

ORGANIZATIONAL BARRIERS TO INTEROPERABILITY: NORWEGIAN CASE STUDY

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The growth of internet access in general, and the development of national strategies for e-government in particular have had a remarkable impact on the information society. This progress has brought about a broad range of new issues and challenges, among these, those of interoperability of systems and services. One area, in which barriers are common, yet not fully understood, is organizational interoperability. In this paper we present results from empirical research exploring such obstacles in Norwegian public administration and government agencies. The findings are based on semi-structured interviews, and organized in ten categories of barriers to organizational interoperability.

1. Introduction

The eSociety strategies (e.g. the i2010, [1]), the growth of internet access in general, and the development of e-government in particular have a remarkable impact on the development of the information society. Clearly, the strategies bear fruit, and new electronic services to citizens and businesses keep evolving. Governments all over the world are offering a rapidly increasing number of on-line services to businesses and citizens on a 24/7-basis. One indicator of this is the percentage of enterprises which use the internet for interaction with public authorities. In Europe, the level was approximately 50 % in 2004, while in 2007 this share had increased to around 65 %. This development has brought about a broad range of new issues and challenges, among these, those of interoperability of systems and services.

There are several models which describe levels of interoperability and interactivity of electronic services. The maturity models as presented by Wauters et al. [2], Gottschalk et al. [3], and the model in the Norwegian white paper [4], are composed of a zero-level and several consequent levels of interaction, or service and content availability on-line (Fig. 1). Many European and other governments are reaching the first stages interoperability. However, it seems to be challenging to reach the more mature levels. According to the upper levels of sophistication, several suppliers of information and basic services need to collaborate in order to deliver the required services. This requirement challenges the organizations involved in the collaboration in many different ways. Above all levels of interoperability, there are high-level policy issues which concern objectives (e.g. efficiency, effectiveness and efficacy) and strategies at governmental and intergovernmental levels. Below this, there are interoperability issues of both technical, semantic and organizational character.

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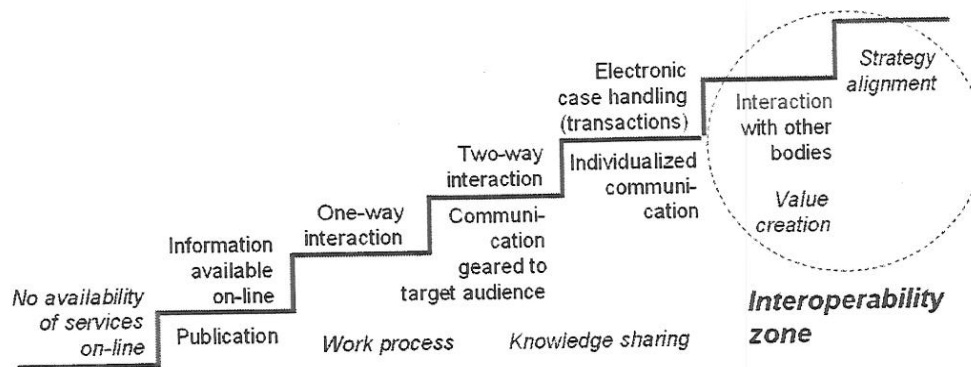


Figure 1: Above the stage-line the sophistication stage model of Wauters et al. [2]. Below the stage-line, the service stages as described in the Norwegian white paper [4], and in italics the four maturity stages of Gottschalk et al. [3].

First, there is the very basic level of technical interoperability which includes such topic areas as physical connections, common protocols, definitions of data elements and interfaces, and documentation of system functionality. Semantic interoperability begins to exist when we move from presenting information and exchanging it between computer programmes, to combining it with other information, processing it and using it in a meaningful manner in a given context. Second, the organizations have to be both able and enabled to collaborate. This is where organizational interoperability enters the scene. In order to reach the sophistication level of full, transparent interoperability (cf. Figure 1), a number of obstacles have to be removed. One area, in which barriers are common, yet not fully understood, is organizational interoperability. In the remainder of this paper we present results from empirical research exploring such obstacles.

1.1 Definitions of organizational interoperability

According to Finetti [5] organizational interoperability deals with modelling organizational processes, aligning information architectures with organizational goals, and helping these processes to cooperate. IDABC [6] characterizes organizational interoperability as follows: "This aspect of interoperability is concerned with defining business goals, modelling business processes and bringing about the collaboration of administrations that wish to exchange information and may have different internal structures and processes, and it aims at addressing the requirements of the user community by making services available, easily identifiable, accessible and user-oriented." Later, IDABC has divided the interoperability model into several layers, of which the organizational and legal levels together address issues of organizational interoperability. The latter is said to concern a "broad set of elements of interaction, including business processes, business interfaces ... seamless integration of business processes and the exchange of information that they manage between the organizations. Organizational interoperability occurs when actors agree on the why and the when of exchanging information, on common rules to ensure it occurs safely, ... draw up plans to do all these things, and carry them out" [7]. The ATHENA-project has identified 31 interoperability issues. These are classified according to business management, process management, knowledge management, information management, service management and data management [8]. A large number of the 31 issues go under the general heading of organizational interoperability.

1.2 Known obstacles to organizational interoperability

Organizational interoperability can be seen as an important enabler of all interoperability, semantic as well as technical. Common goals and practical agreements have to be in place before any collaboration can take place. Organizational interoperability issues are therefore gaining increasing interest. Among many important publications, there are several that discuss barriers to organizational interoperability, i.e. why it does not happen to the extent that is intended and desired. There are, of course, also good examples of interoperability on all levels. As far as Norway is concerned, Altinn [9] ("AllIn"; a common internet portal for public reporting), NUCAS [10] (the Norwegian Universities and Colleges Admission Service) and Digital Norway [11] (a collaboration that enables access to geoinformation data and services owned by producers at national, regional and local level) can be mentioned as examples of best practice where systems and services are based on fully transparent interoperability between several service providers. However, there should be more. Thus, our research question is: "Why isn't there?" Below, we refer to research work that has contributed to an understanding of this lack in a remarkable manner. In Chapter 2, we will present our findings that complement these.

Eynon et al. [12] have identified seven barriers to e-government: "1. Leadership failures, which result in slow and patchy progress to e-government, 2. Financial inhibitors limiting the flow of investment to e-government innovation, 3. Digital divides and choices, where inequalities lead to differences in motivations and competences that constrain and fragment e-government take-up and fail to address particular user needs, 4. Poor coordination across jurisdictional, administrative and geographic boundaries that holds back e-government networking benefits, 5. Workplace and organizational inflexibility impairing adaptability to new networked forms of information sharing and service provision, 6. Lack of trust heightening fears about inadequate security and privacy safeguards in electronic networks, and 7. Poor technical design leading to incompatibilities between ICT-systems or e-government services that are difficult to use."

Beckers [13] has identified seven interoperability problems, five of which address organizational interoperability. These are: "1. Administrative interoperability, containing conflicting, exclusive or overlapping jurisdictions and accountability, 2. Legal interoperability, meaning different legal regimes with conflicting rights and obligations, e.g. in relation to privacy and safety regulations, 3. Operational interoperability, i.e. different working processes and information processing, routines and procedures, and 5. Cultural interoperability, addressing conflicting organizational norms and values, communication patterns, and grown practices." Scholl et al. [14] have reviewed a large body of literature and identified nine categories of constraints with regard to e-government integration and interoperability. These are: "constitutional/legal, jurisdictional constraints, collaborative, organizational, informational constraints, managerial, cost, technological and performance constraints".

We regard further exploration of barriers to organizational interoperability as a key issue in the enterprise of approaching sophisticated e-government. In the remainder of this paper, we report from our empirical studies related to obstacles to organizational interoperability. In the Semicolon-project [15] semi-structured theme interviews were carried out to provide a better understanding of barriers to organizational interoperability.

.. Barriers to organizational interoperability – the Norwegian case

2.1 Method

In September-December 2008, 15 semi-structured interviews were carried out in the Semicolon-project sites and other relevant organizations. Each interview lasted from one to one and a half hours. The interviewees were recruited among middle to upper management and senior advisers with professions or careers close to but not necessarily within the ICT-departments of the organizations. The interviews were targeted to inform the Semicolon-project, as well as to provide information about experienced and practical barriers to organizational interoperability. This technique was used in order to collect qualitative data by setting up an interview situation which allowed the respondents to talk freely about their opinions on and experiences with the subject (i.e. organizational interoperability). Open-ended questions were used, the wording of which was practically identical for all respondents. The main themes, including a number of sub-themes, were:

1. "What do you understand by organizational interoperability, or how would you describe it?"
2. "What promotes organizational interoperability in general?"
3. "What retards organizational interoperability in general?"
4. "Do you have any examples of best practice within organizational interoperability?"
5. "What kind of measures or what kind of initiatives would boost organizational interoperability?"

The material is highly qualitative. The interviews were transcribed into structured schemes, expressing the main statements made by the informants. In the next chapter, these statements are presented in ten categories of findings. No weak indications are included in the findings: a minimum of one third of all informants must have clearly indicated the existence of a particular barrier in order to be included in the findings. To be included in the findings, at least one third of the informants must have explicitly pointed at a particular barrier. Approximately one third of the barriers were mentioned by slight majority of informants. Because of obvious anonymity reasons, no citations are provided.

2.2 Findings

Below, the main findings from the interviews are presented. An attempt has been made to cultivate the categories of findings. The categories are undoubtedly intertwined (e.g. those in 2.2.5 and 2.2.6). There are also many individual statements and comments that are not included in the presentation of the findings. The collected material is large, and therefore we have chosen to systematize the findings in categories that several or many informants identified as barriers to organizational interoperability.

1. Competency gaps: Organizational interoperability is based on a good understanding of business processes, and models of these. In many public organizations and government agencies, modelling of business processes has not taken place. Business is done "as usual", and changes occur more or less on an ad-hoc basis. In order to integrate the business processes of two or more organizations, models of these processes are obviously required. Models, in turn, are necessarily based on a detailed knowledge of real tasks, procedures and

routines. These have to be analyzed and put into a frame of formal descriptions, i.e. models. Poor knowledge of business processes represents a true obstacle to organizational interoperability. Equally poor is the ICT suppliers' knowledge of the business processes of the customer, in this case public organizations. Thus, their systems and solutions do not correspond to current interoperability needs or future opportunities. The third instance of poor competency often occurs at the operative level of organizations. Digital illiteracy and resistance against new applications of ICTs reduce the potential that interoperability through uses of modern ICTs could offer.

2. Lack of "measurables": The informants indicated clearly that instruments for measuring organizational interoperability are missing. This lack of proper instruments has a negative impact on both planning, execution and evaluation of organizational interoperability. In the planning or re-engineering of business processes, the description of organizational interoperability goals suffers both from the high level of abstraction and the difficulty to quantify the level of ambition. Performance indicators, score cards or barometers for organizational interoperability are clearly missed. In this connection, economic indicators that describe the effects of successful interoperability are also called for.

3. Money talks: Many informants pointed at the fundamental power of money, and this manifests itself in a number of different ways. In Norway, governmental departments and agencies operate according to a strict fiscal sector principle. Each department takes care of its own business, and collaboration in general and interoperability issues in particular are typically not part of this enterprise. Further, the letters of allocation from the government to the sector departments usually do not instruct the departments or the governmental agencies to spend money on interoperability actions. Actions for interoperability are therefore often seen as additional tasks which generate overhead and eat up possible surplus.

4. Absence of national joint efforts: According to the informants, one of the most important drivers toward broad organizational interoperability is the existence of large technology projects involving several influential organizations. Currently, too few such projects are active, thus constituting a hindrance for organizational interoperability. A majority of the informants mentioned Altinn ("AllIn", see Chapter 2.1) as an excellent example of interoperability-enhancing projects, and they complained about the absence of similar efforts for the time being. Such projects serve a number of purposes. They enhance knowledge of other organizations and their business processes, they offer a practical arena for integration and interoperability efforts, and they make progress because of the project organization as such. New hopes are directed towards newly initiated large-scale projects "eDialogue for public employers", i.e. joint filing of salaries, personal taxes and payroll taxes, and "eID", the establishment of electronic IDs and electronic signatures in the public sector [4].

5. Archipelago of small project islands: In contrast to the large projects described above, the informants point to the myriad of small, uncoordinated projects and project initiatives as a major barrier to interoperability on all levels (both technical, semantic and organizational). The explanation to this is three-fold: First, many small ICT-development projects – often with universally relevant goals – are continuously being initiated without anchorage points in overall strategies for cross-sector development. Second, even if local projects could contain openings for interoperability, such projects seldom find a counterpart in other organizations, simply because the other organizations already have given priority to other projects. Worst of all, perhaps, there is no catalogue or database which gives an overview of current and past projects small and large, for continuity and possible reuse of existing results.

6. Disharmony in legislation: Legislation with all laws, provisions of Acts, rules and regulations is a huge complex with a broad range of impact areas. Consequently, new laws or amendments to an Act bring about uncertainties with respect to the total body of laws and the total area of impact; are there unintended consequences of the new law or amendment to other areas of jurisdiction, or does the new law, rule or regulation even prevent reasonable collaboration, such as provision of information from one public body to another? Or, which public body is legally responsible for services or information provided by a conglomerate of public bodies with distinct areas of legislation? Indeed, our informants regard the legislative framework as an important area of practical obstacles to organizational interoperability. Double reporting of information to public registers is a frequent example of poor interoperability. Furthermore, one department may have no authority to request information from another department for case handling, or the law may directly prohibit merging information from different sources for security or privacy reasons. Against this background of examples, it is reasonable to assert that disharmony in legislation hampers organizational interoperability.

7. Anaemic arenas: Organizational interoperability requires collaborative arenas to succeed. There has to exist a common understanding of the importance of interoperability, strategies have to be worked out, mutual agreements have to be entered, etc. For organizational interoperability, such actions should be taken at the management level of participating organizations. For progress and continuity purposes there has to exist arenas where the top management meets regularly. According to the informants, some arenas do exist, but these have a tendency to turn into enervated meeting places. Vital arenas have an "expiration date".

8. Invisible best practice: Organizational interoperability is difficult to define precisely, and it is non-trivial to implement. Complexities are connected to both formal agreements on collaboration and practical approaches to organizational interoperability. Our informants communicate unambiguously the need for good examples in general, and show-cases of best practice within particular domains, be it tools for process modelling, management of organizational alignment, or ICT-literacy. The fact that there is a shortage of best practice constitutes an obstacle to the advancement of organizational interoperability.

9. People and their leaders: When organizational interoperability is in focus, we have to take a look at the people who work in these organizations, and the management of people. The people-factor has individual and collective dimensions. According to the informants' experiences, many initiatives to practical collaboration (or organizational interoperability) fail because of negative attitudes and non-collaborative working practices. There are people who simply do not like or want to work together with other people, or who do not cope well in situations of interaction. There are leaders who do not promote collaboration, leaders who are afraid of losing existing positions if collaborations should lead to more rational distribution and organization of work, and leaders who practice authoritative leadership. There are trade unions that do not promote collaboration because of potential rationalization and loss of jobs. This hindrance to organizational interoperability is considered as sensitive and difficult to counteract.

10. Ubiquitous heterogeneity: Many of the informants express the view that a number of inherent differences hamper organizational interoperability. This starts with unequal levels of competency in general and digital literacy in particular, continues through differences in strategic thinking and foresight, organizational cultures, phases in development processes and available technologies, and ends in dissimilarities in available resources. One illustration of this kind of obstacles to interoperability comes from the municipalities, counties and public enterprises under municipal or county ownership. In Norway, there are ca. 430 municipalities,

varying from tiny rural communities to large urban centres. The scales of economy are totally different, and consequently the fiscal priorities vary from financing absolute necessities in poor municipalities, to fundamental renewal and innovation. The practical possibilities of different municipalities to participate for instance in the development of common ICT-solutions (and thus interoperability) are totally different. Another illustration of similar heterogeneity is the different modes of operation in governmental sector departments. Our informants assert that some departments promote (and finance) collaboration and interoperability initiatives in an excellent manner, while others seldom enter the mode of collaboration. So, there is a serious deficit of partnerships due to unequal preconditions.

3. Discussion

Barriers may be turned into opportunities by applying appropriate corrective measures. Eynon et al. [12] propose four organizational, technical and legal key solutions to the barriers to e-government that they identified. With reference to the interview questions, our informants were asked to make suggestions for appropriate measures to build down barriers to organizational interoperability. Below, some of these are presented as an illustration of possible approaches:

- Competency measures within process modelling and uses of ICTs.
- Development of indicators and barometers for measuring organizational interoperability.
- Fiscal measures for dedicated funding of interoperability projects.
- Establishment of large ICT-projects with cross sector participation.
- Catalogue/database on previous and current ICT-projects and appointment of coordinating project officer(s).
- Catalogue/database on best practice within formal contracts, project management, design of interoperable systems and services.
- Actions for organizational alignment (organization development projects).
- Governmentally organized and financed innovation projects.
- Financial support for interoperability actions (governmental financing).

The Semicolon-project which the empirical work reported in this paper is part of, will in 2009-2010 go into detail on the identified barriers. This will be done by quantitative measurements of the barriers. An on-line survey will be designed for this purpose and carried out twice during the project.

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