UNIVERSITÄT AUGSBURG
Universitätsbibliothek

OPEN ACCESS
OPUS AUGSBURG

Can national e-government standards find acceptance?

Daniel Veit, N. P. Parasie

Angaben zur Veröffentlichung / Publication details:

Veit, Daniel, and N. P. Parasie. 2009. "Can national e-government standards find acceptance?" In *2009 42nd Hawaii International Conference on System Sciences (HICSS), 5-8 January 2009, Waikoloa, HI, USA*, edited by Ralph H. Sprague Jr., 1–10. Los Alamitos, CA: IEEE. https://doi.org/10.1109/hicss.2009.103.

Nutzungsbedingungen / Terms of use:

licgercopyright

Dieses Dokument wird unter folgenden Bedingungen zur Verfügung gestellt: / This document is made available under these conditions:
Deutsches Urheberrecht
Weitere Informationen finden Sie unter: / For more information see:
https://www.uni-augsburg.de/de/organisation/bibliothek/publizieren-zitieren-archivieren/publiz/

Can National E-Government Standards find Acceptance?

Daniel J. Veit, Nils P. Parasie
Dieter Schwarz Chair of Business Administration and Information Systems
University of Mannheim, Business School
Schloss, 68131 Mannheim, Germany
{veit, parasie}@bwl.uni-mannheim.de

Abstract

In recent years many national e-government standards have been developed. Even though the definition of such standards may be a necessary condition for the creation of interoperable services, this alone does not make it a sufficient condition.

In this paper we report on the results of a quantitative empirical study on the acceptance of e-government standards in German municipalities. The study reveals a high awareness level of the German standard, as well as a positive level of acceptance. This is a sharp contrast to the low publicity of the European standard, which is hardly known among municipalities.

The outcome is interpreted with respect to the future development of standardization efforts. We argue that the alignment of such efforts with the requirements of public procurement legislation will play a major role.

1. Introduction

A substantial amount of commercial software solutions is available for the private sector to support the activities of "running a business". In past years many efforts were taken to enable the integration of legacy and company specific applications into one companywide Information System (IS) [7, 13, 19]. Clearly this is not an easy task as new and integrated IS impose changes to a company that affect the very way that its business is done. Activities in the public sector, on the other hand, are based on laws and regulations. With respect to procurement, for example, public requests for proposal (RFPs) need to take into account a multitude of regulations in order to ensure that the RFPs are carried out in a fair and non-discriminatory way [29]. A change of administrative processes for a new IS installation does not represent an option, unless the law can be changed accordingly. For the success of the new system it is thus crucial that it can be customized to abide by the law. Software solutions for the public sector may therefore be required to incorporate an even better flexibility for customization than their private sector counterparts, if they are intended to be used in more than one administration. In countries with a federal government structure the implementation of binding IS strategies for the public sector is especially complicated. In Germany, for example, there are over 20.000 independent public administrations. Each of these is running up to several hundred specific applications [24]. But interdependencies between public organizations are even greater than between their private sector counterparts [3, 4]. Thus, while the nature of federalism suggests a certain diversity and competition among legally independent administrations, there is a strong need for interaction and cooperation between these independent partners.

In order to achieve a transformational stage of e-government, integration is needed between the numerous applications in each administration, as well as between the administrations themselves. Given that (a) many different applications are used in each administration and (b) the need for interaction among legally independent administrations is high, the development of common standards can be seen as a prerequisite for an integrated e-government. Without national and international standards, IS applications for the public sector may become isolated and fail to achieve the transformational stage of e-government. In recent years national e-government standards have been developed by several countries [12, 16, 20]. In this paper the term e-government standard is understood as a comprehensive document published at the federal level of a country or a group of countries (e.g. the European Union) which comprises guidelines and recommendations for the implementation of e-government services. The goals of these documents are to foster economies of scale and interoperability by supporting e-government executives in the selection of appropriate technical

standards and through giving common guidelines [20].

This paper is organized as follows. In Section 2 we give an overview on the most prominent e-government standards of industrialized countries and on the current literature. In Section 3 we focus on the results of an empirical study on the acceptance of national and international e-government standards in German municipalities. In Section 4 we discuss the results and give an interpretation of the effects of these findings. Section 5 concludes the paper and outlines further research.

2. Overview on e-government standards in industrialized countries

2.1 Characteristics of e-government standards

The goal of e-government standards is to foster interoperability and economies of scale. In an exploratory study Parasie and Veit [20] analyze ten national and international e-government standards (Austria, Australia, Belgium, Canada, Denmark, European Union, Germany, United Kingdom, United States, and New Zealand). All of these standards were published at the highest federal level in the particular country, as they aim to improve interoperability on a national and international scale. The results show that the recommendations given in these documents are generally made up of three domains: (a) technical standards, (b) data standards and (c) software architectures (cp. Figure 1).

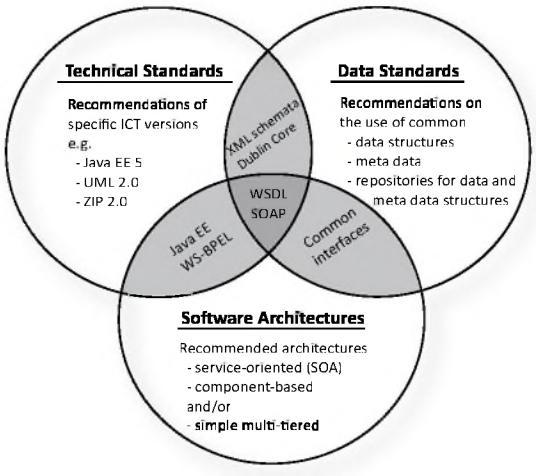

Figure 1. **Characteristics of e-government standards**
Source: [20]

The highest level of detail is given in the recommendations of **technical standards**. Comprehensive lists of specific versions of information and communication technologies (ICT) are given in this domain to guide e-government representatives in the development of new applications. The focus of the recommendations is on open standards. This term is defined by the European e-government standard as follows [9, p. 9]:

- *The standard is adopted and will be maintained by a not-for-profit organization, and its ongoing development occurs on the basis of an open decision-making procedure available to all interested parties (consensus or majority decision).*
- *The standard has been published and the standard specification document is available either freely or at a nominal charge. It must be permissible to all to copy, distribute and use it for no fee or at a nominal fee.*
- *The intellectual property - i.e. patents possibly present - of (parts of) the standard is made irrevocably available on a royalty free basis.*
- *There are no constraints on the re-use of the standard.*

In the recommendations on **data standards** the use of XML is advised as the technical standard in all ten countries (only the US and Australia do also recommend the Electronic Data Interchange standard). Approaches to standardize data structures differ between the ten countries, five of which support central repositories which help to foster common structures.

In the domain of **software architectures** recommendations are given to use service-oriented architectures (SOA) in all ten countries (only the EU, Germany and the US do also recommend component-based and simple multi-tier architectures). Compared with the two previously mentioned domains, the level of detail provided with the recommendations of software architectures is low [20].

2.2 Literature on e-government standards and interoperability

According to the economic theory of network effects the benefits of using a standard are positively correlated with the number of agents adopting the standard [10, 15, 23]. A distinction can be made between direct network externalities, indirect network externalities and externalities resulting from the availability of experience and support networks for a specific standard [15, p. 424]:

Direct externalities are realized through increased possibilities of communication if more agents adopt a specific standard. Indirect externalities arise from complementary products that become available as a standard gets higher acceptance. Externalities from experience and support networks arise when a standard is complemented by a rising number of qualified agents offering support in its use [15].

Up to 50 percent of the economic activities in developed countries are made up by the public sector [14]. Given the strong need for interaction between public administrations [3, 4] and considering the public sector's mission to efficiently use its resources, we conclude that standardization plays an important role in the development of integrated e-government solutions. However, positive network externalities may only be realized, if the public sector commits itself to the use of common standards and at the same time avoids situations of technology lock-in, i.e. a selection of standards that turn out to be unsuccessful or that incur excessive license fees once fully adopted [23]. The e-government standards, which were introduced in the previous section, aim to do precisely that: they guide officials in the selection of appropriate technical standards, data standards and software architectures, in order to maximize the use of common standards, while avoiding situations of technology lock-in. Further analyzes of e-government standards have been conducted by Guijarro [12], Klischewski [16] and Scholl [22].

Guijarro [12] analyzes the e-government standards of the six countries Denmark, European Union, France, Germany, United Kingdom and United States. The results show that all documents comprise comprehensive recommendations of technical standards. Guijarro argues that this can be seen as a basic enabler for a first stage of interoperability, while organizational interoperability along with an alignment of administrative procedures may be reached in a second stage once the basic interoperability has been achieved [12].

Klischewski [16] identifies information integration and process integration as two prominent concepts that can be found in the e-government standard of the EU [8, 9] and the US [26]. The European standard encourages the development of business interoperability interfaces and thus clearly supports the concept of **process integration**, i.e. the development of inter-organizational business processes and workflows. The e-government standard of the US, on the contrary, supports the concept of **information integration**, i.e. the inter-organizational exchange of electronic data, by highlighting the functional structure of the public administration [16].

While the definition of common standards can be seen as a necessary condition for interoperability and integration in the public sector, this alone does not make it a sufficient condition. Studies on e-government development demonstrate that a stage of inter-organizational integration has not been reached in the public sector so far [1, 2, 5, 25, 27]. Scholl [22] finds that the success of interoperability initiatives also depends on leadership support in the relevant institutions and on appropriate incentives for collaboration.

In federally organized countries the use of common e-government standards cannot easily be imposed by law. This is exemplified by a recent discussion between the German federal government and the federal states, in which the latter argue that binding e-government standards could undermine the very principle of federalism [17]. Scharpf [21] argues that a controlled deviation from joint decisions must be possible in order to sustain efficient coordination processes in federalism. Thus the success of common standards depends on the acceptance that they find among the individual administrations.

The contribution of this paper is an investigation into the acceptance of e-government standards in Germany. In the next section we present the results of an empirical study on the acceptance of the German and of the European e-government standard in German municipalities.

3. Acceptance of e-government standards in Germany – an empirical test

3.1 Research model and hypotheses

The use of compatible technologies as well as a selection of mature versions of these technologies is crucial for the establishment and maintenance of high service levels for e-government applications. However, the question arises about where and how e-government standards should be developed and maintained.

Consider for example the maintenance of user data in a public library, where the user should be able to register and get a current view of his account and the books he has currently lent. The RFP for such a system has to include both: the process description including a specified service level for the customers, as well as the technical specification in order to guarantee the integration into the municipality's ICT infrastructure. The former has to be individually defined by the library, whereas the technical specification can be done by a reference to the appropriate standards. This would grant the

interoperability and reduce the necessity of technical specifications in the individual case by having the standardization process conducted beforehand.

The example above shows the strong normative power of the authority defining the e-government standard. So far e-government standards have been published by institutions at the highest federal level [20], which can be an obstacle for the acceptance of those standards at the lower federal levels, as discussed in the previous section.

Germany is a federal republic. The power of the government is divided between the federal level, the federal state level and the municipal level. There are two e-government standards relevant for Germany. One is the document "Standards and Architectures for e-Government Applications" (SAGA, version 3.0) [11] and the other one is the "European Interoperability Framework" (EIF, version 1.0) [9]. The former is a standard developed at the federal level, which is published and maintained by the "Coordination and Advisory Agency for IT in the Federal Administration" (KBSt) of Germany's Federal Ministry of the Interior. It aims at supporting e-government activities on all federal levels. The latter is a standardization document provided by the "Interoperable Delivery of European eGovernment services to public Administrations, Businesses and Citizens" (IDABC), a division of the European Commission. The goal of the EIF is to enhance the national e-government standards by a pan-European dimension.

The reference to an e-government standard increases interoperability and reduces the amount of complexity in the preparation of RFPs at the local procurement offices. Therefore, we suppose that there is a positive acceptance of the German and of the European e-government standard in German municipalities, despite the fact that these were developed at high federal levels.

H1a: There is a positive acceptance of the German e-government standard SAGA in German municipalities.

H1b: There is a positive acceptance of the European e-government standard EIF in German municipalities.

Nevertheless, the German e-government standard is a rather substantial document (the English version of SAGA is made up of 185 pages [11]). It can be assumed that bigger municipalities have better capacities at their disposal to consider the standard and thus show a higher level of acceptance.

H2: The acceptance of SAGA is positively correlated with the city size.

As it is the goal of the European e-government standard EIF to enhance the national standards with a pan-European dimension, but not to compete with them, we suppose that municipalities which adopt SAGA are also more likely to adopt the EIF.

H3: The acceptance of SAGA is positively correlated with the awareness for the EIF.

Furthermore, municipalities which outsource the creation of their e-government services may be less likely to accept the SAGA standard, as interoperability challenges become the responsibility of the external service provider.

H4: Municipalities which outsource the creation of their e-government services are less likely to accept SAGA.

3.2 Survey design

This study aims at the analysis of the acceptance of SAGA and the EIF on the lowest federal level in Germany, which is represented by the municipalities who deliver the largest number of e-government services.

The acceptance of SAGA and the EIF was measured in cooperation with the German Association of Cities (Deutscher Städtetag) which is the head organization of 214 German municipalities (Deutscher Städtetag, www.staedtetag.de, access date 06/14/2008). It represents all cities with a population above 100'000, with the exception of two cities, and a uniform distribution of municipalities with populations between 10'000 and 100'000. This distribution of cities is shown in Figure 2 in descending order.

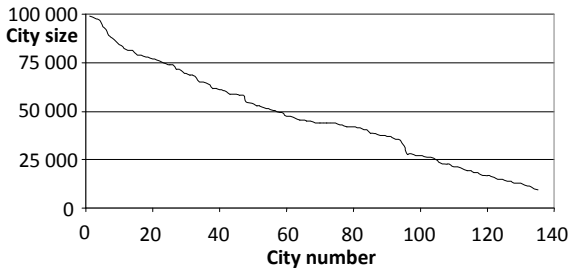

Figure 2. Distribution of cities with a population of less than a 100'000, descending order

Three different survey methods are available for a nationwide empirical study of municipalities. These are telephone interviews, mailed questionnaires and online surveys. While the first two methods are expensive and time consuming, online surveys can be

conducted in a very efficient manner. As all of the municipalities in our sample have got a website and as the questionnaires were directed at the e-government officials in the communities, we concluded that an online survey would be appropriate for our study.

The survey covers the acceptance of the standards in several dimensions. The dimensions were measured using five point Likert [18] scales which ranged from one (strongly agree) to five (strongly disagree). Reliabilities of the answers for each dimension were measured with Cronbach's [6] coefficient alpha. The reliabilities in our survey vary from 0.85 to 0.93 (cp. Table 1).

Pretesting of the survey was done with eight colleagues using cognitive pretesting methods. The probing method and the "think-aloud" method were used. In both methods the survey is filled out by a participant in the presence of an interviewer who communicates with the participant while the survey is filled out [28, pp. 42-64]. The resulting revisions of our survey included minor modifications of the questions and the dropping of a question item in one case.

The survey was conducted over a period of four weeks in January and February 2007. It was sent out to the e-government officials of all members of the German Association of Cities. A reminder was sent out one week before the survey deadline.

3.3 Results of the survey

A total of 214 municipalities were contacted in our survey, 95 of which completed the questionnaire. The resulting response rate is 44 percent. This particularly high response rate can be attributed in part to the support of the German Association of Cities.

In this section the results of the survey are presented in a descriptive manner. Figure 3 shows the answers to the initial questions on whether the participants know SAGA and the EIF. A total of 88.4 percent of the participants know the German SAGA standard or have heard of it before. A total of 23.1 percent of the participants know the European EIF standard or have heard of it before.

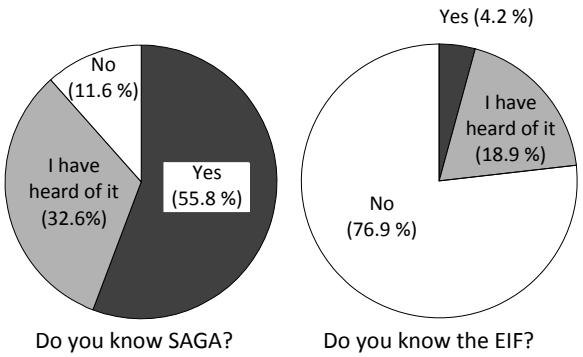

Figure 3. Awareness of the German (left) and of the European standard (right)

Participants who know or have heard of SAGA before were asked about their acceptance of the standard in four dimensions with three question items each. Figure 4 shows the resulting mean values for each dimension on a scale from one (strong acceptance) to five (no acceptance).

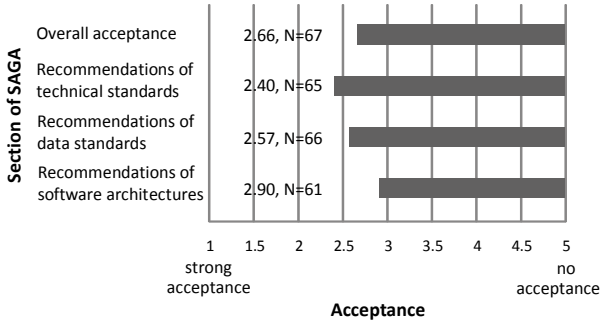

Figure 4. Acceptance of the SAGA standard

For the *overall acceptance* of SAGA respondents were asked whether they respect the standard in their e-government services. This overall acceptance is 2.66 (N=67 participants). The result was compiled from three question items with a reliability of α=0.88 (cp. Table 1).

The dimension *recommendations of technical standards* captures whether respondents respect the technical recommendations given in the SAGA document when choosing appropriate technologies for their e-government services. The acceptance of the recommended technical standards is 2.40 (N=65 participants). This result was compiled from three question items with a reliability of α=0.91 (cp. Table 1).

The dimension *recommendations of data standards* captures whether respondents respect the recommendations about modeling and standardizing data to allow for data exchange with other e-government services. The acceptance of these recommendations of data standards is 2.57 (N=66 participants). This result was compiled from three question items with a reliability of α=0.93 (cp. Table 1).

The dimension *recommendations of software architectures* captures whether respondents deliberately selected one of the software architectures specified in the standard. The acceptance of these recommendations is 2.90 (N=61 participants). This result was compiled from three question items with a reliability of α=0.90 (cp. Table 1).

Table 1. Reliability of the survey by dimension

Dimension	Cronbach's alpha	Number of items
Overall acceptance of SAGA	0.88	3
Recommendations of technical standards	0.91	3
Recommendations of data standards	0.93	3
Recommendations of software architectures	0.90	3
Overall acceptance of the EIF	0.90	3
Use of English for the technical back-end	0.92	3
Use of external service providers	0.85	2

Participants who had stated that they know or have heard of the European EIF standard (23.1 percent) were also asked about their acceptance of the standard. However, only 7.4 percent (N=7 participants) were able to answer those questions, resulting in an acceptance of 2.86, which was compiled from three question items with a reliability of α=0.90 (cp. Table 1).

All participants of the survey were asked about the languages available at the front-end of their e-government services, as multilingualism is strongly recommended in the EIF. The results are shown in Figure 5. In addition to German which is offered by all municipalities, 8.4 percent of the participants offer services in English, 3.2 percent offer services in French, 2.1 percent in Spanish and 1.1 percent of the participants offer services in Czech.

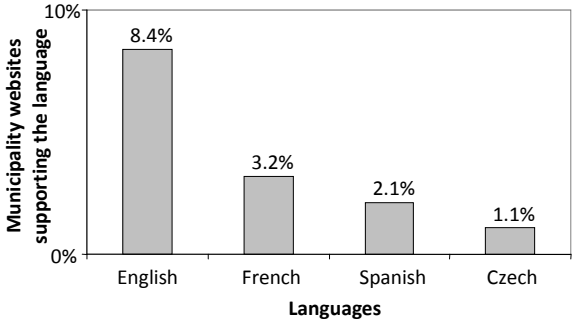

Figure 5. Supported languages at the front-end

The EIF further advises to keep information architectures at the back-office level "linguistically neutral" [9, p. 8]. In this survey all participants were asked about the degree to which they use English as a language for development, data structures and documentation at the technical back-end of their applications. The results are shown in Figure 6. The mean value of the support for English at the technical back-end is 4.53 (N=63 participants) on a scale from one (strong support) to five (no support). This result was compiled from three question items with a reliability of α=0.92 (cp. Table 1).

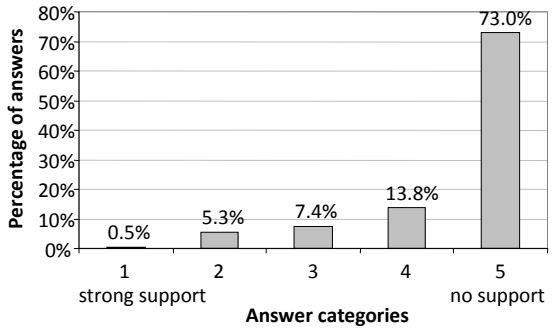

Figure 6. Use of English at the technical back-end

Participants of the survey were asked about the degree to which external service providers are used in the creation of their e-government services. The degree to which external services providers are used is 2.15 (N=88 participants) on a scale from one (heavy use of external service providers) to five (no use of external service providers). This result was compiled from two question items with a reliability of α=0.85 (cp. Table 1).

3.4 Analysis of the results

The results of the survey show a positive acceptance level of the German SAGA standard among the participants of the survey. In this section these results are further analyzed for their significance among the overall population of German municipalities.

A one-tailed t-test is used to analyze whether the acceptance levels of the four SAGA dimensions, of the EIF and of the use of external service providers are significantly better than the Likert scale's mean value of 3.0 which represents a neutral attitude towards using the standards on a scale from one (strong acceptance) to five (no acceptance). The null hypothesis of the one-tailed t-test is:

$$H_0: \mu \geq 3.0$$

μ equals the mean acceptance among the overall population. For the first three SAGA dimensions (overall acceptance, acceptance of technical standards and acceptance of data standards) the null hypothesis must be rejected at a p=0.01 significance level (cp. Table 2). These highly significant results show that the alternative hypothesis H_1: $\mu<3.0$ can assumed which confirms a positive acceptance of these dimensions in the overall population of German municipalities.

Table 2. One-tailed t-test on positive acceptance levels

Dimension	mean	T	df
Overall acceptance of SAGA	2.66	-2.58	66 (*)
Recommendations of technical standards	2.40	-4.68	64 (*)
Recommendations of data standards	2.57	-3.25	65 (*)
Recommendations of software architectures	2.90	-0.69	60
Overall acceptance of the EIF	2.86	-0.39	6
Use of external service providers	2.15	-7.61	87 (*)

* statistically less than 3.0 at a significance level of 1% or less

A positive acceptance of the recommendations of software architectures in the SAGA standard cannot be confirmed. The same holds for the overall acceptance of the European EIF standard.

The highly significant result of the use of external service providers shows a positive attitude among German municipalities towards the utilization of service providers for the creation of their e-government services (cp. Table 2).

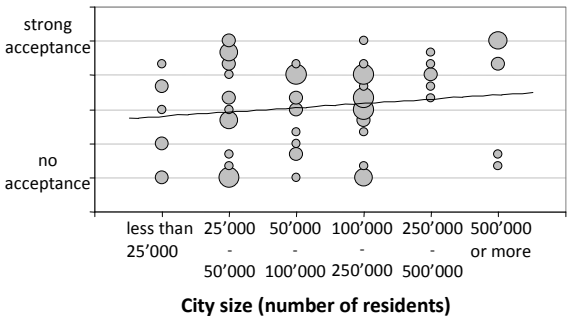

Figure 7. Acceptance of SAGA depending on the city size (R=0.23, p=0.04)

A bivariate analysis of correlation on the acceptance of the German SAGA standard shows a weak but positive correlation (R=0.23) with respect to the size of the municipalities (represented by the number of residents), which is significant at the 5% significance level (p=0.04). It can therefore be assumed, that bigger cities show a slightly higher acceptance of the German standard than smaller ones (cp. Figure 7).

It was further assessed whether there is a positive correlation between the acceptance of SAGA and the awareness for the EIF. A modest correlation can be found between these two variables (R_s=0.37) which is significant at the 1% significance level (p=0.00). The correlation is calculated using Spearman's rank correlation coefficient, because the awareness of the EIF was measured as an ordinal variable (cp. Figure 3).

A bivariate analysis of correlation was also done to assess whether the use of external service providers for the creation of e-government services has got an influence on the acceptance of SAGA. No significant correlation can be found between these two variables (R=-0.01, p=0.41).

Table 3. Hypothesis testing

	Variable	Coefficient	p	Support
H1a	Positive SAGA acceptance	m=2.66	0.01	YES
H1b	Positive EIF acceptance	m=2.86	0.36	NO
H2	Positive correlation between SAGA acceptance and city size	R=0.23	0.04	YES
H3	Positive correlation between SAGA acceptance and awareness for the EIF	R_s=0.37	0.00	YES
H4	Negative correlation between outsourcing and SAGA acceptance	R=-0.01	0.41	NO

Coefficients: m=mean
R=Pearson's product-moment correlation coefficient
R_s=Spearman's rank correlation coefficient

4. Discussion

4.1 Acceptance of e-government standards

Hypothesis 1a is supported. The results of the survey show a high awareness level as well as a positive acceptance of the German e-government standard SAGA in the municipalities. Recommendations of technical standards and data standards make up the most detailed parts of e-government standards [20]. In this study we find that the recommendations of technical standards and data standards also represent the most accepted parts of the German e-government standard. This indicates that the recommended common standards are actually being used by the municipalities, thus supporting better interoperability and positive network externalities.

Hypothesis 2 is also supported. A significantly positive but weak correlation is found between the city size and its acceptance of the German standard. This implies that bigger cities generally show a higher acceptance level of the standard, possibly because they have more capacities for considering the document and its implications.

Hypothesis 3 is supported. A significantly positive and modest correlation is found between the acceptance of SAGA and the awareness for the EIF. This indicates that municipalities which adopt the SAGA standard are also more likely to adopt the EIF.

4.2 Non-significant results

Unexpected results are also interesting to evaluate. Hypothesis 1b is not supported. The awareness level of the European EIF standard is low in the municipalities and its acceptance cannot be confirmed to be significantly positive. The results further show that e-government services of German municipalities do not provide multilingual websites in most cases and that the development, data structure design and documentation of the systems are not carried in English language so far. This confirms the result of the low awareness for the European EIF standard which recommends multilingual front-ends and linguistically neutral technical back-ends [9]. It can be seen as an indication that e-government services in Germany are mostly focused on their national origin so far.

Hypothesis 4 is also not supported. Unlike our expectations no significant correlation can be found between the use of external service providers for the creation of e-government services and the acceptance of SAGA. A possible explanation for this could be the high acceptance for outsourcing among municipalities as reported in sections 3.3 and 3.4.

Another potential explanation for this could be the use of e-government standards in public RFPs. While we hypothesized that the contracting company does not have an interest in the use of specific standards, municipalities could explicitly require compliance to selected parts of SAGA in their RFPs.

4.3 Research implications

Compliance to the German SAGA standard as well as to the European EIF standard is optional for German municipalities. The overall positive acceptance of the German standard indicates that the guidelines and recommendations are being used by the administration, thus supporting the goals of better interoperability and economies of scale. However, while the acceptance of SAGA is significantly positive, in the sense that it is better than an average acceptance of m=3 on a scale from 1 (strong acceptance) to 5 (no acceptance), it is still not overwhelmingly positive (the mean value for the overall acceptance is m=2.66). A possible explanation for this could be that fact that SAGA is published at the highest federal level and must take into account a multitude of heterogeneous requirements by different administrations, which might prove to be an obstacle for the acceptance at the level of the local administrations.

A second explanation could be the fact that even though a reference to standards can be meaningful

from an economic perspective, this approach faces limitations due to the conditions of public procurement laws, namely the principle of non-discrimination which was agreed on by the members of the World Trade Organization (WTO) as part of the plurilateral Agreement on Government Procurement (GPA) [29]. Thus even compliance to a small subset of an e-government standard may not hold as a mandatory condition in an RFP, as a bidder who is providing an offer not based on the specified standards may be able to document the equivalence of his solution.

Future research could be conducted to reveal how the acceptance of national e-government standards can be improved even further and how much their relevance is in fact affected by the nature of the public procurement laws.

5. Conclusion

National standards for e-government have been published by an increasing number of countries in recent years. The term e-government standard can be understood as a comprehensive document published at the federal level of a country or a group of countries which comprises guidelines and recommendations for the implementation of e-government services. The goals of these documents are to support economies of scale and interoperability for e-government solutions. Three domains can be identified which are covered by e-government standards, these are recommendations of (1) technical standards, (2) data standards and (3) software architectures.

In this study we find that there is a significantly positive acceptance of the German e-government standard SAGA in German municipalities. A significantly positive acceptance can also be found for the recommendations of technical standards and data standards. Furthermore we find that the acceptance of the German e-government standard is significantly positively correlated with the municipality size.

The European e-government standard EIF on the other hand is hardly known among German municipalities. Its acceptance cannot be found significantly positive and its implications like multilingual websites and linguistically neutral information architectures have so far had little impact on German municipalities.

Given these results we conclude that national e-government standards do matter for the municipalities, thus supporting the goals of economies of scale through a pre-selection of appropriate technical and data standards at the federal level, as well as better interoperability through the use of these common recommendations, which may further enhance the use of these standards through positive network externalities. The results also lead to the conclusion that e-government activities in Germany are mostly focused on their national origin so far, as the international e-government standard EIF is not utilized by the municipalities.

Future research on e-government interoperability has to reveal where standards should be developed and how binding they are made for public administrations. Both issues are currently part of a heavy debate between the federal government and the federal states in Germany [17].

The success of interoperable e-government services in the future could largely depend on the successful national and international placement of e-government standards, in a way that further increases their acceptance at the local administrations. A critical enabler for this will be the degree to which standardization can be accomplished in accordance to public procurement laws.

6. References

[1] Accenture, "Leadership in Customer Service: New Expectations, New Experiences", http://www.accenture.com/xdoc/ca/locations/canada/insights/studies/leadership_cust.pdf, 2005, access date: 05/27/2008.

[2] Becker, J., Niehaves, B., Algermissen, L., Delfmann, P., and Falk, T., "eGovernment Success Factors", in: EGOV 2004, R. Traunmüller (ed.), Springer, Heidelberg, 2004, pp. 503–506.

[3] Bozeman, B., and Bretschneider, S., "Public Management Information Systems: Theory and Prescription", Public Administration Review, vol. 46: Special Issue: Public Management Information Systems, 1986, pp. 475-487.

[4] Bretschneider, S., "Management Information Systems in Public and Private Organizations: An Empirical Test", Public Administration Review, vol. 50: 5, 1990, pp. 536-545.

[5] Capgemini, "Online Availability of Public Services: How is Europe Progressing?", http://ec.europa.eu/information_society/eeurope/i2010/docs/benchmarking/online_availability_2006.pdf, 2006, access date: 05/27/2008.

[6] Cronbach, L.J., "Coefficient Alpha and the Internal Structure of Tests", Psychometrika, vol. 16: 3, 1951, pp. 297-333.

[7] Davenport, T.H., "Putting the Enterprise Into the Enterprise System", Harvard Business Review., vol. 76: 4, 1998.

[8] European Commission, "Architecture Guidelines - For Trans-European Telematics Networks for Administrations", http://ec.europa.eu/idabc/servlets/Doc?id=19280, IDABC, 2004, access date: 05/27/2008.

[9] European Commission, "European Interoperability Framework for Pan-European eGovernment Services", http://ec.europa.eu/idabc/servlets/Doc?id=19529, IDABC, 2004, access date: 05/27/2008.

[10] Farrell, J., and Saloner, G., "Installed Base and Compatibility: Innovation, Product Preannouncements, and Predation", The American Economic Review, vol. 76, 1986, pp. 940-955.

[11] German Federal Ministry of the Interior, "Standards and Architectures for eGovernment Applications", http://www.kbst.bund.de/cln_012/nn_837392/SharedDocs/Anlagen-kbst/Saga/saga__3__0__en.html__nnn=true, Federal Government Co-ordination and Advisory Agency for IT in the Federal Administration, 2006, access date: 06/14/2008.

[12] Guijarro, L., "Interoperability frameworks and enterprise architectures in e-government initiatives in Europe and the United States", Government Information Quarterly, vol. 24: 1, 2007, pp. 89-101.

[13] Jinyoul, L., Keng, S., and Soongoo, H., "Enterprise integration with ERP and EAI", Communications of the ACM, vol. 46: 2, 2003, pp. 54-60.

[14] Joumard, I., Kongsrud, P.M., Nam, Y.-S., and Price, R., "Enhancing the Cost Effectiveness of Public Spending - Experience in OECD Countries", OECD Economic Studies, vol. 37, 2003, pp. 109-161.

[15] Katz, M.L., and Shapiro, C., "Network Externalities, Competition, and Compatibility", The American Economic Review, vol. 75, 1985, pp. 424-440.

[16] Klischewski, R., "Information Integration or Process Integration? How to Achieve Interoperability in Administration", in: Electronic Government, Springer, Berlin et al., 2004, pp. 57-65.

[17] Lemke, H., "Bessere IT-Governance durch mehr Bundeszuständigkeit? (in German)", eGovernment Computing, vol. 5-2008, 2008, p. 3.

[18] Likert, R., "A technique for the measurement of attitudes", Archives of Psychology, vol. No. 140, 1932.

[19] Linthicum, D.S., Enterprise Application Integration Addison-Wesley, Boston et al., 2000.

[20] Parasie, N., and Veit, D., "Nationale E-Government Standards - Mehr Interoperabilität durch zentrale Richtlinien?" in: Proceedings of the Multi-Conference Information Systems (Multikonferenz Wirtschafts-informatik, in German), Munich, 2008.

[21] Scharpf, F.W., "The Joint-Decision Trap Revisited", Journal of Common Market Studies, vol. 44, 2006, pp. 845-864.

[22] Scholl, H.J., "Interoperability in e-Government: More than Just Smart Middleware", in: Hawaii International Conference on System Sciences, Hawaii, 2005.

[23] Shapiro, C., and Varian, H.R., Information Rules: A Strategic Guide to the Network Economy, Havard Business School Press, Boston, MA, 1999.

[24] Tschichholz, M., and Fox, O., "Dienste statt Software - Architekturen für prozessorientiertes E-Government", in: Handbuch E-Government - Strategien, Lösungen und Wirtschaftlichkeit (in German), A. Zechner (ed.), Fraunhofer IRB Verlag, Stuttgart, 2007.

[25] United Nations, "UN Government Survey 2008: From E-Government to Connected Governance", http://unpan1.un.org/intradoc/groups/public/documents/un/unpan028607.pdf, 2008, access date: 05/27/2008.

[26] US Office of Management and Budget, "FEA Consolidated Reference Model Document", http://www.whitehouse.gov/omb/egov/documents/FEA_CRM_v20_Final_June_2006.pdf, Office of E-Government and Information Technology, 2006, access date: 05/27/2008.

[27] West, D.M., Digital Government: Technology and Public Sector Performance Princeton University Press, Princeton, Oxford, 2005.

[28] Willis, G.B., Cognitive interviewing: a tool for improving questionnaire design, Sage Publications, Thousand Oaks, 2005.

[29] World Trade Organization, "The plurilateral Agreement on Government Procurement", http://www.wto.org/english/docs_e/legal_e/gpr-94_e.pdf, GPA, 1994, access date: 06/06/2008.