

Electronic Services in Public Sector: Development Challenges

Seppo J. Sirkemaa

Abstract—The benefits of Internet are typically based on ease of use, speed and online access to information. For the consumer, when purchasing a product finding one with a good price is something where access to waste amount of businesses and the ability to use various price-comparing services is clear benefit. Consequently, electronic business has changed the business in many fields.

In public sector development of services has not been as rapid as introduction of business applications. In this paper we look at challenges in development of electronic services in public sector. The question of interest is how electronic services could be developed more efficiently.

Index Terms—Added value, challenges, development, electronic business, electronic services.

I. INTRODUCTION

Internet provides added value by giving instant access to information independently of time and geographical location. These are issues that are widely beneficial. Consider the case of weather information, up-to-date weather information is critical to people out in the sea, for example. There are numerous other applications where access to online information is important. The first online services were developed of pure enthusiasm, but soon thereafter were services developed for business purposes. Moving activities to the internet makes it possible to serve customers on a 24/7-basis and compete globally, these are just few of the key benefits that may prompt the development of applications for electronic commerce.

In general, development of public sector services has not been as rapid as introduction of business applications [1], [2]. This is interesting because it might seem clear that also public sector services would benefit from electronic access.

Taking advantage of information technology would be beneficial to both organizations providing public services and to their clients, ordinary people looking for information on primary education or those who are building a new house, for example.

In this paper we look at development of electronic services in public sector organizations. Many public services are based on cooperation of various departments and functions in the public organization, interaction between different service providers, experts and other stakeholders. There are technical challenges in connecting different systems, but also need to reorganize processes. Let us look at electronic services.

Manuscript received August 23, 2013; revised November 20, 2013.

Seppo J. Sirkemaa is with University of Turku, Finland. He works currently at University Consortium of Pori, Finland (e-mail:seppo.sirkemaa@utu.fi).

II. WHY ELECTRONIC SERVICES

Computers and internet make it possible to provide services in a way that adds value to the user of these technologies. Today the concept of service is inextricably linked to e-business applications and the types of services there are provided in e-business environment [3]. In the business world it changes the way how we purchase products and services. Surfing the net gives ideas, allows gathering of information and comparing products and services so that purchasing decisions can be made with confidence. The situation depends on what you are interested in, buying a television or pair of trousers are differently suited to e-business because of the product itself. Even though some things are better to be purchased in a store than on the web, gathering information and comparing products or services, and where to buy them are areas where internet gives added value.

Development of electronic business is not alone driven by idea of adding value to the potential customer. Organizations can also use information technology in streamlining and re-organization of their processes. Development of e-business makes it possible to increase company's efficiency and effectiveness [4]. Here possibility to reach customers from a wider area, increasing sales by better focusing or making things more effectively in internal processes are examples of areas where e-business can make significant changes in the marketplace. Ideally, Internet allows small- and medium sized companies to compete together with larger corporations on global markets.

The most significant benefits of Internet technologies are related to communication and transactions [5]. Internet reduces transaction costs for both buyers and sellers. Changes take place in real-time, for example prices may be changed as raw-material costs change. As a result, potential buyers have access to most recent prices. This is important as most online shoppers are very price sensitive, and use services which compare prices [6]. As a result, staying competitive with low prices is a strategy that has become increasingly challenging.

Electronic business allows restructuring of processes and better profitability - these are important issues for all organizations independently of industry and size. It may be wondered what makes providing electronic services in public sector different from development of e-business applications in private companies. The purpose of operations, ethics and values may be little different, but development of processes and performance in general have become increasingly important also in public sector organizations [7], [8].

Electronic services are in public sector mostly related to accessing information. There are significant differences

between organizations, public units and departments, but generally there are already several information related tasks be done from users computer terminal independently of time and location constrains. It is important to notice that at the same time there is an increasing demand on interactive and transaction-enabled services [9]. It is obvious that electronic services need to be integrated into processes and systems, especially if there are transactions involved in the services provided to the users [3]. Furthermore, public services should be equally accessible to all citizens, not only the ones who use computers.

III. WHAT ARE ELECTRONIC SERVICES

A. Dimensions of Electronic Services

Electronic services can be described by using three dimensions (see in Fig. 1); they can vary from separate to coordinated (or integrated), be general in opposite to individualized and be informative in opposite to performative [10], [11].

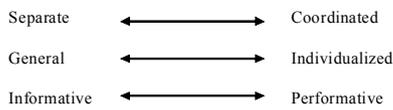


Fig. 1. Polarities of electronic services.

The first dimension – whether the service is separate or coordinated – is about the degree of integration of the services. Many public services are provided by a single agency, department or other administrative unit. At the other end of the spectrum there are services which are result of integration of systems and processes from a variety of sources. In extreme cases there may be services which are fused together. By definition, fused services are highly integrated in a way that individual service elements cannot be separated [12]. However, there can be integrated services which may not be separated from each other. In all cases the service should be well reliable, easy to understand, and provide the user added value.

The second dimension relates to how generic the service is. The services may range from individual services, designed to a certain user or purpose – to general services. General services are not targeted to any special user segment. However, individual services or part of service can be intended to a narrow group of users or specific user needs.

The third dimension of e-services is about the level of information and interaction in the service. Often in basic services the service is informative in nature, and transactional elements are missing. However, once the services have been developed further more services that allow interactions and transactions to be done will be available. In this way, once the services become more mature they will be developed towards services that allow more interactions, instead of providing different kinds of information alone.

B. Stages of Electronic Services

In general, the development of electronic services tends to go through different stages (see in Fig. 2), starting with presence on the internet and moving towards transactional services that make it possible to carry out activities right away [12], [13].

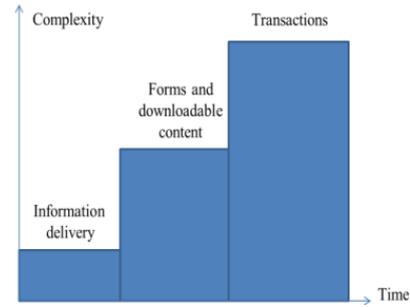


Fig. 2. Stages of electronic services.

Services at the first stage are mostly related to providing different kind of information to citizens. In the second stage there are different forms and applications on the website for the user to download and fill. The most enhanced stage is called transactional services. For example, transactional service is when the citizen can fill-in an application for renewing drivers' license, send it and receive acknowledgement. It might also be possible for the citizen to later track the progress of the drivers' license renewal, for example.

The complexity of services is another dimension which tends to be connected to the stage of service provided. Typically, information-related services can be more simple and straightforward, without interfaces to other databases or systems. However, when the service needs to provide online status from other systems the complexity increases. Consequently, people from different functions and units have to work together. Also outside experts, service providers and partners are needed, their systems and expertise is critical for development and maintenance of the electronic services and underlying systems.

IV. DEVELOPMENT OF ELECTRONIC SERVICES

In general, there are laws and regulations that guide public sector services. Public sector organizations are challenged to provide services in an environment where resources are scarce. Here issues like efficient operations, cutting costs or streamlining processes are motivators for developing electronic services.

Public organizations do not provide electronic services alone, there are also other stakeholders involved. Sundgren [11] lists stakeholders into three categories:

- 1) Government agencies: public sector organizations providing the service to their clients.
- 2) Businesses: different business partners and systems providers needed in providing the service to the user.
- 3) Citizens, customers and clients: users of the services.

As a result, planning, development and provision of electronic services is based on interaction of organizations providing the services, businesses and users of the service.

Expertise is often a scarce resource. It is commonplace to rely on outside service providers, IT experts and consults in areas where internal expertise is limited or lacking. For example, in municipalities resources in IT departments can be very small. In this case programming of the application could be done by a specialized software company while the public sector organization concentrates on the content of the service and development of the service process. Service providers could also provide infrastructure or maintenance services.

There are differences among organizations e.g. in terms of role, technical skills, organizational structure and in the attitude towards innovations. Furthermore, the pace of development differs among partnering organizations [9]. Management of the service development can therefore be challenging, especially in development of technically complicated and inter-related solutions.

V. CHALLENGES IN DEVELOPMENT

Development of electronic services relies on cooperation. Having people from different organizations working together involves cooperation and crossing organizational boundaries. The challenges here are largely connected to issues like management and organizational cultures.

There are also a variety of other issues that can make development challenging. Gil-García and Pardo [14] group challenges into five main categories. Accordingly, challenges to public sector electronic services, development of e-government and services alike have their roots in (1) information and data, (2) information technology / IT, (3) organizational and managerial, (4) legal and regulatory, and (5) institutional and environmental issues. Kubicek and Hagen [15] underline also the importance of human factors. Technical expertise and skills are important elements in any project. Another necessary resource is funding of the project [15].

Information and data issues relate to difficulties in capturing, storing, managing, using, dissemination and sharing of existing information. Here it is also important to notice the quality and accuracy of data. For example, there may be different practices among organizations generating records into common databases. The result is that the value of the data will not be very good as some may store more accurate data into database than users in other organization. It is also likely that information needs vary among organizations and users. Consequently, issues like standardization, control and education are vital in order to preserve adequate quality and accuracy of the data.

Electronic service development contains often technical difficulties. These include incompatibilities among different systems. It is also typical that legacy systems need to interconnect with systems that are still being constructed. Familiarity with technology can also cause problems, for example finding people capable of programming interfaces to a legacy system.

Cooperation of several partners, units and stakeholders calls for management resources, especially when the number of organizations is high. In larger, inter-organizational projects misunderstandings and communication delays are typical management related issues [15]. Dawes and Pardo [16] noted the existence of multiple, partially conflicting goals in public sector projects where several stakeholders are involved. Successfulness of projects is affected when different organizations act independently; often result of poor coordination of activities [17]. Organizational cooperation is a key issue in development of services that cross organizational boundaries. Managerial issues can therefore be the most challenging issues here [14].

Developers need to take into account laws and regulations

in order to create services for users. It may also be the case that there are no clear regulations [15]. Typically one must consider the language used in services and equal access to all citizens. It is not possible to provide only digital services, also people who cannot afford computers or who are not able to use one should have access to service.

Lastly, there are institutional and environmental issues challenging the development. For example, in Finland there are increasing pressures to cut the number of municipalities. People move to larger cities and other centers of growth. In other areas, the number of taxpayers is going down fast. As a result, administrative structures have to reflect these changes. Political pressures to preserve existing structures and services are significant. However, from financial viewpoint changes are inevitable. Electronic services are here important as they provide a cost-effective solution to the need of providing services. It is still important to understand that the development does take place in an environment where there are plenty of external forces impacting the work.

VI. TOWARDS BETTER SERVICES

Many electronic services in public sector are in their early stages providing information or some digital interaction. Enhanced information exchange such as online interaction or services that provide transaction tracking are rare. It is common that agencies concentrate also in electronic services only to their “own” services and activities. One explanation is that current services are based on existing ways of doing things instead of thinking what citizens need [18]. Especially transaction-related services need integration. This is not only a technical issue, departments and units need to cooperate in a new way.

Clearly, services should be available in a way that users do not need to have expertise in the way administration is organized into separate departments. The developers of electronic services should better understand the needs of the users of their services. A typical user is looking for information from service providers’ website, applications or requesting further information and advice. It is not uncommon that it takes time to find the information or service that is needed, often because the sites are developed around the activities of the agency, department or unit [12].

“...to approach the Web with a philosophy of helping users solve problems, not merely delivering their same old services through new medium” [12].

There is a need for more straightforward portals that are organized based on services rather than administrative boundaries. Websites should also provide information, advice and links that are of interest to the user, even though they do not fall into the specific domain of the agency in question. In fact, there is a need for total re-planning of services and processes in order to better meet the needs of the citizens [12].

VII. CONCLUSION

In this article we have looked at the challenges involved in development of electronic services. These services are here defined services provided by public organizations to their users electronically. Electronic services are further defined as

interactive, content-centric services which can be accessed through internet [4], [19].

In public sector it has been common that departments, units and agencies provide services to citizens rather independently. It is not surprising to find processes across departments that are not connected, data is stored in separate databases and information systems come from different vendors which are far from compatible. This may be enough when services are focusing on delivering information between the public administration and the citizens. In many cases documents and forms are provided in downloadable format and made accessible through the internet. However, more services need to be developed, more features are added to existing services, and more enhanced, transactional services are required [3], [12], [13]. This means that their technical complexity increases. Especially, making services transactional can be a big step for the developers [18]. Transactional services require connections to other systems and integration of data, and databases need to be accessed and updated from users' interface through the web. Here originally separate systems, possibly different software and database architectures need to be integrated.

Development of electronic services requires connecting different technologies, applications and data resources in order to provide solutions for users. It is noteworthy that infrastructures, applications and data can be owned, maintained or developed by other organizations, agencies or companies from public or private sector [9], [11]. The development relies on expertise and effort from people both inside the organization and from external environment. Here cooperation of units, functions and organizations in public sector together with external service providers is needed – especially if the services are sophisticated, require authentication.

Developers of electronic services should approach services from user's perspective in order to understand the possible added value. Ease of use is a very important factor that affects adoption of electronic service [3], [20], [21]. The web experience should be enjoyable for the user, as this increases the profitability that the site will be visited also in the future [22].

The successfulness of electronic services in public sector depends on several issues. Here we have underlined the importance of management of service development, which is result of interplay between several stakeholders. Technical issues can be challenging, but usually solutions can be found. The developers need to cross organizational boundaries and redesign processes in creating electronic services. As a result, in many cases the work of developing and rebuilding government for the digital age is just beginning [12]. The real challenge is to create services that add value to users in a way that users start using them. Eventually, public bureaucracies will give way to e-government where users–citizens–are provided services that meet user needs [23].

REFERENCES

[1] H. Hasan and H. R. Tibbits, "Strategic management of electronic commerce: an adaptation of the balanced scorecard," *Internet Research: Electronic Networking Applications and Policy*, vol. 10, no. 5, pp.439-450, 2000.
 [2] R. McIvor, M. Mchugh, and C. Cadden, "Internet technologies supporting transparency in the public sector," *The International*

Journal of Public Sector Management, vol. 15, no. 3, pp.170-187, 2002.
 [3] G. K. de Ruyter, M. Wetzels, and M. Kleijnen, "Customer adoption of e-service: an experimental study," *International Journal of Service Industry Management*, 2001, vol 12, no 2, pp.184-207, 2001.
 [4] R. T. Rust and P. K. Kannan, "E-service: a new paradigm for business in the electronic environment," *Communications of the ACM*, vol. 43, no. 6, pp. 37-42, 2003.
 [5] A. Dutta and R. Roy, "Anticipating Internet diffusion," *Communications of the ACM*, vol. 46, issue 2, pp.66-71, 2003.
 [6] S. Mulpuru. (March 2007). Topic overview: US online retail. *Forrester Research* [Online]. Available: <http://www.forrester.com/go?docid=41752>
 [7] A. M. Parhizgari and G. R. Gilbert, "Measures of organizational effectiveness: private and public sector performance," *Omega*, vol 32, no. 2, 2004.
 [8] Z. Van Der Wal, L. Huberts, H. Van Den Heuvel, and E. Kolthoff, "Central values of government and business: differences, similarities and conflicts," *Public Administration Quarterly*, vol. 30, no. 3, 2006.
 [9] A. Ancarani, "Towards quality e-service in the public sector: the evolution of web sites in the local public service sector," *Managing Service Quality*, vol. 15, no. 1, pp. 6-23, 2005.
 [10] G. Goldkuhl and A. Persson, "From e-ladder to e-diamond – re-conceptualising models for public e-services," in *Proc. of the 14th European Conference on Information Systems*, Göteborg, 2006.
 [11] B. Sundgren, "What is a public information system?" *International Journal of Public Information Systems*, vol. 2005, no. 1, pp.81-99.
 [12] R. D. Atkinson and A. Leigh, "Customer-oriented e-government: can we ever get there?" *Journal of Political Marketing*, vol. 2, issue 3-4, pp. 159-181, 2003.
 [13] M. Asgarkhani, "The effectiveness of e-service in local government: a case study," *The Electronic Journal of E-Government*, vol.3, no 4, pp.157-166, 2005.
 [14] J. R. Gil-García and T. A. Pardo, "E-government success factors: Mapping practical tools to theoretical foundations," *Government Information Quarterly*, vol. 22, issue 2, pp. 187-216, 2005.
 [15] H. Kubicek and M. Hagen, "One stop government in europe: an overview," in *One Stop Government in Europe. Results from 11 National Surveys*, M. Hagen, H. Kubicek, Eds. Bremen: University of Bremen, pp. 1-36, 2000.
 [16] S. S. Dawes and T. A. Pardo, "Building collaborative digital government systems," in *Advances in Digital Government. Technology, Human Factors, and Policy*, W. J. McIvor and A. K. Elmagarmid, Eds. Norwell, MA: Kluwer Academic Publishers, 2002.
 [17] Z. Irani and P. E. D. Love, and A. Montazemi, "E-government: past, present and future," *European Journal of Information Systems*, vol. 16, pp. 103-105, 2007.
 [18] M. Howard, "E-government across the Globe: how will 'e' change government?" *Government Finance Review*, August, 2001.
 [19] R. T. Rust, P. K. Kannan, and N. Peng, "The customer economics of internet privacy," *Journal of the Academy of Marketing Science*, vol. 30, no 4, pp. 455-464, 2002.
 [20] M. K. Lee and E. Turban, "A trust model of consumer internet shopping," *International Journal of Electronic Commerce*, vol. 6, no. 1, pp. 75-91, 2001.
 [21] K. S. Lim, J. S. Lim, and J. H. Heinrichs, "Testing an integrated model of e-shopping web site usage," *Journal of Internet Commerce*, vol. 7, issue 3, pp. 291-312, 2008.
 [22] R. A. Shang, Y. C. Chen, and L. Shen, "Extrinsic versus intrinsic motivations for consumers to shop on-line," *Information and Management*, vol. 42, no. 3, pp. 401-413, 2005.
 [23] A. Persson and G. Goldkuhl, "Government value paradigms-bureaucracy, new public management, and e-government," *Communications of the Association for Information Systems*, vol. 2010, issue 27, pp.45, 2010.



Seppo J. Sirkemaa has a Ph.D. in information systems management from Turku School of Economics at University of Turku, Finland. He has held several academic positions from researcher to research professor, and worked as a vice director of Pori Unit in Turku School of Economics at University of Turku, Finland.

Dr. Sirkemaa is also an IT consultant, and has published almost 100 academic publications.