, and customers do not suffer the inconvenience of having to make special trips to fill out and hand in forms.

The e-office is now working with municipal departments to identify which services could make use of the platform and then make them available on the website.

My municipality

Perhaps Karlstad's biggest web project is the introduction of personalised pages for its citizens. Citizens can now log in to the municipal website to view the status of their queries, cases and applications.

MyPages 1.0 will be a very simple solution – the integration of data sources across departments would have been extremely costly. Instead, MyPages 1.0 runs off a separate database which officers have to update manually with the status and comments on all cases. Although this is an extra step for officers (they must manually enter information into the MyPages back end), it will allow agents in the customer contact centre to respond directly to customers asking about the status of their enquiry. They will not have to contact back office staff for updates and therefore free them from interruptions and simple status enquiries. Alternatively, citizens can simply go online and see the status of their enquiries for themselves.

This first version of MyPages is some way from Karlstad's plans for the final version, but it will help citizens and the municipality to see the potential of web-enabled services. MyPages will help to make the organisation more transparent and more process-oriented. Karlstad hopes this initial attempt at personalisation will help it to be more efficient, to be more customer-focused, and able to deliver higher quality services at a lower cost.

Knitting services and website together

However, despite these advances, Karlstad is struggling to understand where its website ends and its e-services begin. At present the management of the website and e-services are handled by separate offices. Although e-services are typically accessed through the website, the website merely acts as a front end or a frame around entirely different systems.

"Currently in Karlstad e-services and the website are treated as separate subjects," said Martin, but he thinks they should be developed hand-in-hand. "Currently the development is relatively independent, not terribly strategic, and we don't really know how the two relate to each other. We need some kind of common governance or strategy and map out how e-services and the website are related to one another. Unless we work together we will not be able to offer more complex e-services."

The question of governance is just one of the 'big questions' which Martin is addressing in a current study of the city's web strategy. "It is clear we need to understand more about what we are trying to achieve through the web and what our citizens want. Our content management system is about to get a major upgrade so this is a great time for a complete web makeover. We can strategically redevelop our website to meet the expectations of our users and deliver the services they really need and want."

6 Kortrijk: my city



The city of Kortrijk is situated in the south of the Belgian province of West Flanders on the Leie River, 25 kilometres north-east of the French city of Lille. Kortrijk is part of the transnational Eurodistrict of Lille- Kortrijk-Tournai, which has a population of approximately 1 900 000 people. Over the past decade Kortrijk has been working hard to develop its local strengths in the design industry.

Kortrijk in numbers

Population: 75 000

Percentage with internet access: 81%

Website traffic: 70 000 unique visitors per month

The city of Kortrijk is one of the first to provide its citizens with a personal web login which gives them access to all their personal data and allows them to track their case histories, enquiries and service requests.

The Kortrijk website is already quite advanced in terms of the e-services on offer. By filling in a dynamic e-form citizens can make a variety of requests – for example for parking permits, leisure passes, etc. They can also access online library services and request copies of their birth certificate.

But all of these are relatively simple services, admits Hans Verscheure. “You fill in a form with your name, address and email and make simple requests. Now we want to raise the bar and provide much more personalised services and content that require secure authentication of individuals and give them access to their case files and the status of their applications through a personalised page. We also want to use their profile information to provide them with more relevant and localised information.”

This kind of online web login and personalised account system is not new, but it is a technological approach that municipalities still have to embrace. Hans agrees that the technology is mature – it is time that the benefits of personalisation for citizens and for employees were showcased to local government.

“Citizens are beginning to ask for this kind of traceability. However, we still need to convince employees that transparency is the best way of working for everyone.”

The ‘My Pages’ concept brings customers into the back office, where they will have access to their personal files, be able to respond to queries from civil servants, and be able to see the status and progress of their applications. Kortrijk also wants to help users find and access website content and services that are relevant to their interests and circumstances (e.g. if the user says they have young children, the website should suggest relevant services and activities). As part of their account registration, customers will be asked about their interests and preferences: this profile information will be used to deliver both appropriate news and products and a website structure that is influenced by their interests and the address they provided when they registered for the site.

Contact central

One of the first important steps in creating personalised pages is making sure that users have access to their personal information and are able to update it whenever necessary. Even more importantly, **every department** in the municipality should be using these most up-to-date personal details.

A Smart Cities pilot has developed a central, shared contact database for the city’s citizens. Using correct contact data is an absolute prerequisite for successful customer relationship management, but before the pilot each department has its own separate contact management system. Citizens had to provide their personal details to each department in turn; if they failed to inform one department about a change of address, for example, the department’s database immediately contains inaccurate information.

With a central contact database, all contact between the municipality and individual citizens – by email, telephone or post – will use the same set of contact details. But the cleverest part of this approach is that **responsibility for keeping contact details up-to-date is delegated to the citizens themselves**, who can amend their contact details by logging onto their ‘My Pages’ section of Kortrijk’s website.

Kortrijk city hopes that this database system will evolve into a real middleware solution and pave the way for greater data integration between departments. “This is the ultimate aim for the organisation” says Hans. “Data integration will allow us to re-use information from different sources and deliver it to a variety of channels, from touch screen tourist kiosks to the municipal website and its personalised pages. Our primary aim is to give customers easier access to the service they need.”

The benefits – in brief			
Customers More transparency More convenience	Performance Efficiency (fewer transcription errors, more successful contacts)	Employees Faster administration for communication campaigns	Financial Fewer hours spent trying to keep contact details accurate and up-to-date

7 Kristiansand: new platform, new channels



The city of Kristiansand is located in the south of Norway on the North Sea coast. With its near neighbour Lillesand, it supports a mixture of electro-metallurgical processing, oil-related industries, trade and tourism.

Kristiansand in numbers

Population: 80 000

Percentage with internet access: 90%

Website traffic: 70 000 unique visitors per month

In 2009 Kristiansand was forced to rebuild its website when its web platform supplier decided to pull out of the market. This opportunity to start from scratch has allowed Kristiansand to redesign from the bottom up and develop a strategic online communication strategy.

Most municipalities like to plan their web projects very carefully, scoping them out, consulting departments, agreeing targets, objectives and metrics. But Kristiansand had to manage a crisis. “We got a letter from the supplier of our web platform that it was changing its business focus and would no longer be supporting its website platform. We were forced to find another vendor, and quickly,” recalls Rita Hansen, head of communications for the municipality. “Still, this was an opportunity to look at our website completely fresh. We could start from scratch and build in whatever we wanted.”

The old website had a few digital forms for basic requests, for example to order copies of official documents. But the content was difficult to manage and organise. Rita says that municipal employees spent a lot of time just moving information around and entering it into the website. Now they had an opportunity to implement an efficient system and include new features which would fulfil Kristiansand’s vision for better communication with its citizens.

Unfortunately, the city's web crisis meant that it had no time for consultation with its citizens to find out what they wanted from their municipal website. "We made our decisions on what we knew about the old website – what people liked, which pages and services were popular, for example," Rita explains.

Meet the people

Rita's web project team also looked at the criteria which are used in Norway's annual local authority website ratings to get an idea of the issues the website had to address and what it should be able to offer. But which of these many criteria should the city emphasise? "We decided to really focus on digital communication," says Rita. "Of course our website had to offer information, but we wanted to use the web to deliver modern, convenient communication channels – online forms, chat and social media for example – between the municipality and our customers. You only have to look at your own personal life and the amount of time we spend on social media like Facebook to realise how important these digital channels have become. We have to go where the people are, meet them there and make it easy for them to interact."

"Of course, the website is still extremely important for providing information," Rita continues, "but Facebook and Youtube are where you find the people – and where they are more likely to give you feedback and comments. By using these channels we are more attractive and in touch; people are more willing to talk to us. We don't put information up on Facebook that isn't on the website, but our website analytics show that we get a huge number of referrals to our website from the Facebook community."

Digital dialogue

Digital communication channels have another big advantage besides making it easy and convenient for users to request services and interact with the municipality: digital communication is efficient. Customers do a lot of the basic administrative work (i.e. form filling) themselves.

Self-service is an important concept – it saves time for users and is cheaper for the municipality. Rita was delighted to discover through an online survey of Kristiansand's website users that most people managed to find the information they were looking for almost immediately. Given the size and complexity of the site, this is an excellent achievement.

Rita puts this achievement down to several of the changes which they introduced into the new website, for example the navigation structure which now follows the Norwegian national 'Los' standard. She is also really pleased with the visitor tracking and analytics on the new platform which are really helping the web team to see how people are using the site and prioritise new developments.

The new website also has some rudimentary geo-based services which make use of Google Maps to display information about areas of the city. Since March 2011, the 'Meld fra' section of the website has let users request services or log complaints (e.g. problems with water quality, requests for snow clearance, etc.) by interacting with a map on the website. The city plans to expand this map-based interaction to other service and information requests.

"The work of website development is never finished," Rita concedes, "so we are continuing to develop more e-services such as digital forms and are becoming even more visible on social media sites. We need to learn how to integrate our online presence on these sites with what we do on the main website, but without losing those citizens who do not use platforms like Facebook so everyone has equal access to what we have to offer."

The benefits – in brief		
<p>Customers</p> <p>All communication can be electronic</p> <p>Convenience and flexibility for customers</p> <p>Easier to leave feedback and engage in dialogue</p>	<p>Performance</p> <p>Faster and more effective response to requests</p> <p>Better customer feedback helps to make services more demand-led</p>	<p>Employees</p> <p>Lower administrative burden for employees</p>

8 Lillesand: a window into the municipal world



The cities of Lillesand and Kristiansand are neighbouring municipalities in the south of Norway on the North Sea. Both support a mixture of electro-metallurgical processing, oil-related industries, trade and tourism.

Lillesand in numbers

Population: 9 000

Percentage with internet access: 90%

Lillesand in Norway believes in sharing and recycling. Its new online services run on a platform shared with its near neighbour Kristiansand. By adopting a central government system, Lillesand have also made it possible for residents to log in and track the progress of their applications.

Thanks to the Norwegian government's increasingly prominent e-government agenda, local authorities in Norway are being supported to build out e-services and municipal websites.

For example, the national government has published a set of guidelines on municipal web portals: who they should target, what content they should contain, how they should be structured. This document is based on thorough research and consultation so it provides small communities like Lillesand with valuable customer insights, laying out the requirements and expectations of citizens. The town has been able to build a customer-focused website which would have been impossible if Lillesand had had to finance its own consumer surveys.

Lillesand works in close collaboration with its near-neighbour Kristiansand. In autumn 2010 the town launched an initiative to refresh its website and move it onto a new web platform shared with Kristiansand.

Lillesand takes a sensible approach, being careful not to 'reinvent the wheel'. The town tries to use existing technologies and solutions where they are available and appropriate to its needs. For example, its website authentication technology (i.e. the software and services which allow users to log in to the website with a user name and password) makes use of a central government authentication platform. "It seems silly to recreate something that already exists," remarks Lillesand's project manager Vinh Huu Nguyen, "so we make use of central government's log in system. If a Lillesand resident has a web account with central government then they can log into our website as well, using the same central government account details."

Local knowledge

Lillesand has not just followed a set of rules and steps prescribed by central government, however; there is always a case for some local adaptation and reprioritisation. “We reviewed our web traffic and customer contact statistics (telephone calls and visits to municipal counter services) to identify the most popular services and service requests with high volumes or simple responses,” Vinh explains. “We have tried to focus on the most-used services, for example applications for kindergarten places which is merely a question of filling in a form. The first e-services on our website are the low hanging fruit.”

But it is not just simple services which have been made available online, Vinh explains because some of the most complicated services can now be accessed online too. “There are a lot of very complex services which need a lot of case handling and gathering information from citizens. But by putting requests for the services online you really free up staff; the municipal officers no longer have to spend so much time with customers just to help them fill in forms. With e-forms the information is automatically inputted into the system which massively boosts efficiency in the back office and saves a lot of time on case handling.”

Transparent transactions

One of the big issues for Lillesand was the lack of transparency in its internal processes. If a citizen wanted to ask about the progress of an application they would have to contact someone from the townhall, who would then have to track down the officer handling the application to ask about its status.

Now all citizens have to do is log on to their web account. Their personalised web space gives them details about all their current services and the status of any requests and applications. Thanks to electronic workflows, every individual case is tracked through the entire work process from request through to delivery. The town hopes that it will be able to provide its local residents with a one stop shop, connected into central government’s personal pages.

The application process for planning permission will be the first to offer this new online tracking and should launch in autumn 2011. The municipality has also signed a contract with a vendor to add some geo-based functionality to this online service so that users will be able to click on a map of the area or type in their postcode and see all the planning permission applications in the vicinity and their progress through the application process.

Many other e-services are now available through the Lillesand website, including applications for kindergarten places, parking permits and alcohol licensing.

However this massive change and focus on the online channel has not come without problems. “There was some internal resistance from back office employees,” admits Vinh, “especially those who had been working here for many years and were used to the old ways of doing things. They didn’t really understand the new processes to start with, nor see the benefits for customers or themselves. It is well known that when you look into the way someone works they feel threatened; when you ask them to change they see it as a criticism of the work they have been doing. We had to work with our employees in a constructive way.”

Although Lillesand has not yet carried out any citizen surveys to find out residents’ opinions of the new website, an independent website review by Difi² awarded Lillesand five stars for ‘quality online’ in its 2011 review.

The benefits – in brief			
<p>Customers</p> <p>Convenience of online communication</p> <p>Application status tracking</p>	<p>Performance</p> <p>Easier to track cases and monitor performance</p> <p>Full automation of some services</p>	<p>Employees</p> <p>Monitoring to reward top employees</p> <p>Easier to change roles in organisation due to standardised workflows</p>	<p>Financial</p> <p>Cost reductions</p>

² Direktoratet for forvaltning og IKT – the Norwegian Agency for Public Management and eGovernment – <http://www.difi.no>

9 Osterholz-Scharmbeck: click into the web future

	<p>The city of Osterholz-Scharmbeck is a modern district town in Lower Saxony, Germany. Surrounded by unspoilt countryside, it attracts large numbers of tourists and offers excellent opportunities for leisure and recreation.</p>
Osterholz-Scharmbeck in numbers	
Population: 30 000	
Percentage with internet access: 76%	
Website traffic: 9 000 unique visitors per month	

Osterholz-Scharmbeck is giving its static website a complete overhaul. It now offers a wide range of online, self-help services, user-focused navigation and more dynamic content.

Just because a town is set in beautiful countryside does not mean it should be behind the times. Osterholz-Scharmbeck certainly has every intention of providing its citizens, businesses and visitors with a top quality website and online services, all supported by the very latest web technologies.

“We have learned over the years that a good internet presence is an important tool for a local authority to reach out to its customers,” explains Nicoline Schambach, press and public relations at the municipality of Osterholz-Scharmbeck. “A good website is about getting the right information to the right people and improving workflows for municipal employees. And to be perfectly honest, the old website was not so good and a little bit unstructured; people would be on it for hardly any time before going somewhere else to find the information they needed.”

Although the previous municipal website was packed with information, it was completely static, looked old fashioned and failed to attract two of the town’s key audiences: elderly residents and young people. It offered no real online services, just a basic contact page.

Designed by us, for us

But what did the residents and local businesses in the town want from the website? Stefan Molkentin – from the external consultancy atene KOM – went out together with students from the Jade University of Applied Sciences and asked this very question. The agency ran an extensive consultation exercise to discover what the municipality's customers and website users expected from the Osterholz-Scharmbeck website. The consultation included workshops with city residents (advertised in the local press), municipal employees (who would also be big users of the website) and local businesses. A questionnaire was also completed by around 500 residents, local businesses and by all the employees of the municipality.

From these surveys, the municipality prioritised how the website should be redeveloped to meet user demands. What was the 'must-have' functionality, content and services for the town's new portal system? Easy navigation came out top; citizens wanted to find relevant information quickly and easily. They also wanted to download documents, so they could then fill them in, print them off, sign them at home and go to the town hall just once to hand in the form.

The consultation also revealed the expectations of the town's two key target audiences. Older people wanted more dynamic and even real-time information, and of course improvements to the website's structure to make navigation much easier. Design and layout issues were also important; older people wanted simple text that was not too small to read (i.e. more user-friendly).

"Young people, on the other hand, wanted to see more content and functionality that was relevant to their lifestyles. They wanted the website to look good and feel more modern so they could identify themselves with their city," explains Stefan Molkentin.

Supported by a content management system equipped with new features and small teams of employees from each municipal department to update and manage the website's content, the new portal went live in May 2011. As well as becoming an important contact and communication tool between citizens and the municipality, the website is now one of the most important sources of information about events and activities in and around the town. People want combined information on one site and the municipal website is the most obvious place for them to get information about local facilities and events. The municipality represents the town, so they expect the website to have all this information – even if the local authority has nothing to do with the event itself.

The new portal also provides Osterholz-Scharmbeck residents with their first taste of online services: applications for passports, federal ID cards, building permits, marriage registration and affidavits.

The main parts of the website are even available in English. “We have a large number of tourists and they use the site to get information about what to do in the town and the surrounding area, so it makes sense. Again, it reflects our demand-driven approach to the redesign,” said Nicoline Schambach.

Making it work

Even though the new website has been built from the bottom up, focusing on the needs and expectations of its users, the municipality is keen to share an important lesson: it doesn't matter how much you offer on the web or how well you design your website, you still have to get users – citizens and employees – excited and motivated to go online.

Nicoline Schambach argues that any municipal website relaunch should be backed up with an effective internal and external communication campaign. “Through good PR – leaflets, articles in the local paper, etc. – you can take people by the hand and encourage them to go online. You have to keep employees and politicians informed about your redevelopment and demonstrate the benefits of the online systems. Even today you still have to persuade people about the benefits of using the web.”

The benefits – in brief			
<p>Customers</p> <p>Time saved travelling in person to town hall</p> <p>24/7 access to application forms</p> <p>Simpler and search-based navigation</p>	<p>Performance</p> <p>More time available for handling more complex cases</p>	<p>Employees</p> <p>High productivity</p>	<p>Financial</p> <p>Greater productivity means lower overtime costs</p>

10. Appendix - Strategies for website development

Smart Cities is an innovation network made up of fifteen government and academic partners from six countries that is working to improve the development and take-up of e-services and e-government across the North Sea Region of Europe. Project partners are improving e-service-delivery by rethinking the basics of service delivery, by changing their innovation methodology, by transferring their best practices to other project partners, and by working with academic and research partners.

The development of web-portals has been a vital part of the project. The partners have shown a range of different ambitions, different ways of approaching the task and have had different results. This led Kristiansand to survey Smart Cities partners to see if there are any differences in municipal approaches to website development in the North Sea region.

This Appendix is a brief review of how a web-portal can be created and the key elements that have to be considered when doing so. Municipalities should refer to the companion guide - Creating Municipal IT Architectures – a reference guide from Smart Cities (<http://www.smartcities.info/ict-architecture>)

You cannot overestimate the importance of having a solid and efficient ICT-architecture as the foundation on which to build a web-portal. You can have whatever ambitions you like, if the basic architecture is not flexible and built with communication and interaction in mind you will not be able to deliver your goals.

8 municipalities responded to this survey. Questionnaires were distributed by e-mail as a word document, which was returned for analysis in this report. While 8 is of course too small a sample to draw any wide and general conclusions, but the results show the issues driving web portal development, what they thought, what they built, who drove the initiative and who took part in website development.

The cities' population ranged from 9 700 to 190 000 with an average of 66 899. On average 84% of the cities' population had computer access and the municipalities expected that between 60 – 90 % of the population are potential users of their websites.

10.1 The introduction of a new web-portal

What is the driving force behind the introduction of a new website? Sometimes we think the impetus comes from citizens, sometimes from national government. Our partners showed that that the real driver for establishing a new site actually is the local authority and/or some of the administrative units in the organisation.

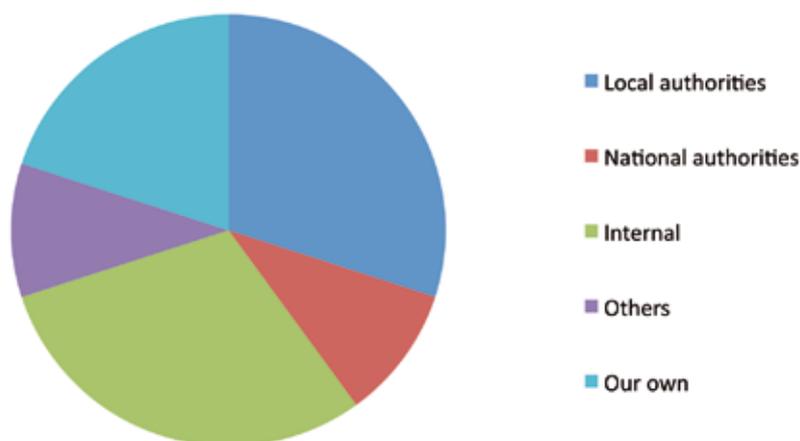


Figure 1. Who was very important in driving the development of a new web site?

All participants had had previous website initiatives before their current one – most had had at least two.

Ambitions

The ambitions of the websites differed. All participants had an clear aims – these included:

- Improve communications to provide better service and reduce telephone call handling
- Provide more and better services for citizens
- Roll out an easier and more efficient CMS (Content management system) in order to provide internal users with a better tool for getting and giving information to the public and the organization.

7 of the participants shared an organizational vision for their website. These visions were closely related to the participants' ambitions, and were mainly related to the organisation and the desire for improved efficiency and effectiveness. Nobody provided a political vision.

Website goals

Partners were asked what were their most important goals in developing their websites. The responses tended to be generalisations:

- More visitors to the web-site
- Better and more available information
- More available services at the web-site
- Simple publication

Only two answers were directly measurable goals:

- To make the most of the existing forms available and to increase the transactions done online (both up to 90%)
- To improve the Socitm ranking from 2 to 3 stars.

(Socitm is an association for ICT and related professionals in the public and third sectors in the UK. They perform an annual evaluation of the functionality and usability of municipal web-sites in the UK.)

Target groups

Local citizens, business and tourists are the most common target-groups for websites.

Primary target-groups	Secondary target-groups
Citizens	Politicians
Business	Employees
Tourists/Visitors	Other public authorities and organizations
Media	Tourists
Potential new residents	Business
Interested parties of the city	Associations and Institutions
Politicians	Leisure house owners
	Neighboring citizens
	Possible migrants

Customer interaction

The cities planned to make their websites interactive, mainly through providing Web 2.0 services.

Specifications

Participants used both internal and external resources to develop the specification of their web-sites. Internal resources were most important, but external resources were also important when developing the specification of the website.

When asked how well their web site specifications covered the real issues website development faces, the answers ranged from 1 to 4 (1: very good, 5: not good) with an average of 1.8. The municipalities were equally satisfied with internally and externally prepared website specifications.

“We built the website within the boundaries of our i-architecture. Our architecture is based on national guidelines (GEMMA architecture). Project-management used a Prince II approach. For the design part, we worked in short iterative phases – i.e. rapid Prototyping. First we made an interaction design and described the way we lead visitors to the desired information. We used the interaction design as blueprint for the functional- and graphic design.”

Who makes a website happen?

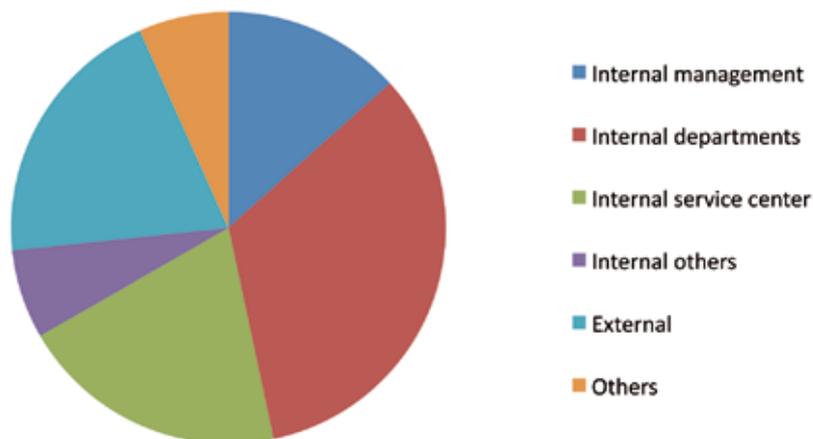


Figure 2. Internal departments are the driving force in building new websites

7 municipalities said that they were able to build their website on budget - only 1 went over budget.

10.2 Co-design

Users

Participants used different methods to involve and get information about target groups/external users and what they wanted in a new web-portal.

Questionnaire and focus groups were the most common approach, while only a few used interviews or NGOs. It is interesting to see that all partners involved external third parties to help develop their websites.

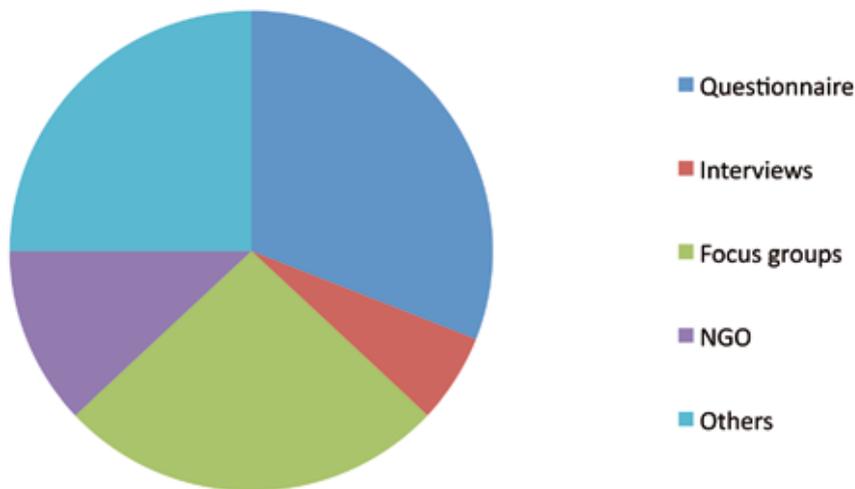


Figure 3. How did you find out what your citizens wanted?

What were the most important needs for the target groups/external users	What were the most important expectations for the target groups/external users
Updated information and communication with their own city	User-friendly / simple
Services for citizens	Nice lay-out
Web 2.0 applications	More info about leisure, hobby, culture...
Contact information	Events
Information on tourist sites and events	Information around the city
Intelligent search engine / Good retrieval possibilities	Services
User-friendly system	Updated and relevant information
Navigation based on users needs	
Fast response	

Most of the partners adapted their websites to meet their user's expectations.

Universal Design/ web accessibility

All the partners surveyed took Universal Design/ web accessibility into consideration, and many had followed relevant standards:

- National guidelines and standards
- Web Content Accessibility Guidelines (W3C)
- Simple coding
- Achievement of Socitm criteria for accessibility
- Testing

“Accessibility and user-friendliness is an important element in the redesign of our website. The following things are considered, inter alia: Well-structured texts, easy to understand language, no abbreviations, scalability of the spelling, a Flash-animated objects or flashing text, images and links will be provided with an alternative text. Tables are used only in emergencies. And our website has to follow data protection laws, like all other German websites of local authorities, it is certified according. to internet privacy standards (ips).”

Five of the eight participants had specific user groups to address accessibility issues.

“In principle should all citizens be able to access information from the web? This is a challenge, especially for the blind.”

10.3 Design and development

Since the partners have very different local political systems, we wanted to check whether there were any differences in how they provided information on their web-portals. Public bodies are more politically led on the Continent and in the UK, while Scandinavian authorities often have greater freedom. So we compared what information the participants wanted to offer to users with what they actually provided.

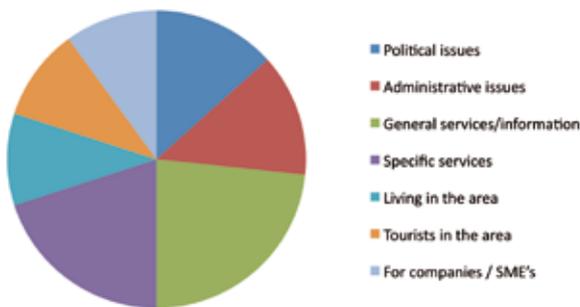


Figure 4. What information is most important on your website?



Figure 5. What do you prioritise on your website?

Participants ranked the different information they wanted to offer to the users, and the highest ranked services were general services/information, while the participants said political issues were less important.

Municipalities prioritise the information they provide to website users. Specific services, general services, administrative and political services have the highest priority. General services/information and specific services were the most important in both cases. These spider diagrams compare what the participants want to offer with what they actually provide. Municipalities ranked the importance of issues on a scale from 1 - very important, to 5 - not very important).

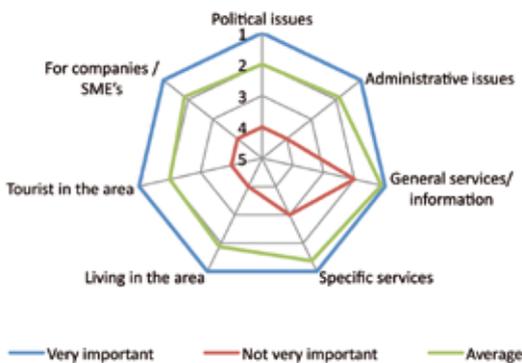


Figure 6. What information did municipalities feel was important to provide online?

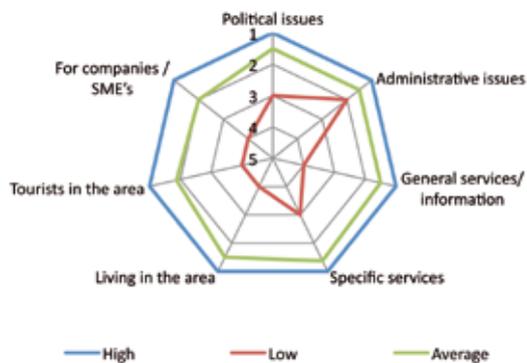


Figure 7. What information do municipalities currently provide online?

The next set of graphs shows the differences between the most “positive” and most “negative” responses.

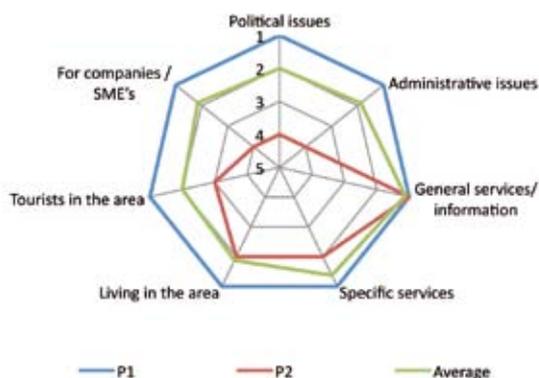


Figure 8. Services municipalities wanted to provide

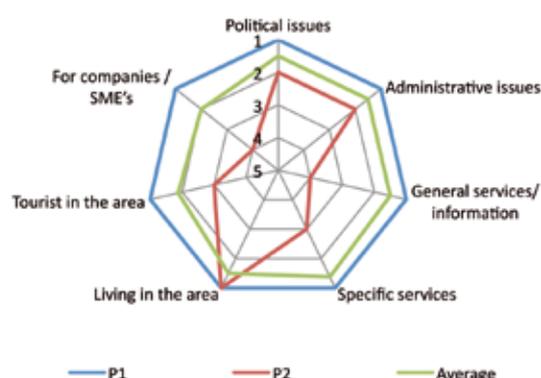


Figure 9. Services municipalities were less interested in providing

P1 is the most **positive** participant, while **P2** is the most **negative** participant. The average is the average of all partners. This gives an indication of how the data varies.

It is interesting to see that if we take all the highest and lowest levels of interest that were reported by the municipalities then we get a quite good impression on the spread of ambition of the group, but if we take only the highest and the lowest levels of interest among the partners (Figure 8 and Figure 9), there is a strong indication of their desire to focus on ‘*Living in the area*’, ‘*Specific services*’ and ‘*General services*’. While the municipalities may say providing political information is important, their focus is on providing service information.

What service channels do you provide, and what do you want to provide?

The municipalities wanted their services to be easily accessible to their users, and it was important to increase participation by providing Web 2.0 style services. It was felt that combining a website that was open 24/7 with easily found information about services would increase user satisfaction – one respondent wanted to provide “pro-active information – for instance getting an email when there’s a new building plan in your neighbourhood”.

All participants planned to offer services through their website, while digital forms were highlighted as the most important way to provide services.

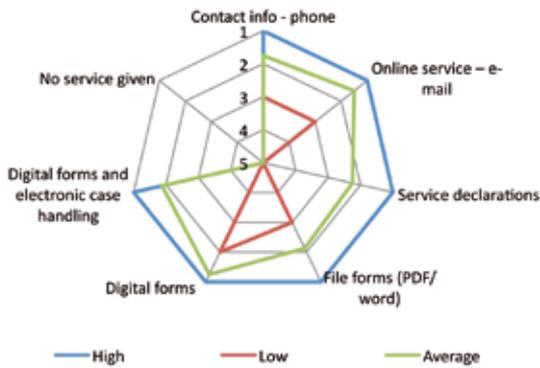


Figure 10. What channels do you want to use to provide services?

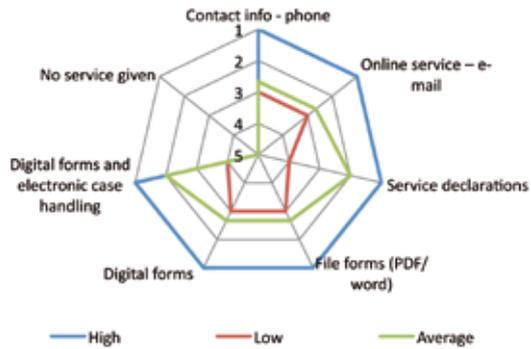


Figure 11. What channels do you usually use to provide services?

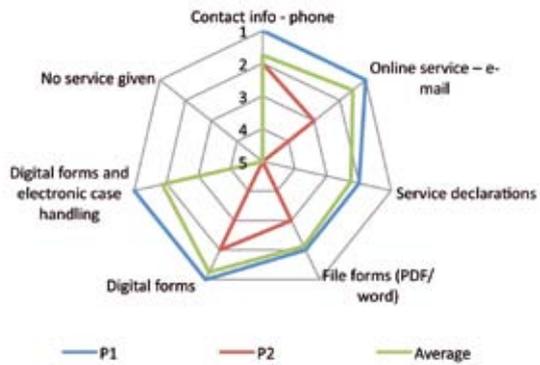


Figure 12. Channels municipalities want to use

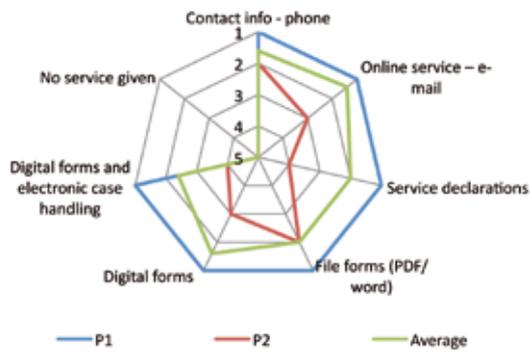


Figure 13. Channels municipalities are less interested in using

It is interesting to see that municipalities feel that digital forms and electronic case handling are very important and have great potential, but that partners weren't able to offer these services as much as they wanted. We can also see that the telephone is a channel they want to move away from.

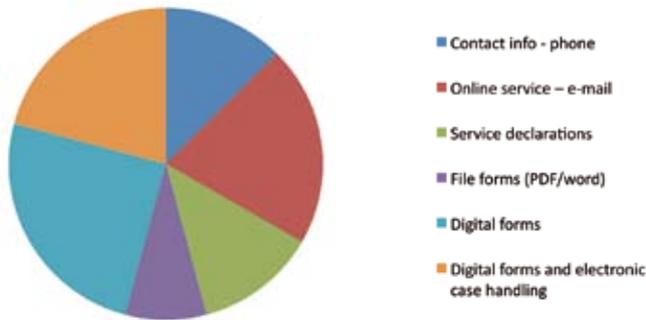


Figure 14. service channels municipalities feel it is 'Very Important' to offer

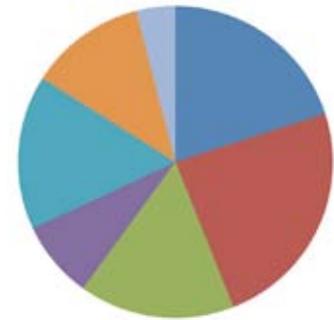


Figure 15. the services channels that are 'mostly' used in municipalities

Municipalities felt that all the different service approaches that could be used were important – this may mean that there will be many ways/channels to provide the same services. The results show that there are differences between what municipalities wanted to deliver and what they actually did deliver. This could infer that there are questions about whether municipalities had the appropriate ICT architectures for the services they wanted to deliver.

How can users get in touch with municipalities?

3 of the 8 municipalities provided online chat services for users, while 4 did not. Given the importance the partners put on digital forms and digital case handling, this may be a practical limitation that constrains e-service processes

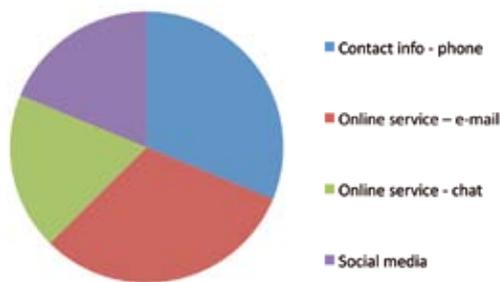


Figure 16 – Easiest ways for contribute and communicate with municipalities

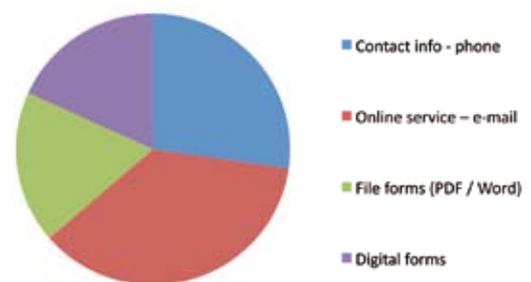


Figure 17 – Most used ways and communicate with municipalities

The easiest way for users to contribute and communicate, and the mostly used way for a user to access schemes is through phone and e-mail.

10.4 What we learned

The municipalities that worked on their websites all learned different lessons, which is reflects their different reasons for improving their sites – some focused on increasing user-satisfaction levels and others aimed to modernise and update their sites. Partners delivered a range of outcomes, including “A high rise of number of visitors – up 36% in 2010 when compared to 2009”, “Involving the organization” in web processes, and “Prioritizing essential content”.

Better planning, better testing and more involvement from the top-management were common lessons that the partners reported.

“Quality of content can only be raised over a longer period of time”

“Websites will develop rapidly in the coming years, so we have to get used to the website continuously developing and integrating appropriate new methods. For example we have to think about the use of GIS methods and social media tools. And we have to combine the “flood of information” and make it usable and user-friendly to fit the needs of our local target groups.”

“You need to clarify & get firm commitments in the organization to establish a new website”

“It is crucial that the organization has established an understanding and acknowledged the importance of having a well functional and updated website”

10.5 Conclusions

Smart Cities partners are at very different stages of web-development: some just trying to get it “up and going”, while others are more mature and are planning further developments and expanding the services they provide.

This is also true for the content provided on their websites: some partners provide a broad range of content, while others are very focused. Some are service-oriented, some are information-oriented, and some have very ambitious plans to develop their websites as a tool for improvement, greater efficiency and communications.

The partners averaged between 40 and 185 000 users each month, with an overall average of 90 000. We did not do an analysis of average use for each partner, although this is something that could have been of value if we were trying to evaluate the sites and their improvement efforts.

The partners that had done user surveys found that most of their users seemed to be content with what they were offering. This may be because citizens have not searched for services elsewhere, or because they have low expectations from the municipality.

This small survey may indicate that there is trouble ahead for some partners’ ICT architectures, with clear indications of larger ambitions than may be able to deliver. This may be the most severe obstacle facing public services. Previous ICT investments that are not able to deliver what modern service-oriented citizens want may force either additional investment by the public sector or lead to dissatisfied citizens.

Municipalities indicated that they would like to improve a range of services:

- Include more websites on tourist attractions and businesses in our website via sub domains, e.g. all city owned companies.
- Digitize management processes as much as possible.
- Improve opportunities for participation of citizens.
- Improve citizen involvement in discussion and decision-making processes via the website.
- Link with social networks (Facebook, etc.).
- Continually improve both content and functionality. More services must be provided electronically.

While participants reported that their organizations are positive about their current websites, they know things can still be improved. Feedback from citizens after website improvements has been mostly positive.

There are many different levels of government regulations that affect municipal service provision. The Flemish region in Belgium is using social security cards as an authentication system for e-services and providing secure public sector services over the internet. This is one of the most forward-looking visions in the North Sea region. In other countries - like the UK - there are service levels and quality measures to be fulfilled, which are set by the national government and have to be delivered by the local authorities.

After analyzing the questionnaires we are unsure if the participants had had the same understanding about the different concepts we were examining. When is something digital? Is a service digital when a citizen can download a Word file to complete, or is a service digital when there are digital forms that are integrated into a departmental workflow?

It seems that our municipalities are mostly thinking alike but are doing things differently. From the survey results it seems that some municipalities have a much better perspective/vision on the services they want to provide than others.

Smart Cities Guides

The Smart Cities project has produced a number of guides for municipalities and governments to help them design and deliver better e-services.

1. Customer Insight Profiling and Service Design Guide - <http://www.smartcities.info/customer-profiling>
2. Creating Customer Contact Centres - <http://www.smartcities.info/customer-contact-centres>
3. Creating Municipal ICT Architectures - <http://www.smartcities.info/ict-architecture>
4. Improving business processes and delivering better e-services - <http://www.smartcities.info/business-processes>
5. Using Co-design to design and deliver better e-services - <http://www.smartcities.info/co-design>
6. My City Online – making the case for municipal web portals - <http://www.smartcities.info/web-portals>
7. Using Geographic Information Systems to provide better e-services - <http://www.smartcities.info/gis>
8. An introduction to Municipal ICT Architectures for Managers - <http://www.smartcities.info/ict-architectureSmart>

Cities Research Reports

1. Comparing levels of internet access, internet use and e-government use in the Smart Cities countries
2. Customer profiling to target service delivery
3. Measuring levels of supply and demand for e-services and e-government: a toolkit for cities
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