

# The Impact of Interoperability Standards Adoption on Organisations in Government Information Networks

Florian HENNING

UNU-IIST Center for Electronic Governance  
Casa Silva Mendes  
Est. do Engenheiro Trigo 4  
Macao  
+853 2871-2930  
florian@iist.unu.edu

UNU-MERIT/Maastricht Graduate School of Governance  
Keizer Karelplein 19  
6211 TC Maastricht  
The Netherlands  
+31 (0)43 388 4400  
henning@merit.unu.edu

## ABSTRACT

The past decade has seen a steady rise of the phenomenon of ICT-enabled governance networks, also called Government Information Networks. Such networks essentially rely on electronic information sharing across organisations, and thus rest on interoperability (IOP). However, whilst previous research has argued that expected impacts from IOP standard are a central factor for organisations' motivation to adopt them, not much research has been done on the actual impacts from adopting IOP standards for organisations. This paper aims to provide a better understanding of the impacts from the adoption of IOP standards on partner organisations in Government Information Networks. To this end, it combines a literature study with data from stakeholder interviews from two cases in the Netherlands in order to i) identify the relevant main impact categories and dimensions; ii) assess their relative relevance to stakeholders; and iii) draw recommendations for IOP governance from this analysis. The study thus fills a relevant gap in existing research on IOP, and contributes a guiding framework with key dimensions that practitioners can use for assessing the impacts and feasibility of IOP standards adoption.

## Categories and Subject Descriptors

E.0 [Data – General]: Data Standards; H3.5 [Information Storage and Retrieval – Online Information Services]: Data sharing; H3.7 [Information Storage and Retrieval – Digital Libraries]: Standards

## General Terms

Management, Design, Human Factors, Standardization, Theory

## Keywords

Government Information Networks, Interoperability, Interoperability Governance, Standards Adoption, Impact Analysis

## 1. INTRODUCTION

Over the course of at least the last decade, the transformative potential of ICT has increasingly been utilised in connection with transformations of public administrations towards “connected governance” [1]. This transformation has received many labels from the “hollow state” [2] to “joined-up government” [3]. While these terms differ in their nuances, they essentially describe a general reform trend from hierarchic towards “heterarchic” architectures of public administrations – i.e. networked systems whose actions are governed by multiple dynamic power structures. Such heterarchy builds on partnerships with the private and non-profit sectors for delivering public services, and on supplanting the vertical sectoral boundaries of traditional bureaucracy with collaborative structures that cross-cut and integrate previously separate organisations with service-specific, rather than department-specific portfolios.

ICT increasingly emerged as a suitable tool to support these reforms, resulting in what Janowski et al. call “Government Information Networks”: “all ICT-enabled policy networks, collaboration networks and governance networks” [4]. Key to the relevance of ICT for government information networks is their ability for storing, processing, and especially sharing information [cf. 5, 6].

Government Information Networks rely on well-functioning communication between organisations' back-offices, where information output of one organisation has to be understood and processed by another organisation. A crucial requirement for Government Information Networks is therefore that the systems of the various partner organisations need to be compatible [7, 8, cf. 9]. Their ability to “talk to each other” based on a set of standards and agreements is called “interoperability” (IOP). IOP can be broadly defined as “the ability of disparate and diverse organisations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organisations, through the business processes they support, by means of the exchange of data between their respective ICT systems” [10]. Essentially, IOP necessitates the adherence to a common set of standards and agreements among the organisations in Government Information Networks that ensure that they can communicate seamlessly with each other [11-13]. Whilst early conceptualisations of IOP were concerned almost entirely with technical standardisation, the concept more recently has put an emphasis on the importance of including

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

ICEGOV2013, October 22-25, 2013, Seoul, Korea

Copyright 2013 ACM 978-1-4503-2456-4/00/0010 ...\$15.00.

standards and agreements on semantics (vocabulary and concepts), as well as organisational dimensions (processes, institutional structures, policies and guidelines) [14].

However, achieving IOP in Government Information Networks in practice appears to be difficult. Government Information Networks often encounter substantial difficulties with back-office collaboration because they fail to achieve IOP [9, 15-19].

Achieving IOP in Government Information Networks is challenging, because it necessarily requires the organisations in these networks to undergo changes. IOP needs to be achieved by mutual adjustment of the various organisations with regard to administrative, legal, operational, technical, semantic, and cultural dimensions [9]. Adjustments in these domains can impose considerable pressure for transformation on organisations, and IOP thus often requires substantial investments in organisational change from the partnering organisations. However, the impacts from IOP standards adoption by public organisations have not been researched in sufficient depth.

In addition, there is widespread agreement in the literature that the strategic oversight of IOP (“IOP governance”) is a key factor for achieving IOP in Government Information Networks [20-25]. However, there is not sufficient research about the role of the impacts for IOP governance, thus requiring further investigation.

Addressing the research gap described above, this paper addresses the following research question: “what is the impact of IOP standards adoption for organisations in Government Information Networks, and what are the implications for IOP Governance?” To this end, the study draws on a theoretical framework that is derived from related research, and refined based on a qualitative study of two Government Information Networks in the Netherlands.

The remainder of this paper is organised as follows. Section 2 provides an overview of related work that is relevant to IOP adoption and impacts. Section 3 develops a preliminary theoretical framework that is derived from relevant theory. Section 4 presents the methods of data collection and analysis. Section 5 discusses the findings from the analysis, and section 6 discusses the implications for IOP governance. Section 7 provides concluding remarks on the significance of this study for IOP governance practice and for future research.

## 2. RELATED WORK

An overview and conceptualisation of the phenomenon of Government Information Networks is provided in Janowski et al [4]. A number of studies have in the past also addressed the issue of government information sharing is discussed in a number of other studies. Dawes [5], Pardo [18] and Gil-Garcia et al. [6] discuss the benefits from government information sharing. Next to the concept and benefits, the challenges and management strategies for government information sharing are discussed in Gil-Garcia et al. [6] and Yang et al [26]. Estevez et al [27, 28] propose a conceptual framework to guide the development of government information sharing policies, strategies, and implementations. There also have been studies on the determinants and success factors for inter-agency information sharing [29, 30].

The concept of IOP in the context of e-governance has been defined in Gasco [31], dos Santos & Reinhard [12], and Scholl and Klischewski [17]. Pardo et al [32] highlight the multi-dimensionality of IOP in e-governance, combining policy, management and technology dimensions. A discussion of the role

of IOP for electronic governance, and how it can be achieved, is given in Laskaridis et al [7]. The specific relevance of IOP for Government Information Networks, and back-office collaboration in government in general, is also discussed in Fountain [15], Bekkers [9], dos Santos & Reinhard [16].

Pardo et al [23] have pointed out the importance of IOP governance for achieving IOP. The concept, definition and role of IOP Governance is discussed in several studies [20-23, 25].

The adoption of e-governance innovations by public-sector organisations has been analysed in a number of studies from the innovation diffusion and technology acceptance literature [cf. 33, 34-38]. Whilst most of these studies focus on the determinants for adoption, there is hardly any research that specifically investigates the impacts from adoption (at most, these studies address impacts from adoption indirectly, as a determinant in terms of *expected* impacts). Only very few studies directly address the impact of adopting e-governance innovations on public organisations: a study by [39] evaluated the impact of shared services by means of simulation, and a study by [40] investigates the institutional impact brought by the use of new technologies in public administration. Bekkers [9] discusses the necessary adjustments for IOP adoption in public organisations.

Although several studies also have investigated the adoption of standards by private sector organisations [41, 42, cf. 43, 44, 45], only very few studies have specifically addressed the adoption of IOP standards by public sector organisations. Parasie [46] and Veit & Parasie [47] study the determinants for standards adoption by municipalities. Andersen et al [48] focus specifically on the role of policy as a determinant for standards adoption. Scholl and Klischewski [17], Hellman [49] and dos Santos & Reinhard [16] specifically investigate the barriers for achieving IOP.

Whilst there is thus a body of related work that identifies the need for IOP in Government Information Networks, and the need for IOP governance to make this happen, there is a clear gap of studies that investigate the issue of impacts from adoption. This paper aims to contribute to this gap in existing research, by investigating the impacts of IOP standards adoption and their significance for IOP governance.

## 3. THEORETICAL FRAMEWORK

This section first defines the key concepts of Government Information Networks, IOP and IOP Governance. It then goes on to construct, based on the body of relevant literature described above, a theoretical framework for conceptualising IOP adoption impacts.

In order to get a more detailed understanding of the challenges with regard to the adjustments that are necessitated by various IOP requirements, it is useful to consider the distinction of the various functional dimensions of IOP. Most commonly, a differentiation is made between the three layers of technological, semantic and organisational IOP [cf. 13, 50].

Broadly speaking, IOP governance concerns the institutional structure for strategic oversight on key issues of IOP standards, such as their definition, implementation, maintenance and monitoring. Pardo and Burke [23] define IOP governance accordingly as “the existence of appropriate decision making rules and procedures to direct and oversee government IOP initiatives that are planned or underway”.

As mentioned in the previous section, the impacts of IOP standards adoption for public sector organisations are hardly

researched. Therefore, a theoretical framework needs to be informed by related theory. The innovation diffusion and technology acceptance literature offer relevant insights in this regard. But since these studies address impacts from adoption indirectly at most (i.e. as a determinant in terms of *expected* impacts), this can only provide a preliminary theoretical frame, and needs to subsequently be validated and enriched by empirical analysis.

Several authors [37, 51] have previously argued that the innovation diffusion literature is of particular relevance to the study of e-governance systems because such systems can be seen as innovations. This also extends to IOP standards, which equally represent innovations for adopting organisations. The classic innovation diffusion theory aims to explain “the process in which an innovation is communicated through certain channels over time among the members of a social system” [52]. Rogers’ theory derives five attributes of innovations which influence the adoption rate of an innovation: relative advantage, compatibility, complexity, trialability, and observability [52]. Four of these are equally useful for analysing adoption impacts. “Relative advantage” refers to the degree to which an innovation is perceived to be better than its precursor. “Compatibility” concerns how the innovation is perceived to fit into the adopters’ existing values and needs, as based on past experience. “Complexity” is the perception of how difficult the innovation will be to use. Finally, “observability” is the degree to which the results from using an innovation are perceived to be visible to others.

Moore and Benbasat [53] adapted Rogers’ theory to specifically study the adoption of ICT. They add some adoption determinants that relate to (expected) impact: “ease of use” (the perceived ease or difficulty to use the innovation), “image” (how much the use of an innovation is perceived to improve the adopter’s status), “results demonstrability” (in how far the results from using the technology can be observed and communicated to others).

Similarly to the innovation diffusion theory, technology acceptance theory treats (expected) impacts as determinants and can thus inform an analysis of adoption impacts. One of the most widely and successfully applied models on ICT adoption is the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. [54]. UTAUT specifies four determinants influencing the intention to use a technology: performance expectancy, effort expectancy, social influence and facilitating conditions. The first two of these are also informative for the analysis of (expected) impacts. Performance expectancy is the expected impact of adoption on the adopter’s performance, and effort expectancy concerns the expected impact of adoption in terms of ease of use.

Whilst these theories only talk about “expected” impacts, they can be used to derive a theoretical frame that conceptualises the dimensions of impacts from adoption. The dimensions identified from these theories are presented in the following. The theoretical framework follows the basic distinction made in the above-described theories between efforts (e.g. complexity, ease of use, compatibility) on the one hand, and outcomes (e.g. performance, observability, image) on the other hand. Below, the impact dimensions identified from the literature are explained. An overview is given in table 1.

*Outcomes* can be distinguished as two categories: *internal-operations outcomes*, and *external-relations outcomes*.

*Internal-operations outcomes* are those outcomes that pertain to the impacts on the adopting organisations’ internal operations. The key impact dimensions derived from the literature for this dimension are described below. *Effectiveness* refers to the output of the organisation, such as its contribution to solving domain-level problems [cf. 55]. *Efficiency* from adoption on the organisation’s input/output ratio [cf. 22, 38, 55, 56, 57, 58]. *Resource acquisition* refers to access to complementary resources for the organisation [cf. 57, 59, 60]. *Data management* is specified as a sub-construct which refers to effects on data management that may result from adoption [cf. 5, 6, 22, 56, 58]. *Coordination* refers to the effects on the coordination of programmes and services through integrated planning and service delivery [cf. 5, 6, 61, 62].

The *external-relations outcomes* dimension relate to effects on an organisation’s external relations from adopting the IOP standards [cf. 5, 58]. The key impact dimensions derived from the literature for this category are described below. *Political effects* are those impacts related to political power vis-a-vis other actors [cf. 30, 38, 42, 63, 64-66]. *Image* refers to effects on the organisation’s status and alignment with normative pressures in its environment of peers [cf. 53, 60, 67, 68]. *Reach Expansion* refers to impacts regarding the reach of the organisation in terms of partners and operational fields [5, 61, 69].

*Adoption efforts* can be conceptualised as the actual extent of efforts experienced by an organisation during the adoption process, i.e. the efforts that are required to deal with complexities and inflexibilities in the various spheres of the organisation [cf. 52, 53, 56, 62, 65, 70]. The relevant effort dimensions mentioned in the literature can be grouped into *technological efforts*, *organisational efforts*, *legal efforts*, and *resource costs*.

*Technological efforts* refers to the efforts resulting from the degree of technological difficulty and costs of adopting the IOP requirements [6, 65, 71-74]. *Organisational efforts* are the required efforts to fit the IOP requirements into organisational structures and processes, including efforts related to intra-organisational structures and processes as well as efforts related to the interfacing of organisational structures and processes with those of partnering organisations [cf. 30, 55, 61, 62, 65]. *Legal efforts* are the efforts to overcome legal obstacles [6, 16, 17, 59, 61, 64, 71, 72, 74]. Finally, *resource costs* of adoption refer to the financial costs of adoption, including technological and infrastructure costs as well as administrative costs [cf. 5, 61, 66, 69].

**Table 1. Dimensions of theoretical framework**

Adoption Outcomes	
Internal Operations	External Relations
Effectiveness	Political effects
Efficiency	Image
Resource acquisition	Reach expansion
Data management	
Coordination	
Adoption Efforts	
Technological efforts	
Organisational efforts	
Legal efforts	
Resource costs	

## 4. METHODS

Due to the exploratory nature of the research question, a qualitative methodological approach was chosen for this study. The data for this study comes from 37 semi-structured interviews with key informants from two Government Information Networks in the Netherlands, conducted by the researcher in the period from January until September 2011. The two cases were selected as representative instances of Government Information Networks: The Digital Client Dossier (Digitaal Klantdossier, DKD) and Studielink.

The DKD case is a virtual electronic dossier of work and income related data that various public agencies hold on their clients. In essence, it consists of a nation-wide digital linkage of these agencies' databases, which aims to assist the tasks of professionals from the work and income (SUWI) domain by allowing them to collate relevant information on individual clients into a digital dossier. DKD is a fairly complex network, involving over 400 diverse organisations, its main actors being the municipalities' social services and the national social insurance agencies.

Studielink may be regarded as the higher education sector's equivalent to DKD, a "digital student dossier". It is a collective IT system for handling registration of students in the Dutch higher education sector, based on the electronic exchange of student registration data via a central broker application. Studielink is a fairly non-complex network, involving approximately 70 organisations from the same sector, its main actors being the higher-education institutions (universities and universities of applied sciences) and the national education administration agency DUO.

Interviews have been conducted with key informants from partner organisations from the two networks, as well as informants at network level for each case. Interviewees have been selected based on their position in the organisations of interest. Each interview has been recorded and transcribed. The data analysis was based on the qualitative coding of the interview data, using the atlas.ti software package. Qualitative coding, broadly described, refers to the "tagging" of the data with conceptual categories (hereafter referred to as "codes"). The codes are largely aligned with the key concepts from the theoretical framework, each representing a different concept.

The codes were generated through a combined deductive and inductive approach. An initial code list has been created based on the concepts from the theoretical framework presented above. This list was then enriched inductively, by identifying from the data any additional concepts to those from existing theory.

Two strategies were used for the analysis of the coded text segments (hereafter referred to as "codings"). An interpretive analysis strategy used the codes as a means of "filing" interviewees' statements (codings) by the concepts defined in the theoretical framework, in order to identify the subdimensions of a concept and patterns across them. A semi-quantitative strategy used the frequencies of codings per code in order to assess their relevance for interviewees. It also counted "co-occurrences" of codes (i.e. text segments that were tagged with several codes simultaneously) in order to assess relationships between concepts.

## 5. FINDINGS

This section discusses in detail the impacts that the adoption of IOP standards can have for organisations in Government Information Networks, based on the analysis of the collected data.

Section 5.1 discusses the identified impact categories and dimensions, and section 5.2 analyses how stakeholders have evaluated these impact categories.

### 5.1 Impact categories

In addition to the three impact categories identified in the theoretical framework, two new categories have been identified inductively from the interview data. These are *Return-on-Investment Outcomes* and *Network-Level Outcomes* and are discussed in sections 5.1.4 and 5.1.5 respectively. Table 2 presents the relative share for these categories among all impact-related codings. The table shows that impacts on internal operations, together with the efforts needed for standards adoption, were clearly the biggest concerns for the interviewed stakeholders.

**Table 2. Impacts (percentage of codings/impact category)**

Dimension	% (N=679)
Internal-Operations Outcomes	43
Adoption Efforts	42
External-Relations Outcomes	8
Return-on-Investment Outcomes* <sup>1</sup>	5
Network-Level Outcomes*	2

The analysis showed that the different IOP dimensions are associated to different degrees with the different impacts. This is the most visible in the dimension-specific *Efforts* categories (table 3). For instance, under *Semantic Efforts*, semantic IOP takes the biggest share (although when comparing the share of codings for each IOP dimensions, with 20% it is the least mentioned overall, in contrast to 37% for organisational IOP and 43% for technological IOP). However, it is noteworthy that all IOP dimensions (albeit to various degrees) were mentioned by interviewees in relation with nearly all impact categories - even categories like *Semantic Efforts*, which are more specific to a single IOP dimension. This suggests that the different IOP dimensions are highly interrelated in terms of their impacts. (The picture is similar for other impact categories such as internal-operations outcomes, but not shown here due to space limitations.)

**Table 3. Co-occurrence of adoption effort and IOP dimension codes (overall, absolute frequencies)**

	Technol. IOP	Semantic IOP	Organ. IOP
<b>Organisational Efforts</b>	40	6	83
<b>Technological Efforts</b>	64	12	12
<b>Semantic Efforts</b>	6	16	2
<b>Legal Efforts</b>	2	1	2
<b>Resource Costs</b>	23	6	8

In the following sections, for each of the five impact categories discussed, first an overview of the identified dimensions is given, indicating their relative relevance (as indicated by codings frequencies within that category). Then, the findings for each of these dimensions are presented in turn, discussing their subdimensions that were identified from the literature and from the data, as well as the relevance attributed by interviewees to them.

<sup>1</sup> All inductively identified dimensions and subdimensions are marked with an \*

### 5.1.1 Internal-Operations Outcomes

As table 4 shows, the frequencies in which interviewees mentioned the Internal-Operations Outcomes are relatively evenly spread. It thus seems that (almost) all internal-operations outcomes are more or less equally important to stakeholders.

*Efficiency.* Three sub-dimensions were identified for this dimension: impacts on *resource costs* (53% of codings within the *Efficiency* dimension), impacts on *usability* (ease of use) (24%), and effects on the *speed of operations* (23%).

*Data Management.* Three sub-dimensions were identified within this dimension. By a large margin, the most frequently mentioned impacts were on *data quality* (61%). Impacts on *data security/privacy* (21%) and on *data processing reliability* (18%) were mentioned less often.

*Effectiveness.* The identified sub-dimensions for this impact dimension were impacts on *Improved Services* (by a vast margin, 63%), *Policy Contribution* (contribution of the organisation to policy objectives) and *Responsiveness* of the organisation (both 15%), impacts on the organisation's *Problem Solving* capacity (6%) and effects of IOP adoption as a kick-start and accelerator for *Triggering Innovation\** in the organisation (2%).

*Autonomy\*.* This dimension has been inductively derived from the data and describes the effects from IOP standards adoption on organisations' autonomous internal activities, such as the flexibility to change their structure or processes. *Autonomy* has not been further divided into any sub-dimensions.

*Resource Acquisition.* Three sub-dimensions were specified based on the literature: *Financial Resources Acquisition* (effects from adoption on the organisation's access to complementary resources), *Information Acquisition* (effects on information access), and *Expertise Acquisition* (effects on access and development of expertise). Only the first two were mentioned by the interviewees. Of these, *Information Acquisition* accounts for a much higher share of codings (62%) than *Financial Resources acquisition* (38%).

*Coordination.* Three sub-dimensions were identified for this: *Goal Clarification* (effects from IOP standards adoption on the clarity of the organisation's goals and mission), *Uncertainty Reduction* (effects on the uncertainty facing the organisation), and *Reporting* (on reporting and decision support). Of these, only the latter two were mentioned by interviewees, with a large majority of codings relating to *Reporting* (63%), and 37% to *Uncertainty Reduction*.

**Table 4. Internal-Operations Outcomes (percentage of codings/dimension)**

Dimension	% (N=273)
Efficiency	24
Data Management	19
Effectiveness	18
Autonomy*	18
Resource acquisition	15
Coordination	6

### 5.1.2 External-Relations Outcomes

As table 5 shows, the most-mentioned category of external-relations outcomes is that of *Political Effects*, which makes for more than half of the external-relations outcomes (55%). *Normative Pressure/Image* outcomes account for a significant part

as well (37%). *Reach Expansion*, on the other hand, seem to only play a minor role for the interviewees (8%).

*Political Effects.* Five sub-dimensions were identified for this sub-construct: *Interdependence* (effects from IOP standards adoption on interdependence in terms of external relations), *Responsibility\** (effects in terms of the organisation's responsibilities and obligations), *Competitiveness/Power* (effects on the organisation's competitiveness/power vis-a-vis other organisations), *Credibility* (effects on the organisation's credibility as a negotiation partner to the outside), and *Equality* (effects related to equality of influence on programme-related decisions). The latter did not reappear in the interview data. The two most-mentioned dimensions in this dimension are *Interdependence* (38%) and *Responsibility* (28%), followed by *Competitiveness/Power* (21%) and *Credibility* (13%).

*Normative Pressure/Image.* Five sub-dimensions were identified for this: *Transparency/Accountability* (effects from IOP standards adoption on the public accountability of the organisation), *Results Demonstrability* (effects in terms of demonstrability of results from adoption to others), *Innovation* (effects on the image of the organisation as innovative), *Legitimacy* (effects on the legitimacy of the organisation with external stakeholders), and *Clarity of Image* (effects on the understanding of the organisation's role by others). *Transparency/Accountability* and *Results Demonstrability* both account for 29% of codings in this dimension, *Innovation* and *Legitimacy* both for 17%, and *Clarity of Image* for 8%.

*Reach Expansion.* With only 8% of codings, this dimension was the least mentioned among the *External-Relations Outcomes*. It has not been further divided into any sub-dimensions.

**Table 5. External-Relations Outcomes (percentage of codings/dimension)**

Dimension	% (N=60)
Political Effects	55
Normative Pressures/Image	37
Reach Expansion	8

### 5.1.3 Adoption Efforts

As table 6 shows, three of the five *Adoption Efforts* dimensions were mentioned considerably more often than the rest. By a considerable margin, *Organisational Efforts* were the most-often mentioned (39%). *Semantic Efforts* (6%) and *Legal Efforts* (5%) only played a relatively minor for interviewees.

**Table 6. Adoption Efforts (percentage of codings/dimension)**

Dimension	% (N=427)
Organisational Effort	39
Technological Efforts	30
Resource Costs	20
Semantic Efforts*	6
Legal Efforts	5

*Organisational Efforts.* Eight sub-dimensions were identified for this: *Process Efforts* are those efforts resulting from aligning IOP standards and existing operations and processes (48%). *Monitoring/Enforcement Efforts* are those resulting from the extent of monitoring and enforcing compliance of others (19%). *Organisational Structure Efforts\** refer to efforts resulting from aligning IOP standards and organisational structure (19%). The remaining five impact dimensions were only mentioned to a small

to negligible extent by the interviewees. *Training Efforts* are resulting from extent of staff training necessary for adoption (8%). *Value Efforts* are those resulting from aligning the IOP standards with organisational norms and values (3%). *Goal Efforts\** are efforts related to aligning the IOP standards with the organisational goals and strategy (2%). *Maintaining Relationship Efforts* concern efforts resulting from nurturing partnerships (1%).

*Technological Efforts*. With 30% of codings, this dimension was the second-most mentioned among the *Adoption Efforts*. It has not been further divided into any sub-dimensions.

*Resource Costs*. Five sub-dimensions have been specified for this: *Infrastructure Costs* result from putting in place the required technological infrastructure (75%). *Monitoring/Enforcement Costs* stem from monitoring and enforcing compliance of others (13%), *Training Costs* relate to staff training needed for successful adoption (12%). *Costs for Maintaining Relationship* and *Transaction Costs* have not been mentioned by interviewees.

*Semantic Efforts\**. This dimension is a result from the inductive coding, and has been defined as the efforts resulting from the degree of difficulty to fit the IOP standards into the semantic structures of the organisation. No sub-dimensions were identified.

*Legal Efforts*. Three dimensions were identified for this dimension (in descending order by their number of codings): *Legal Framework Efforts* concerns those efforts resulting from regulation and legislation (38%). *Ambiguous Legislation Efforts* concerns those impacts from ambiguity in legislation (31%). *Privacy Legislation Efforts* account for 31% of *Legal Efforts* codings. The last two sub-dimensions, *Intellectual Property Legislation* efforts and *Procurement Legislation Efforts* have both not been mentioned by interviewees at all.

On a general level, the interpretive analysis showed that many interview segments were coded simultaneously with both adoption effort codes and codes that are concerning (predominantly) benefits-related outcomes. This pattern underlines something that several interviewees also stated explicitly: namely that in a decision for or against adoption of a standard, efforts are usually weighed against the individual benefits that may also result from adoption.

#### 5.1.4 Return-on-Investment Outcomes

*Return-on-Investment Outcomes* is a category that consists of two dimensions that have been identified from the data, both of which account for relatively even shares of codings in this category (See table 7): *Timing* (57%) refers to the synchrony of efforts and expected benefits. *Sow-Harvest Equality* (43%) concerns the quality of distribution of benefits from the network among partner organisations in relation to their input. It should be noted, however, that this category only had 35 codings overall.

**Table 7. Return-on-Investment Outcomes (percentage of codings/dimension)**

Dimension	% (N=35)
Timing*	57
Sow-Harvest Equality*	43

#### 5.1.5 Network-Level Outcomes

Like *Return-on-Investment Outcomes*, this category has been identified from the data. It also consists of two dimensions: *Network Effectiveness* accounts for the slightly larger share (58%) and refers to the effectiveness of the network as a whole in terms of reaching its objectives. The second dimension, *Future*

*Innovation* (42%), refers to the impact of adoption on future innovation in the domain/network. It has a very low amount of overall codings (12). In terms of relevance to the interviewed stakeholders, the picture for *Network-Level Outcomes* thus is very similar to the previous category (see table 8).

Table 9 presents the validation of the preliminary theoretical framework from table 1, including all additionally identified concepts from the empirical analysis.

**Table 8. Network-Level Outcomes (percentage of codings/dimension)**

Dimension	% (N=12)
Network Effectiveness*	58
Future Innovation*	42

**Table 9. Dimensions of theoretical framework (inductively identified concepts in italics)**

Adoption Outcomes	
Internal Operations	External Relations
Effectiveness Efficiency Resource acquisition Data management Coordination <i>Autonomy</i>	Political effects Image Reach expansion
Return-on-Investment Outcomes	Network-Level Outcomes
<i>Timing</i> <i>Sow-Harvest Equality</i>	<i>Network Effectiveness</i> <i>Future Innovation</i>
Adoption Efforts	
Technological efforts Organisational efforts <i>Semantic efforts</i> Legal efforts Resource costs	

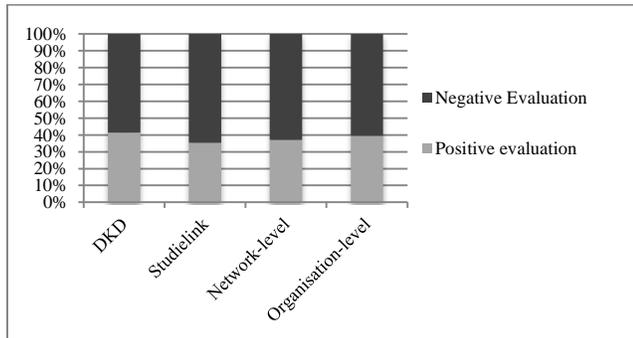
## 5.2 Impact Evaluations

How do stakeholders evaluate the impacts described in the previous sections? To address this question, all impact codings by the interviewees that contained an unambiguous statement by the interviewee about whether they see that impact as generally positive or negative for their organisation, were additionally coded with a *Positive Evaluation* or a *Negative Evaluation* code.

Figure 1 shows the evaluation of impacts overall by the interviewees. The figure shows clearly that in general (and with little variation across cases and interviewee roles), there is a majority of negative evaluations of impacts. Interestingly, the figures also shows that this is no different with network-level interviewees than with organisational stakeholders – in fact, the latter even have a slightly higher share of positive statements.

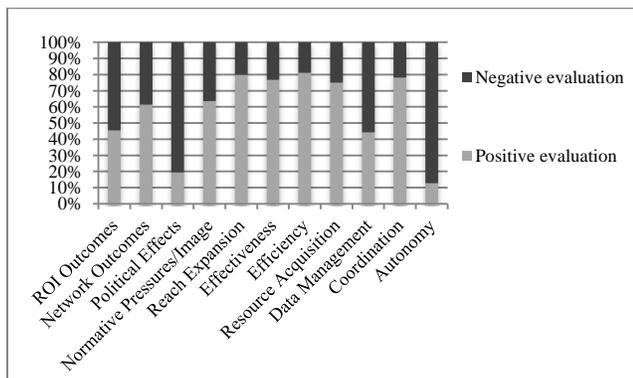
Figures 2 and 3 provide further detail by displaying the co-occurrences of evaluation codings with the impact categories (outcomes and efforts, respectively). As the featuring of both negative and positive evaluations in both figures show, the outcome and adoption effort categories should not be taken as synonymous with a simple dichotomy of “costs” versus “benefits”: although they clearly are aligned with a majority of positive and negative evaluations respectively, the picture appears to be much more complex: as figure 3 for instance indicates, many

adoption efforts are not purely seen as negative, but also evaluated positively. However, the comparison of positive and negative accounts in figures 2 and 3 also shows that the alignment of adoption efforts with negative evaluations is more pronounced than the alignment of adoption outcomes with positive evaluations.



**Figure 1. Impact evaluation (relative frequencies, by cases and interviewee roles<sup>2</sup>)**

Figure 2 gives an impression of the considerable extent of variation of evaluation across the different outcome categories. This breakdown shows that, while the overall majority of outcome codes might co-occur with a positive evaluation, this can be the opposite for individual outcome categories: for example, whilst *Efficiency* outcomes have a clear majority of positive evaluations, *Autonomy* outcomes are strongly more negatively evaluated.

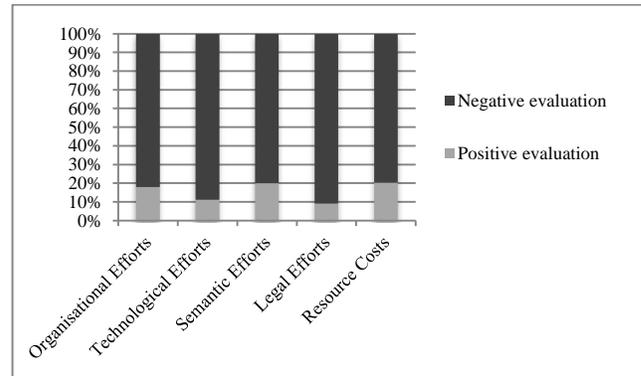


**Figure 2. Co-occurrence of evaluation codes and adoption outcome (absolute frequencies, overall)**

In comparison to the considerable variation of evaluation across outcome codes (figure 2), the alignment of adoption efforts with a particular evaluation (negative) is much more consistent (figure 3): overall, the proportions of positive and negative evaluations do not greatly vary across the effort categories. Only one category (*Resource Costs*) has (marginally) less than 80% co-occurrences with a negative evaluation, while all other effort categories remain above. The effort categories that co-occur with the most negative evaluations are *Legal Efforts* and *Technological Efforts*. However, it should be noted that despite the clear majority of negative evaluations of effort categories, there are is nevertheless a share of

<sup>2</sup> Since each group of interviewees and both cases had different number of interviewees, a comparison based on absolute coding frequencies would give a misleading picture. Therefore, the frequencies were normalised into “relative frequencies”, by dividing the absolute frequencies for a specific code by the number of interviews in the group that is shown.

roughly between 10-20% of positive evaluations for these effort categories. Although this seems counterintuitive, this might be explained by the fact that in their complaints about a particular effort related to adoption, interviewees’ statements often also note the benefits expected in the long-term that can result from such efforts.



**Figure 3. Co-occurrence of evaluation codes and adoption effort (absolute frequencies, overall)**

An interesting finding is the comparison of evaluations given by stakeholders from the adopting organisations (i.e. those in charge of implementing the necessary changes in the organisation and thus representing the organisational viewpoint), and from those stakeholders at the network level (i.e. those who are in charge of overseeing and governing the Government Information Network as a whole, thus representing a network-level perspective). The findings for this are displayed in figure 1. It is striking to see that there is no significant difference in terms of evaluation across network-level and organisational stakeholders – in fact, the latter even have a slightly higher share of positive statements about IOP adoption. This suggests that surprisingly, the opinion of a majority of those who govern Government Information Networks is (even if slightly) more negative than positive.

## 6. DISCUSSION

The analysis found that internal operations and efforts required for adoption are by far the largest concerns for stakeholders when it comes to impacts of IOP standards adoption. In terms of Outcome categories, the analysis found that *Internal-Operations Outcomes* are much more frequently mentioned than any other category. They clearly represent a key concern for stakeholders and need to be targeted as such by any IOP governance body.

In terms of *Adoption Efforts*, *Organisational Efforts* seem to play the largest role for stakeholders at the organisational level. This type of impact from IOP adoption needs to be a specific target area for IOP governance. However, the analysis also showed that there are interrelations between various effort categories, for instance between semantic and technological efforts. IOP governance thus also needs to carefully address these interlinkages by means of a holistic governance design. This does not only necessitate taking into account positive associations between impact categories, but also the possible trade-offs between impacts: the analysis also showed that adoption efforts are typically weighed by organisational stakeholders against the possible benefits from IOP standards adoption.

The analysis of the evaluation of IOP standards adoption showed that overall, scepticism towards IOP standards outweighs positive evaluations. This is not too surprising. When taking into account the general problem of reaching IOP in Government Information

Networks, one would expect that the majority of stakeholders has a more sceptical view on IOP adoption. Despite the overall scepticism, the analysis also indicated that the various impact categories face different degrees of positive and negative evaluations, which possibly might imply also stronger resistance to change in these areas. For one, this means that the “outcome” and “effort” categories should not be taken as synonymous with “advantages” and “disadvantages” from IOP adoption. Furthermore, for IOP governance, this implies that “resistance to change” is a more nuanced picture that requires a more targeted approach to those areas where opposition is strongest. This is particularly noteworthy since the findings also indicate that stakeholders in the organisations do have an understanding that certain efforts are inevitable when wanting to reap benefits from IOP standards in the long run, and thus are not generally “hostile” against IOP standards adoption across all areas.

A potentially concerning finding is that among those interviewees that were at a governing (i.e. network-level) position in the studied Government Information Networks, there were more negative than positive evaluations – indicating that the opinion of a majority of those who govern Government Information Networks is (even if slightly) more negative than positive. While this could mean that there is scepticism about IOP adoption impacts among those governing it, it could also indicate that they are simply more thoughtful of critical issues around the impacts of IOP adoption.

## 7. CONCLUSION

The objective of this paper was to provide a better understanding of the impacts of IOP adoption on partner organisations in Government Information Networks. To this end, it combined a literature study with data from stakeholder interviews from two cases in the Netherlands in order to i) identify the relevant main impact categories and dimensions; ii) assess their relative relevance to stakeholders; and iii) draw recommendations for IOP governance from this analysis.

For policy makers, the findings of this study are relevant in at least two respects. First, the analysis identified the areas of concern that stakeholders have regarding the adoption of IOP standards. As the analysis highlighted, IOP standards have an impact on various aspects of the partner organisations’ operations and strategy, and require various types of organisational change from them. This offers some initial guidance to policy makers as to which aspects need their special attention and policy support. Second, based on the frequency analysis that indicated which individual impact dimensions were mentioned more or less in the interviews, the study provides guidance as to which impact areas are most salient and need to receive particular attention in IOP governance. A better understanding of the impact of standardisation, including the key aspects of efforts as well as benefits, can lead to a more detailed awareness of the feasibility of adoption and to a more accurate assessment of the likely success of standards, and thus provide a better basis for IOP governance.

However, such a semi-quantitative analysis of interview data has obvious limitations in terms of validity, and the findings can thus only be treated as indicative propositions. Future research thus is needed to validate the findings of this study concerning the identified impact dimensions, by replicating this analysis with other cases. In addition, the proposed relevance of impacts should be validated by means of survey research with larger samples.

## 8. ACKNOWLEDGMENTS

The author would like to thank ICTU foundation for the support for this research, and all interviewees for their participation. The author is also very grateful for the insightful comments and feedback received on earlier versions of this study, in particular Prof. Victor Bekkers, Prof. Robin Cowan, Dr. Elsa Estevez, Dr. Tomasz Janowski, Dr. Rita Walczuch, and the ICEGOV reviewers.

## 9. REFERENCES

- [1] United Nations United Nations e-Government Survey 2008: From e-Government to Connected Governance. United Nations, New York, 2008.
- [2] Agranoff, R. and McGuire, M. Multinetwork Management: Collaboration and the Hollow State in Local Economic Policy. *Journal of Public Administration Research and Theory*, 8, 1998, 67-91.
- [3] 6, P. Joined-Up Government in the Western World in Comparative Perspective: A Preliminary Literature Review and Exploration. *Journal of Public Administration Research and Theory*, 14, 2004, 103-138.
- [4] Janowski, T., Pardo, T. A. and Davies, J. Government Information Networks - Mapping Electronic Governance cases through Public Administration concepts. *Government Information Quarterly*, 29, 2011, 1-10.
- [5] Dawes, S. S. Interagency Information Sharing: Expected Benefits, Manageable Risks. *Journal of Policy Analysis and Management*, 15, 1996, 377-394.
- [6] Gil-Garcia, R. J., Chengalur-Smith, I. and Duchessi, P. Collaborative e-Government: impediments and benefits of information-sharing projects in the public sector. *European Journal of Information Systems*, 16, 2007, 121-133.
- [7] Laskaridis, G., Markellos, K., Markellou, P., Panayiotaki, A., Sakkopoulos, E. and Tsakalidis, A. E-government and Interoperability Issues. *International Journal of Computer Science and Network Security*, 7, 2007, 28-38.
- [8] Gil-Garcia, J. R., Pardo, T. and Cresswell, A. M. Conceptualizing inter-organizational information integration in government. ME Sharpe, 2010.
- [9] Bekkers, V. The governance of back-office integration. *Public Management Review*, 9, 2007, 377 - 400.
- [10] Commission of the European Communities. Towards interoperability for European public services. COM(2010) 744 final. Brussels, 2010.
- [11] EPAN. Key Principles of an Interoperability Architecture. Technical Report. Brussels, 2004.
- [12] dos Santos, E. M. and Reinhard, N. *Interoperability standards and e-Government: perspectives and challenges*. Twelfth Americas Conference on Information Systems, 2006.
- [13] Gottschalk, P. Maturity levels for interoperability in digital government. *Government Information Quarterly*, 26, 2009, 75-81.
- [14] Jiménez, C. E. Impacto de la Ley Reguladora del Uso de las TIC en la Administración de Justicia (Impact of the Law Regulating the Use of ICT in the Administration of Justice). Centre of Legal Studies and Specialised Formation (CEJFE), Barcelona, 2012.

- [15] Fountain, J. Building the Virtual State: Information Technology and Institutional Change. Brookings Institution, Washington DC, 2001.
- [16] dos Santos, E. M. and Reinhard, N. Electronic Government Interoperability: Identifying the Barriers for Frameworks Adoption. *Social Science Computer Review*, 30, 2012, 71-82.
- [17] Scholl, H. J. and Klischewski, R. E-Government Integration and Interoperability: Framing the Research Agenda. *International Journal of Public Administration*, 30, 2007, 889-920.
- [18] Pardo, T. Interorganizational information integration: A key enabler for digital government. *Government Information Quarterly*, 2007, 691-715.
- [19] European Communities COM(2010) 245 final/2. A Digital agenda for Europe. European Communities, Brussels, 2010.
- [20] Klischewski, R. and Askar, E. Linking service development methods to interoperability governance: The case of Egypt. *Government Information Quarterly*, 2012, 22-31.
- [21] Kubicek, H. Governance of Interoperability in Intergovernmental Services - Towards an Empirical Taxonomy. *Journal of Systemics, Cybernetics and Informatics*, 6, 2009, 61-66.
- [22] Kubicek, H., Cimander, R. and Scholl, H. J. Organizational Interoperability in E-Government: Lessons from 77 European Good-Practice Cases. Springer, Heidelberg, 2011.
- [23] Pardo, T. and Burke, B. G. *IT Governance Capability: Laying the foundation for government interoperability*. Center for Technology in Government, Albany, 2009.
- [24] Pardo, T., Nam, T. and Burke, B. G. E-Government Interoperability: Interaction of Policy, Management, and Technology Dimensions. *Social Science Computer Review*, 30, 2012, 7-23.
- [25] Abramowicz, W., Bassara, A., Wisniewski, M. and Zebrowski, P. Interoperability Governance for e-Government. In *Proceedings of the International United Information Systems Conference* (Klagenfurt, Austria, April 22-25, 2008). Springer Verlag, Heidelberg, 2008.
- [26] Yang, T.-M., Zheng, L. and Pardo, T. The boundaries of information sharing and integration: A case study of Taiwan e-Government. *Government Information Quarterly*, 2011.
- [27] Estevez, E., Fillottrani, P. and Janowski, T. Information Sharing in Government - Conceptual Model for Policy Formulation. *European Conference on e-Government, ECEG*, 2012, 152-162.
- [28] Estevez, E., Fillottrani, P., Janowski, T. and Ojo, A. *Government Information Sharing: A Framework for Policy Formation*. IGI Global, 2010.
- [29] Akbulut, A. Y. An Investigation Of The Factors That Influence Electronic Information Sharing Between State and Local Agencies. Louisiana State University, 2003.
- [30] Yang, T.-M. and Maxwell, T. A. Information-sharing in public organizations: A literature review of interpersonal, intra-organizational and inter-organizational success factors. *Government Information Quarterly*, 2011, 164-175.
- [31] Gasco, M. Approaching E-Government Interoperability. *Social Science Computer Review*, 30, 2012, 3-6.
- [32] Pardo, T., Nam, T. and Burke, B. G. E-Government Interoperability: Interaction of Policy, Management, and Technology Dimensions. *Social Science Computer Review*, 2011.
- [33] Ahn, M. J. Adoption of E-Communication Applications in U.S. Municipalities: The Role of Political Environment, Bureaucratic Structure, and the Nature of Applications. *The American Review of Public Administration*, 2010.
- [34] Gupta, B., Dasgupta, S. and Gupta, A. Adoption of ICT in a government organization in a developing country: An empirical study. *The Journal of Strategic Information Systems*, 17, 2008, 140-154.
- [35] Hung, S.-Y., Tang, K.-Z., Chang, C.-M. and Ke, C.-d. User acceptance of intergovernmental services: An example of electronic document management system. *Government Information Quarterly*, 26, 2009, 387-397.
- [36] Chu, P.-Y., Hsiao, N., Lee, F.-W. and Chen, C.-W. Exploring success factors for Taiwan's government electronic tendering system: behavioral perspectives from end-users. *Government Information Quarterly*, 2004, 219-234.
- [37] Chen, Y.-C. Citizen-Centric E-Government Services: Understanding Integrate Citizen Service Information Systems. *Social Science Computer Review*, 28, 2010, 427-442.
- [38] Jun, K.-N. and Weare, C. Institutional Motivations in the Adoption of Innovations: The Case of E-Government. *Journal of Public Administration Research and Theory*, 2010, 495-519.
- [39] Janssen, M., Joha, A. and Zuurmond, A. Simulation and animation for adopting shared services: Evaluating and comparing alternative arrangements. *Government Information Quarterly*, 26, 2009, 15-24.
- [40] Gasco, M. New technologies and institutional change in public administration. *Social Science Computer Review*, 21, 2003, 6-14.
- [41] Iacovou, C., Benbasat, I. and Dexter, A. S. Electronic Data Interchange and Small Organizations: Adoption and Impact of Technology. *MIS Quarterly*, 19, 1995, 465-485.
- [42] Nelson, M. L. and Shaw, M. J. Interorganizational System Standards Diffusion: The Role of Industry-Based Standards Development Organizations. University of Illinois, 2005.
- [43] Chen, M. Factors affecting the adoption and diffusion of XML and Web services standards for E-business systems. *International Journal of Human-Computer Studies*, 2003, 259-279.
- [44] Kuan, K. K. Y. and Chau, P. Y. K. A perception-based model for EDI adoption in small businesses using a technology-organization-adoption framework. *Information & Management*, 2001, 507-521.
- [45] Chwelos, P., Benbasat, I. and Dexter, A. S. Research Report: Empirical test of an EDI Adoption Model. *Information Systems Research*, 12, 2001, 304-321.
- [46] Parasie, N. Adoption of E-Government Standards: Increasing Interoperability in the Public Sector. VVB Lauferweiler Verlag, Giessen, 2010.
- [47] Veit, D. and Parasie, N. *Common Data Exchange Standards: Determinants for Adoption at the Municipal Level*. 6th Americas Conference on Information Systems, 2010.

- [48] Andersen, K. N., Veit, D., Medaglia, R. and Henriksen, H. Z. One Inch Wide and One Inch Deep: The Role of Policies in Shaping the Adoption of Open Standards and Software in Government. In *Proceedings of the Electronic Government and the Information Systems Perspective (EGOVIS)*, 2010.
- [49] Hellman, R. *Organisational Barriers to Interoperability*. eChallenges e-2010 Conference, 2010.
- [50] European Communities. IDABC European Interoperability Framework for Pan-European eGovernment Services. European Commission, Brussels, 2004.
- [51] Heeks, R. and Santos, R. *Understanding Adoption of e-Government: Principals, Agents and Institutional Dualism*. Working Paper No. 19, Centre for Development Informatics, 2009.
- [52] Rogers, E. *Diffusion of Innovations*. Free Press, New York, 2003.
- [53] Moore, G. C. and Benbasat, I. Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. *Information Systems Research*, 2, 1991, 192-222.
- [54] Venkatesh, V., Morris, M. D., Davis, G. B. and Davis, F. D. User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, 27, 2003, 425-478.
- [55] Landsbergen, D. and Wolken, G. Realizing the Promise: Government Information Systems and the Fourth Generation of Information Technology. *Public Administration Review*, 61, 2001, 206-220.
- [56] Samuelson, O. and Björk, B.-C. Adoption processes for EDM, EDI and BIM technologies in the construction industry. Hanken University, 2010.
- [57] Oliver, C. Determinants of Interorganizational Relationships: Integration and Future Directions. *Academy of Management Review*, 15, 1990, 241-265.
- [58] Tseng, P. T. Y., Yen, D. C., Hung, Y.-C. and Wang, N. C. F. To explore managerial issues and their implications on e-Government deployment in the public sector: Lessons from Taiwan's Bureau of Foreign Trade. *Government Information Quarterly*, 25, 2008, 734-756.
- [59] Brass, D. J., Galaskiewicz, J., Greve, H. R. and Wenpin, T. Taking Stock of Networks and Organizations: A Multilevel Perspective. *Academy of Management Journal*, 47, 2004, 795-817.
- [60] Schermerhorn, J. R. Determinants of Interorganizational Cooperation. *The Academy of Management Journal*, 18, 1975, 846-856.
- [61] Zhu, K., Kraemer, K. L., Gurbaxani, V. and Xu, S. X. Migration to open-standard interorganizational systems: network effects, switching costs, and path dependency. *MIS Quarterly*, 2006, 515-539.
- [62] Bala, H. and Venkatesh, V. Assimilation of Interorganizational Business Processes. *Information Systems Research*, 18, 2007, 340-362.
- [63] Crosby, B. C. and Bryson, J. M. Integrative leadership and the creation and maintenance of cross-sector collaborations. *The Leadership Quarterly*, 2010, 211-230.
- [64] Soares, D. and Amaral, L. Information Systems Interoperability in Public Administration: Identifying the Major Acting Forces through a Delphi Study. *Journal of Theoretical and Applied Electronic Commerce Research*, 6, 2011, 61-94.
- [65] Kamal, M. M. IT innovation adoption in the government sector: identifying the critical success factors. *Journal of Enterprise Information Management* 19, 2006, 192-222.
- [66] Kamal, M. M., Weerakkody, V. and Irani, Z. Analyzing the role of stakeholders in the adoption of technology integration solutions in UK local government: An exploratory study. *Government Information Quarterly*, 2011.
- [67] Teo, H. H., Wei, K. K. and Benbasat, I. Predicting Intention to Adopt Interorganizational Linkages: An Institutional Perspective. *MIS Quarterly*, 27, 2003, 19-49.
- [68] DiMaggio, P. J. and Powell, W. W. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48, 1983, 147-160.
- [69] Weitzel, T., Beimborn, D. and König, W. A unified economic model of standard diffusion: The impact of standardization cost, network Effects, and network topology. *MIS Quarterly*, 2006, 489-514.
- [70] Mohr, L. B. Determinants of Innovation in organizations. *American Political Science Review*, 63, 1969, 111-126.
- [71] Andersen, K. N., Veit, D., Medaglia, R. and Henriksen, H. Z. One Inch Wide and One Inch Deep: The Role of Policies in Shaping the Adoption of Open Standards and Software in Government. In *Proceedings of the Electronic Government and the Information Systems Perspective (EGOVIS)*, 2010.
- [72] Dawes, S. S. and Eglene, O. New models of collaboration for delivering e-government services: a dynamic model drawn from multi-national research. Working Paper. Center for Technology in Government, 2008.
- [73] Williams, C. B., Dias, M., Fedorowicz, J., Jacobson, D., Vilovsky, S., Sawyer, S. and Tyworth, M. The formation of inter-organizational information sharing networks in public safety: Cartographic insights on rational choice and institutional explanations. *Information Polity*, 2009, 13-29.
- [74] Tambouris, E., Tarabanis, K., Peristeras, V. and Liotas, N. *Study on Interoperability at Local and Regional Level*. European Commission, Brussels, 2007.