Integration - The Next Challenge in e-Government

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Abstract

Expectations originally connected with e-Government have not yet been met. To a major part, this is due to the negligence of interdependencies and an isolated consideration of distinct interrelated aspects framing e-Government developments. As a next urgent challenge, a purposeful analysis is required to identify the diversity and complexity of e-Government through multiple perspectives and their interrelations. In this contribution, a starting point for such an integration is provided, where the complex interrelations between processes, users, technical, organisational, social, political, cultural and legal factors are investigated and structured. Despite of that, a discussion on emergent cross-perspective issues such as standardisation, security, holistic development, best practices and integration of front- and back-office is provided. The contribution elaborates a comprehensive, well-organised and sustainable knowledge structure on e-Government for making e-Government success.

1. Introduction

During the last few years, e-Government has received much attention. Many investigations have been performed and various developments have come up so far. Yet, the landscape is very fragmented and many issues are rather neglected, are developed in isolation or touch distinct factors and, hence, are treated independently. Furthermore, most of the expectations originally connected with e-Government have not yet been met. According to recent studies [1] [5] [8], up to now, online access to Government services is only used by citizens and business partners to a percentage of less than 10% on average. This is due to a number of factors among which the neglect of stakeholder expectations, of the characteristics of the business processes at stake as well as a parochial avoidance of interagency co-operation loom particularly large. Most approaches to e-Government continue to be strongly technology-driven and they chiefly concern Electronic Services Delivery as a part of government practice which is highly visible and where there is a promise of alleviating administrative burdens put on enterprises and on the general public. These are not the only fields on which New Public Management [9] and new concepts of public governance (knowledge enhanced e-Government) are at present focusing in order to promote a public sector modernisation which will bring about institutional change of various kinds, e.g. in promoting Public-Private Partnerships and in harnessing the forces of self-organisation of the civil society.

In this contribution, we first investigate the needs for a comprehensive consideration of e-Government. Section 3 discusses a broader understanding of e-Government beyond the visible part of administrative tasks towards the citizen (public service offers). Based on this broader perception, various perspectives (i.e. different kinds of knowledge resources) on e-Government systems are elicited in section 4. Despite of the core issues framing and shaping e-Government, cross-perspective aspects such as standardisation, knowledge management, security, benchmarking, etc. are to be born in mind (cf. section 5). Section 6 puts forward a concept to integrate the various knowledge perspectives, to elicit the correlations between different perspectives and to support the development of a roadmap for future e-Government initiatives by assessing recent and actual developments and by finding out research and development gaps not solved up to now. In section 7, we conclude with some remarks on the value-add of such an integration step.

2. Needs for a comprehensive consideration

e-Government is not an objective per se but an advanced instrument of the organisation of public governance in order to better serving individual citizens, communities, commercial and non-profit organisations as well as public authorities themselves. Thereby, technology creates more efficient and transparent possibilities for more participation, a higher level for the control of public affairs and of those to whom people invest their trust. Yet, e-Government denotes a socio-cultural and socio-technical domain, where new roles and opportunities of human consultation and of citizen/customer - administration relations emerge.
Therefore, it has to be developed in close correlation with the development of non-technical change requests.

Above all, the development of e-Government has to be based on feasible and reasonable change of governments. This is a strong argument in favour of a holistic approach to work-processes and work-situations in government, which are highly knowledge-intensive and which continue to rely on close forms of interaction between humans and IT. Human actors using "machines serving people for their comfort and convenience" is thus a top priority.

With current developments in e-Government, we still have to investigate and learn a lot to reach such ambient and convivial information systems.

3. Broadening the view beyond the “visible” e-Administration

Since the field of e-Government is rather young, different interpretations have emerged (cf. e.g. [2][6][10]). Strictly speaking, the term “Government” is encompassing legislation and the judiciary, but especially in Europe, e-Government is quite often seen as synonymous with e-Administration, thus being restricted to the executive branch of government [12]. For the sake of reaching a shared understanding and of elucidating the complex structure of policy execution, we will follow this narrower meaning here. Hence, e-Democracy, e-Voting, e-Healthcare, e-Justice, e-Education etc. are not part of this understanding. But also e-Government in a narrow sense is somewhat broader than e-Administration: it includes as well government-to-government relations within the executive and functions of management and of policy making which cannot always be neatly separated from policy implementation in the field of electronic public service delivery. Also, the important role which knowledge plays in enhancing the work of the executive branch of government is to be acknowledged [7].

e-Government in this narrow sense (henceforth called e-Government) is a multidimensional and multidisciplinary field, where many interdependent factors impact its success and acceptance. Among others, the multiplicity of e-Government refers to multiple IT systems and architectures, multiple access channels, multiple devices, multiple process structures, multiple parties (authorities and clients) involved, and multiple knowledge sources. Thereby, many issues to be addressed for successfully implementing e-Government arise. Hence, a holistic framework is required to support the identification of the relevant issues impacting e-Government developments. Three key characteristics of e-Government should guide this investigation:

- different user groups with diverging service needs and interaction requirements,
- distinct government processes, integrating front-office and back-office (organisational issues), supporting government with modern IT, etc.

The overall purpose of the contribution at hand is to investigate and structure this multiplicity of e-Government.

4. Different perspectives on e-Government

Among the many issues to be identified, specified and put into relation with the others, the following seem of utmost importance and should serve as starting point for the integration and structuring purpose on e-Government [11]:

- Process perspective
- User perspective
- Technical perspective
- Organisational perspective
- Legal perspective
- Knowledge perspective
- Cultural, societal and political perspective.

Bringing together these perspectives will provide the knowledge resources required for making e-Government success. Within a holistic framework for e-Government as discussed in [11][12], these issues have to be reflected and put into relation. One also has to be aware of the fact that a change of one of these perspectives strongly influences others and, hence, impacts the success of e-Government developments as a whole. Hence it follows, that many scientific disciplines and practical experiences have to be brought together to fully understand such a complex field. Such a critical mass of experts from distinct research disciplines, of development and application fields should cover administrative scientists, computer scientists, social scientists, HCI experts, CSCW scientists, management scientists, knowledge management and information systems specialists, lawyers, politicians and education experts.

In the following, the major characteristics of these perspectives are described briefly.

4.1. Process perspective

Government's internal and external traditional business processes need to be adapted to electronic businesses processes. For the external perspective, this means to provide public services in a well-structured and well understandable way meeting the needs of the specific users (i.e. citizens, businesses, other organisations). Here, re-engineering of business processes for better serving the needs of citizens or enterprises in specific situations (“life-events, business situations”) is an important option [11].

Implementing integrated e-Government means to adequately map external service structures to internal process structures of public authorities as well. Integrated service and process models are of utmost importance for achieving a seamless government. A great help in this respect is a logical and organisational separation of front
offices, which bundle citizens demands and pass them on, and back offices, which satisfy these demands through adequate business processes and products.

In such a way, one-stop Government becomes possible, but new exigencies for standardisation and reference models of integrated process and service models arise (see emergent cross-perspective issues below).

4.2. User perspective

Addressing the specific needs of different user groups not only refers to a superficial distinction of target groups such as citizens, businesses and governments. To better serve the users, electronic public services have to be developed in strong relation with the specific target groups such as public servants at one-stop service encounters, intermediaries (notaries, architects, lawyers, tax consultants), students, unemployed, families, pensioners, accounting staff of companies, etc.

Usability concerns, human-computer interfaces, socio-linguistic problems, education and know-how transfer (e.g. through network-supported dialogues and discussions as well as intelligent online help on demand) within virtual self-service shops need to be addressed.

A new regulatory framework for an e-Society and the new agora will be required to firmly anchor new service potentials in the real world.

4.3. Technical perspective

Modern IT is to be exploited to better - and appropriately - serve the various user groups including intelligent, knowledge enhanced and usable portals and virtual one-stop front-offices, adequate interfaces towards the backend as well as accurate back-office systems.

Here, standardisation and intelligent functionality has to be provided for the portal, front-office (intake and communication) as well as the back-office (see as well section 5).

To fully exploit the enabling potential of IT, attention should not be limited to what is on the market so far. Especially developments toward a second-generation Internet (e.g. IPv6) as well as mobile computing are important. Large efforts have to be deployed to create the necessary infrastructure, which, in general, demand action on a national (and even international) scale.

Specific attention has to be paid to small units of government in rural regions, which otherwise would never get a chance to use the required e-Government infrastructure (cf. also organisational issues).

In this respect, the need for cooperative, shared architectures and infrastructures to avoid lack of skilled resources and to lower investment and maintenance costs become important, too.

4.4. Organisational perspective

Introducing IT to the field of government strongly impacts organisational structures. Hence, organisational change needs to be carefully implemented, too. Old established, strictly hierarchical, cumbersome and bureaucratic structures have to be replaced by horizontal network structures, one-stop Government, and more efficient organisational work structures facilitating the service and customer orientation as well as transparency. In detail, such changes are contingent on the manifold administrative cultures and the shape of government institutions which exhibits great variance across Europe.

New forms of collaboration in the public service provision and delivery emerge: public-private partnerships (PPPs) are seen as a new option for making government and governance more effective and efficient and for better serving citizens and organisations. Yet so far, only marginal experience and competencies are available on this issue.

Despite of that, the adaptation, training and re-location of human resources to minimise the negative impact of the introduction of new technologies and more efficient labour schemes are required.

4.5. Legal perspective

Government activity is strongly regulated and driven by legal frameworks including national constitutions. With the use of modern IT and communication facilities, electronic public service provision and delivery require the adaptation of laws to make e-Government solutions legally binding.

Among the legal issues to be investigated are data protection, access to sensitive data, networking of authorities and databases, equal opportunities, electronic signature, etc. [4].

The use of expert systems in helping public servants taking their decisions based on complex laws and regulations has to be addressed properly.

4.6. Knowledge perspective

Within the information and knowledge society, data, information and knowledge objects are the major resource to be elaborated. Therefore, appropriate design of the data, information and knowledge objects is required [7]. Standardisation, interoperability, communicability and integration to distinct IT systems over a corporate semantic web become important.

With the strategies to provide electronic public services through virtual or physical self-service shops, knowledge needs to be transferred adequately so that citizens and businesses are able to use these facilities in a smart way. In this respect, semantic interoperability
across governmental organisations (even beyond national borders) become of utmost importance.

Non the less do also public servants and administrative staff need accurate training on new facilities and knowledge support for their work (specific roles and methods of education and training that goes much further than simply handling informatics tools).

4.7. Cultural, societal and political perspective

e-Government is strongly shaped and driven by social, cultural and political factors on local, regional, national and supra-national (e.g. European) levels. Developments have to respect and enable these influences, which not only bear obstacles and hindrances towards a unique solution, but - more importantly - bear huge potentials for individualism, dynamism and creativity.

5. Emergent cross-perspective issues

Apart from the core issues on e-Government presented above, further critical factors frame such developments. Standardisation (semantic and technical) of official proceedings, of data and information objects, of communication networks is such an example that has already been addressed in several perspectives above.

Of particular importance is a smooth integration of front-office and back-office developments (in respect to all above mentioned perspectives) towards seamless knowledge enhanced e-Government through multi-modal and multi-channel access. Especially within many national and local e-Government initiatives, the main focus was put on the front-office. Only a few countries have recognised so far that the back-office reorganisation and modernisation has to have an equal significance in e-Government and that the integration of front- and back-office is a turn-key for the success of the next generation of knowledge enhanced e-Government systems.

Another set of critical factors is constituted by requirements of transparency, trustworthiness, traceability, security and privacy of data (T³SP). Official records and archives are assets highly relevant in e-Government that need to be addressed properly. Citizens have a right to receiving information about public affairs, financial data related to public investments; e-Government provides a means to make these information transparent. In order to enable T³SP, security mechanisms (technical and non-technical) have to be developed to provide the same quality and trustworthiness of public services through electronic means as through the traditional way.

Of critical importance are also the methodologies used in developing new systems. Since e-Government, also in its narrow definition, is such a complex, multidisciplinary domain with strategic, development and runtime shape, a traditional systems development approach will not suffice. Instead, holistic development methodologies and an overall e-Government framework are required. e-Government is shaped by research, development and application; the development approach has to be iterative among these three [3].

Benchmarking and best practice evaluations are drivers and input for further advanced developments. So, indicators, benchmarks and measurements for evaluating e-Government developments have to be developed and performed.

The public sector is dealing with information and knowledge resources by large. Also, the perspectives raised before represent different shapes of knowledge on the same vision: e-Government. This knowledge has to be appropriately managed and smoothly integrated. Hence, knowledge enhancement and knowledge management options have to be integrated in e-Government developments from the beginning.

Table 1: Integrating single and cross-perspective issues: a knowledge structure on current e-Government research

<table>
<thead>
<tr>
<th>Current e-Government projects and their major focus</th>
<th>e-Government system related perspectives</th>
<th>Cross-perspective issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects at local level</td>
<td>Process Perspective</td>
<td>Holistic Development</td>
</tr>
<tr>
<td>Projects at regional level</td>
<td>User Technical Perspective</td>
<td>Knowledge Enhancement &amp; Management</td>
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<tr>
<td>Projects at national level</td>
<td>Technical Perspective</td>
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<td>International projects</td>
<td>Organisational Perspective</td>
<td>Public-Private Partnerships</td>
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<tr>
<td></td>
<td>Legal Perspective</td>
<td>Trustworthiness, Transparency, Traceability, Security &amp; Privacy</td>
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<td></td>
<td>Data, Information &amp; Knowledge Perspective</td>
<td>Front-office, Back-office, Integration of both</td>
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<td></td>
<td>Cultural, social, political Perspective</td>
<td>Best practice &amp; Benchmarking</td>
</tr>
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</table>
6. Integration as a challenge

Due to the high complexity and multiplicity of e-Government, the above listed perspectives and critical cross-perspective factors deserve equal treatment and investigation.

The identification and investigation of relevant issues framing and shaping e-Government and how these mutually influence each other is no simple task, though. Developing a correlation matrix indicating the weights of correlation of mutually dependent factors could be a good starting point. Such a competent and - as far as possible - complete knowledge structure on e-Government should also reflect and indicate the key knowledge accumulated in each of the perspectives introduced above.

Investigating a general e-Government knowledge structure and identifying various developments currently going on reflects another means of integration that could as well provide important knowledge on lessons learnt and on concepts and strategies applied in concrete implementation projects. Such a visionary e-Government knowledge structure should as well provide insight on future, ongoing and recent development projects on specific issues at local, regional, national and international level (a template matrix is depicted in table 1').

Also, emerging technologies should be monitored and their potentials of use in e-Government should be assessed.

7. First assessment of an integration

The following assessment indicates issues currently investigated carefully and issues rather neglected in actual e-Government developments in Austria and Europe. It is based on a quick and dirty evaluation of a) ongoing projects in the field, b) of available literature and technical reports on running projects and c) on experiences and discussions with various experts within the local e-Government community.

7.1. Actual focus on e-Government developments

In investigating current e-Government projects and initiatives in Europe, one realises a variance of focus. A strong emphasis lays on technical developments and security solutions. E.g. in the German speaking countries, digital signature solutions and portal solutions have been of major concern.

Also standardisation concepts and solutions at a technical level – i.e. of data and objects, of technical implementations and of communication mechanisms – have emerged within the last few years. To name a few, XML, WSDL, UDDI, RDF, Dublin Core definitions, EDIFACT, OSCl, etc. have become obligatory standards to be used in many public sector applications.


Even many governments extensively treat adaptation of laws and legal prescriptions in order to enable and justify electronic service delivery for public services. E.g. in Austria, adaptations have been performed within the last two years in order to legally enable and fully equate electronic and traditional performance and delivery of public services.

Currently, a growing interest is being encountered in aspects of knowledge and knowledge management, in semantic standardisation and in the process perspective. However, so far satisfactorily and promising solutions are not really available, yet.

Some work can sporadically be encountered on organisational matters. E.g. in Austria, some restructuring of administrative duties and obligations in respect to local authorities is taking place at the moment in order to enable one-stop government.

7.2. Perspectives still being neglected

In respect to the growing interest on the process perspective, a distinction on the different user groups in e-Government and on the specific needs of them is of utmost importance. Yet, current e-Government developments still do not differentiate between the target groups and do not focus on implementations for the most promising target groups first.

As a whole, the public sector is a complex socio-technical system that requires a holistic development concept. However, most systems engineers apply traditional software engineering methods that do not take into consideration the multiplicity of e-Government.

Of course can e-Government only be implemented step by step. However, in providing online public service delivery via various electronic communication channels, adequate interfaces between the front- and back-office systems are a must. Interfaces are only the first step. To really making e-Government success, full integration of front- and back-office systems becomes obligatory (including cross-organisational application integration between different authorities and between authorities and private companies).

Organisational changes and cross-organisational application integration bring us to another aspect of e-Government, the potential of which is not investigated yet: public-private partnerships. Such PPPs bear huge potentials for outsourcing various tasks of authorities to

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1 Due to time constraints and the visionary ideas of the research reported in this paper, the authors could not evaluate e-Government projects and fill in the table properly.
private suppliers, for bundling related public services with private matters (customer-orientation) and for (pre)financing governmental investments.

In respect to an integrated consideration of e-Government developments and perspectives, cultural, social and political issues reflect a critical point that is barely treated, yet. Even if there exist literature and studies on the catchwords such as digital divide and social inclusion, none of these studies goes into depth to illuminate the real risks and dangers in relation to specific target groups. Also significant studies investigating the impact of e-Government on the society and its evolution are scarce.

8. Concluding remarks

e-Government is a multidimensional and multidisciplinary field, where many mutually interdependent factors impact its success and acceptance.

To make e-Government developments success, a multidisciplinary team needs to bear the main influencing factors in mind. In the same direction goes the claim for more connectivity between different projects. In this respect, internationally operating networks of excellence are a must.

In this contribution, we investigated the key perspectives framing and shaping e-Government and how these can be integrated into a sustainable knowledge structure of the field. Finally, we investigated current e-Government developments in regards to this integration request and elicited which perspectives are actually treated and which ones have to be put on the agenda for future e-Government research.

The major value-add of this integration study is that research and development gaps on issues not addressed satisfactorily so far can be illuminated in an easy and quick way. Based on these findings, action points and research topics to be investigated to realise knowledge enhanced e-Government can be identified for short, medium and long term. E.g. in the short run, the process, user, knowledge and organisational perspectives should be strengthened. Despite of that, the integration of front-office with the back-office systems is of utmost importance.

In further elaborating and exploiting the findings and lessons learnt of this integration work, a roadmap for e-Government developments can be derived. The results of such a comprehensive e-Government investigation as provided above guides politicians, governments, IT providers and researchers in the successful implementation and smooth integration of knowledge enhanced e-Government.

9. References