CENTERIS 2014 - Conference on ENTERprise Information Systems

E-Government interoperability frameworks: a worldwide inventory

Ana Lisboa, Delfina Soares*

Universidade do Minho – Departamento de Sistemas de Informação – Centro ALGORITMI, Campus de Azurém, 4800-058 Guimarães, Portugal

Abstract

An e-government Interoperability Framework (IF) is a document or group of documents that specify a set of common elements such as vocabularies, concepts, principles, policies, guidelines, recommendations, standards, and practices for agencies that wish to work together, towards the joint delivery of public services. IFs are seen by governments as promising instruments to boost the interoperability of their services and systems. Henceforth, many countries have created and published their IFs along the last years. To the best of our knowledge no study has been carried out so far in order to identify the comprehensive list of countries that already have an IF. We argue that the existence of such a list would be very useful and valuable for both practitioners and researchers communities. Hence, this study addresses the question *which is the worldwide comprehensive list of countries that currently have an e-government Interoperability Framework?* To answer this question a worldwide survey that combined a web survey and a web questionnaire was conducted. The aim of this paper is to describe the effort and procedure done in order to conduct the worldwide survey and to present the results achieved with it.

1. Introduction

The achievement of better and more adequate levels of interoperability is currently considered one of the most relevant aims and, simultaneously, one of the most challenging tasks faced by Information System (IS) managers of public administration agencies.

---

* Corresponding author. Tel.: +351-253-510319; fax: +351-253-510300.
  E-mail address: dss@dsi.uminho.pt

Since the advent, by the end of the 90's, of the so called e-government phenomenon that pressure has been set on the need to transform the way public agencies operate. Notwithstanding the improvements that many countries have achieved at this level over the last years, the image of public agencies as operating as a "set of silos" hasn't yet fully disappeared. But public agencies need to operate in a jointly and articulated way, and not as islands of services among which citizens need to move, get easily lost, and waste time and money. A more citizen-centered and streamlined mode of operation is seen as mandatory, not only to boost the quality level of public services provided to citizens, but also to improve the internal efficiency and efficacy of agencies, to reduce their costs of operation, as well as to improve transparency and accountability [1].

With this goal in mind, many countries all over the world have been creating, publishing and adopting what is, for the most part, called Interoperability Frameworks (IFs). An IF is a document or group of documents that specify a set of policies, guidelines, recommendations, concepts, principles, vocabularies, standards and practices for agencies that wish to work together, towards the joint delivery of public services [2,3].

The e-GIF, launched in September 2000 in the United Kingdom by Minister Ian McCartney, is usually considered the first IF published. Since then, many other countries have published their national IFs, not only because they perceive them as an important instrument to foster and facilitate interoperability of public systems but also due to financial and political pressures set by prominent and powerful organizations and institutions such as the European Commission, United Nations, and the World Bank [4].

While there are currently many countries that already have their national IF, we can not state clearly which is the complete list of countries having such documents. Although there are some published works, such as [3,5,6,7,8], that mention various national IFs, in none of them the aim was to present the complete and exhaustive list of existent IFs, but to do a comparison of a subset of IFs of a specific group of countries.

To the best of our knowledge, no study has been carried out so far in order to identify the comprehensive list of countries that already have an IF. It is our opinion that the existence of such a list would be very useful and valuable for both practitioners and researchers communities. Hence, *which is the worldwide comprehensive list of countries that currently have an IF?* was set as the research question that guided the work reported in this paper. To answer this question a worldwide survey that combined a web survey and a web questionnaire was conducted. The aim of this paper is to describe the effort and procedure done in order to conduct the worldwide survey and to present the results achieved, namely the list of 46 countries that were identified as having a national IF, the list of 10 countries that were identified as not having a national IF, and the geographical distribution of countries with or without IF.

The paper is structured as follows. After this introduction, a contextualization about interoperability frameworks is provided, which is followed by a detailed description of the worldwide survey conducted. The data gathered through the web survey and the worldwide web questionnaire is analyzed and discussed. Finally, conclusions are drawn and future work is suggested.

2. E-Government interoperability frameworks

The Communication COM(2010) 744 from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions issued in December 2012, define an e-government Interoperability Framework as "an agreed approach to interoperability for organisations that wish to work together towards the joint delivery of public services" [2, p.2]. According to [6, p.8], an IF is "a strategic document containing specifications and standards to be followed in order to ensure interoperability among public administrations and their beneficiaries (citizens, businesses, other public administrations)". It "specifies a set of common elements such as vocabulary, concepts, principles, policies, guidelines, recommendations, standards, specifications and practices" [2, p.2], which provide guidance to practitioners about what to consider and do in order to enable seamless interaction within their public administration as well as with other public authorities" [9, p.8]. The common elements set in an IF may cover multiple issues at a technical, semantic, organizational, or even at a legal or political level.

IFs are seen as promising instruments to boost interoperability. Many practitioners and academics consider that the creation and publication of a national IF and its adoption by the multiple public agencies may, gradually, generate the appearing of a favorable environment to naturaly achieve interoperability. The existence of IFs may thus ending up contributing to the improvement of the quality of services provided to citizens, to the reduction of

agencies' operating costs, to the improvement of the coordination of government agency programmes, and to the increase of transparency and accountability of government [1].

All these expected benefits and all the entusiam around IFs may however be jeopardized due to the complexity that involves the process of creation, revision, adoption, and governance of an IF. Questions such as "who should lead the IF creation and revision?", "how should the creation and revision processes be guided?", "what should be the frequency of the IF revision?", "what should be the content of the IF?", "what standards should be included?", "what support services should be provided?", "who should provide those services?", "who should control and evaluate IF use and compliance?", and "what strategies should be adopted to ensure IF compliance?" need to be answered but are undoubetedly tricky and difficult to deal with. They constitute a challenge not only to practicioners but also to researchers, which have been directing their attention and their efforts to the study of IFs topic.

Most of the research conducted so far on this topic has been focused on the analysis and comparison of different national IFs. Good examples of these are the studies by [3,5,6,7,8]. In these works, authors use different analytic frameworks to compare particular sets of IFs. These studies were particularly interesting for this research because they allowed the quick identification of the IFs of an initial set of countries.

3. Study description

This section describes the process of data collection and analysis carried out in this study. As depicted in Figure 1, the work was organized in two main phases: *Web Survey* and *Web Questionnaire*. In the figure the rounded corner boxes represent activities and the light gray rectangles represent the results produced by those activities.
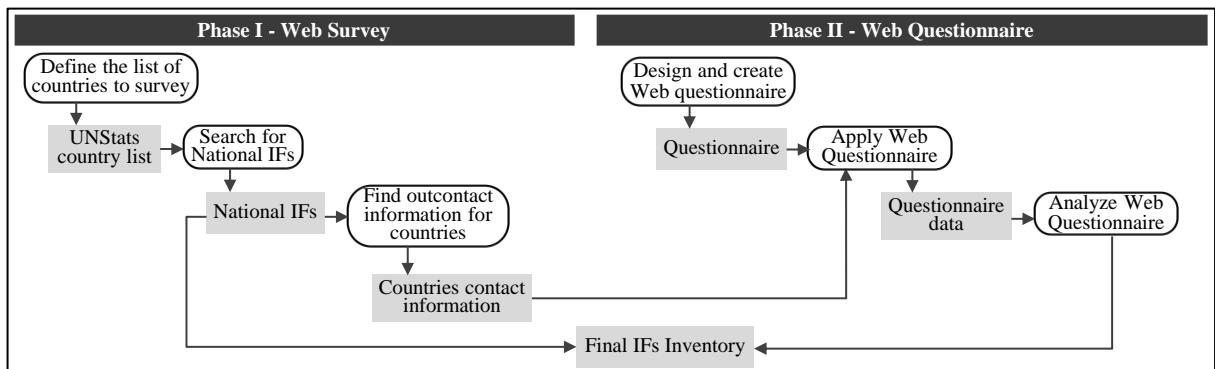

Fig. 1. Study phases.

Phase I involved an extensive and thorough web survey. This web survey was performed with three main objectives in mind: (i) to define the worldwide list of countries to use in the study, (ii) to find out and gather national IFs publically available on the web, and (iii) to obtain contact information that would be necessary to run the web questionnaire in phase II.

Three main activities were conducted during this phase. The first activity – *Define the list of countries to survey* – was easily performed. The decision was to adopt the United Nations Statistics Division world countries list (https://unstats.un.org/unsd/methods/m49/m49alpha.htm). This way we had the guarantee of using a complete and up to date list of countries.

Having the list, the second activity performed was to *Search for National IFs*. This activity involved the realization of a huge number of searches using the most known search services. The basic set of search keywords included: *Interoperability framework*; *Enquadramento de interoperabilidade*; *Cadre d'interopérabilité*; *Enquadramento de interoperabilidad*; *e-Government interoperability*; *Public administration interoperability*; *E-government standards*; *Standards for interoperability*. A set of 44 national IFs were found as result of this activity.

Finished the second activity, the subsequent activity – *Find out contact information for countries* – was performed. Its aim was to find out contact information for the 197 countries to which no IF has been found during activity 2 or for the 15 countries to which the founded IF was not in an understandable language for the research

team's members, i.e., in English, Portuguese, or Spanish. As such, the search for contact information comprehended a total of 212 countries. This search was a very demanding task, involving four main steps. In the first step, for each country we tried to identify and find out the contact for at least one of the following entities:

- To the public agency/ministry that was responsible for information systems and technologies at the national level
- To the public agency/ministry that was responsible for the public administration modernization initiative or for public administrative reformation national programmes
- To the public agency that was responsible for the national e-government development

If any of the entities was found its contact information was collected and used.

For countries to which none of the previous entities had been found, we had, in step two, searched for the contact of groups/associations that represent multiple countries, such as, for example, the African Union and the COMESA (*Common Market for Eastern and South Africa*), in order to try to obtain their help to identify the contacts of some of the missing countries.

In step three, we contacted the Portuguese Ministry of Foreigner Affairs also aiming to have their help in the identification of such entities for some of the missing countries.

Finally, in step four, we searched for the contact information of the embassies, set in Portugal, of countries for which we haven't yet found a contact to use. Our intention was to send the questionnaire to the embassy email contact and kindly ask them to redirect the questionnaire to the adequate public entity/ministry in their country.

By the end of this search process a total number of contacts to 150 countries were identified. For a total of 62 countries no contact information was found.

Finished Phase I, a second phase – *Web Questionnaire* – was started. The main objective of this questionnaire was to identify other national IFs that hadn't been identified during Phase 1. Additional information was also gathered for countries that explicitly indicated that they didn't have an IF.

Phase II involved three main activities. As the name suggests, the first activity – *Design and create Web questionnaire* – was focused on the elaboration of the questionnaire. The questionnaire was designed to be short and concise, so as to obtain the largest possible response rate. It was mainly composed of short and multiple choice questions, to avoid ambiguity of answers. Figure 2 details the structure of questions contained in the questionnaire.

The first three questions served to collect demographic information about the respondent, namelly the agency to which he belongs, his role in the agency and his email address. The remaining questions intended to identify if the country had an IF and, in that case, if there was an English, Portuguese or Spanish version of it and if it was possible to have access to it. If the country had no IF, the respondent was asked if there was any intention of creating an IF, the actual status of development of the IF, why did they decide to create it and who is the responsible entity for the IF creation. Finally, for countries that indicated that do not have an IF neither do they intended to create one, it was asked why this happened and if there are any other alternative similar documents in the country.

The questionnaire was created in the LimeSurvey open source survey software and hosted in a web server located in the university to which the research team members belong.

The second activity – *Apply the Questionnaire* – involved the application of the questionnaire. The email message, explaining the goal of the questionnaire and containing the URL where it was available for answer, was sent to 150 countries. These were countries for which no IF had been found during the Web survey or for wich an IF had been found but it was in a not understandable language for members of the research team and for which contact information had been found. The email message was sent from an institutional email address, and the additional contacts of the research team (phone number, mail address, etc.) provided were also institutional, in order to allow the verifiability of the questionnaire and of the contact. The questionnaire was available for answer during 53 days.
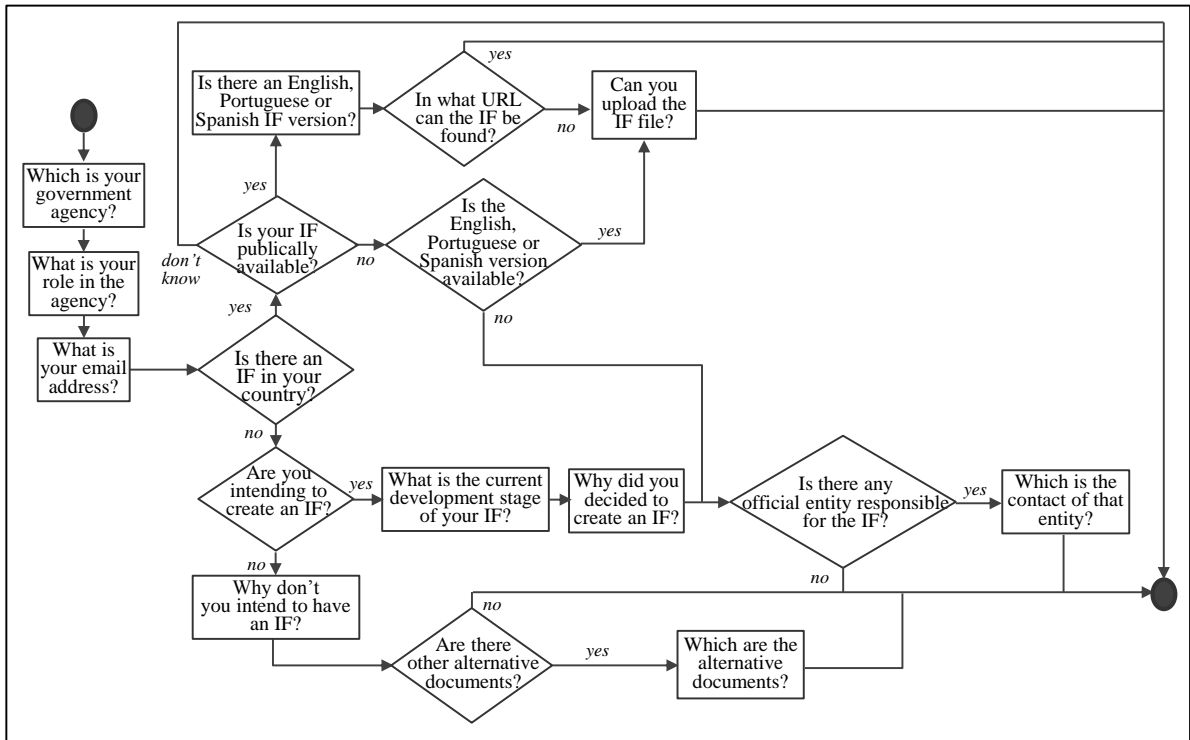
Fig. 2. Structure of questions used in the Web questionnaire.

Reached the closing date of the questionnaire, the third activity – *Analyze Web questionnaire* – was initiated. The details of the analysis are presented in next section.

4. Study results

4.1 Web survey results

As explained in section 3, the activities performed during Phase 1 produced the following results:

- The world countries list, which contained 241 countries
- The list of 44 IFs identified
- The list of contact information for 150 countries for the remaining countries no contact information was found

The list of contact information was fundamental to proceed to Phase II and determined the number of questionnaires that were sent. As explained previous in the paper, there were 62 countries that should also be in this list but that were not included because, despite the effort done, no contact information was found.

4.2 Web questionnaire results

Table 1 resumes the main figures concerning the application of the Web questionnaire. The questionnaire was sent to 150 countries. Of those, 28 countries did not successfully receive the questionnaire message due to reasons such as mailboxes quota exceeded, unrecognized addresses, server errors, or out of office auto-reply messages.

Twenty of the 122 countries to which the mail was successfully delivered answered the questionnaire. From those, 5 did not finished the answering process, being thus considered as incompleted answers. A total of 15 countries answered completly to the questionnaire, corresponding to 12,3% of valid answers. The analysis presented in next paragraphs is based on this set of 15 completed/valid answers.

Table 1. Main figures of the Web questionnaire

	Total	**Distribution by Continent**				
		Africa	*America*	*Asia*	*Europe*	*Oceania*
# of countries to which the questionnaire was sent	**150**	33	37	28	34	18
# of completed answers	**15**	0	4	0	11	0
# of incomplete answers	**5**	0	3	0	2	0
# of new IFs identified	**2**	0	1	0	1	0
# of countries that indicated not to have an IF	**10**	0	3	0	7	0

Analysis of respondents demographics

In what concerns their affiliation, 10 of the respondents belonged to ministerial or admininistrative units responsible for national management of information systems and technology (IST), for national e-government development, or for national administrative reform and modernization. The remaning five respondents were from the Ministry of Finance, Ministry of Interior and Ministry of Environmental Protection and Regional Development.

Concerning the role played by each respondent, three of them indicated to be an expert and a main responsible for the promotion and development of country interoperability strategies and initiatives, and five to be the main responsibles for national e-government programs and development. The remaining seven respondents were heads of IST units or senior advisers in the IST area.

In the last question of this group respondents were asked to provide their email address. Fourteen of them provided it. All the addresses provided belonged to governmental domains.

Analysis of IF data

The first question set about the IFs was "Does your country have an IF?". From the 15 responses, only five (33%) countries mentioned to have an IF. As shown in Figure 3, the remaining 10 countries (67%) explicitly incated that they didn't have it. From the five countries that indicated to have an IF, four have the IF publically available. In what concerns the IF language, only one of the five IFs identified were in one of the understandable languages, in the case in Spanish.
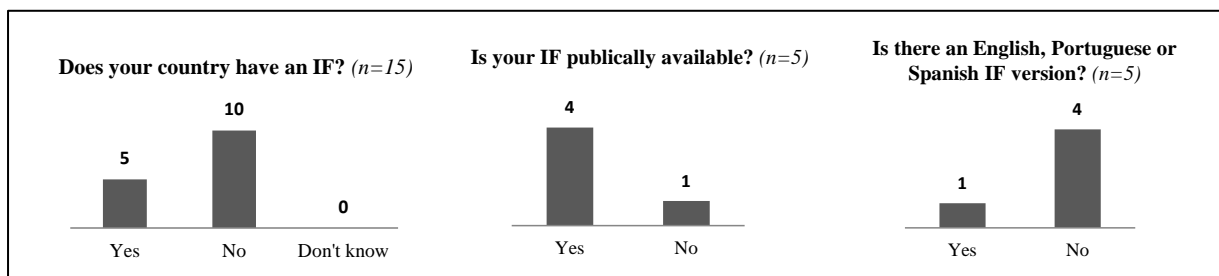

Fig. 3. Answers to the questionnaire.

The 10 countries that indicated not to have an IF were then questioned about their intention to create it. As depicted in Figure 4, eight of them confirmed their intention to do that, two of wich were already creating their IF and six were still planning to do it. These eight countries were then asked if *there was any oficial entity responsible for the IF creation*. According to the answers, only three of the eight countries had an entity responsible for the IF creation and revision.

The eight respondents that mentioned their intention to create an IF were also asked to indicate the reason why they decided to do that. Two of them indicated that it was to meet European Union directives and requirements, one that was due to the benefits that the IF might bring, and five because they considered the IF a fundamental instrument to implement digital whole-of-government initiatives and to achieve more eficient government.
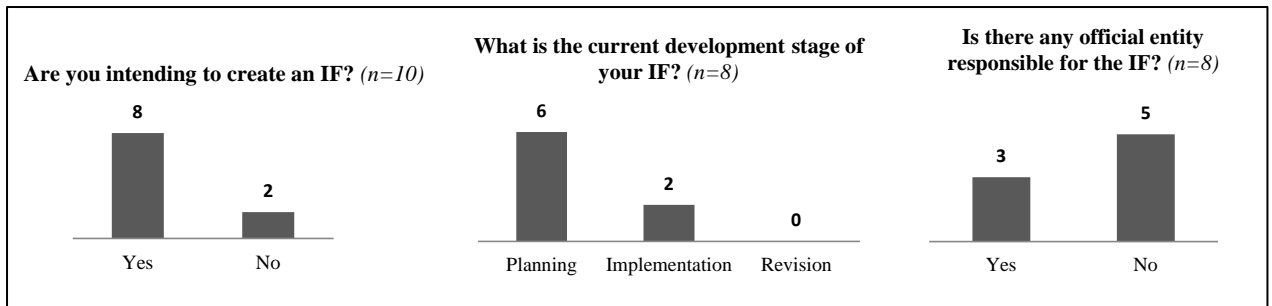
Fig. 4. Answers to the questionnaire.

In the same line, the two respondents that indicated that they didn't plan to have an IF were asked why. One of them answered that the reason was because neither didn't they know what an IF was nor didn't they understand the utility that an IF could have. The other respondent answered that there was in his country an alternative document, which was used mostly to deal with potential suppliers in the context of tendering of services provision.

5. Discussion

Combining the results of the two phases of the study, a total number of 46 national e-government IFs was inventoried, 44 through the Web Survey and two through the Web Questionnaire. It was also possible to identify a set of 10 countries that do not have an IF. Table 2 summarizes the main figures of the study. The list of countries analysed and the indication of the existence or inexistence of IF for each of them is provided in Appendix A.

As can be seen from Table 2, Europe and Asia are the continents where more IFs were identified. In Europe, 21 of the 53 existent countries, i.e. 42% of the countries, have IFs. This number may probably increase soon, since five other countries mentioned in the questionnaire that they are planning to (Czech Republic, Ireland, and Republic of Moldova) or are currently implementing (Iceland and Bosnia and Herzegovina) an IF. In Asia, this percentage is 30%, since 15 of the 50 countries have now an IF.

Table 2. Main figures of the study

	Total	*Distribution by Continent*				
		Africa	*America*	*Asia*	*Europe*	*Oceania*
# of countries	**241**	58	55	50	53	25
# of countries with IF	**46**	5	3	15	21	2
# of countries that do not have IF	**10**	0	3	0	7	0

The percentages obtained for the remaining continents are much lower. In Africa 5 (9%) of the 58 countries have an IF and in America 3 (5%) of 55 have it. The percentage in America may quickly rise to 11%, since three countries (Costa Rica, Haiti, and Canada) indicated in the questionnaire that they are planning to create their IF. Oceania has the lower percentage: from the 25 countries we only found 2 (8%) with an IF.

The higher numbers found in Europe may be the result of a set of policies, strategies and efforts that the Europeran Commission has set since 1995, mainly throught their IDA I, IDA II, IDABC, and ISA programmes, in order to promote and facilitate the improvement of interoperability at an European level, which have put some pressure on member state countries to create their national IFs. In Asia the number of IFs may also be the result of the existence of programs such as the UNDP that helped countries of the Asian-Pacific region with IST projects that may also promote the IFs [1].

It is important to remark that these numbers may actualy be slightly different, since we may have not identified and recorded all the existent IFs, namelly due to the unsisfactory response rate obtained to the questionnaire. While, if we take into account the typical response rates to questionnaires [10], we can't consider the response rate of the

web questionnaire too low, it was not, indeed, the intended one. One of the reasons for that may be the fact that some of the countries are political and culturally very closed and difficult to penetrate, what makes undoubtedly rise the probability of not getting an answer from them.

Figure 5 gives a snapshot of the geographical worldwide distribution of the identified IFs. In the figure, black markers represent the countries that confirmed not to have an IF and grey markers countries that have an IF.

Fig. 5. Geographical distribution of countries that have and that do not have IF.

It should be mentioned that, for a small number of countries, such as for example Argentina and Isle of Man, while no national IF were identified, some documents containing recommendations for public IS development and implementation, as well as documents approaching interoperability issues for some specific domains, were found. This reveals the existence of a awareness and a set of starting efforts of those countries in order to promote interoperability, being thus highly expected that, in a near future, they will ending creating and publishing their IFs.

6. Conclusion

The main objective of the research described in this paper was to provide a worldwide comprehensive list of countries that currently have an IF. While having a simple formulation and being easily understandable, this objective represented an ambitious, challenging, and risky endeavour for three reasons. First, its worldwide scale involved the search for IFs in all the countries of the world, the number of objects under analysis was huge, what demanded a significative work overload and effort from the research team. Second, because it involved the realization of a questionnaire. Due to their usual low rates of response, questionnaires are always efforts that comprise some risk of failure or unsuccess. The third reason was the inexistence of an already systematized list of contacts that could be used as basis to launch the questionnaire.

The elaboration of the list of contacts was, indeed, one of the main difficulties in this study, since it was not simple neither to find out, through web searches, the entity that was, at a national level, the more suited to answer the questionnaire, nor the specific contact to use in that entity. In order to produce a more complete and accurate list of contacts, a complex strategy, explained in section 3, that included the contact of embassies, ministries and country associations, was followed.

In what concerns the typical low questionnaire response rates, some actions were also taken to avoid it, namelly to keep the questionnaire as short, closed, and easy to answer as possible, and to run it from an institutional server and using institutional email addresses. The use of institutional contacts make the questionnaire and emails more verifiable and credible to respondents, what could hopefully generate in them a bigger propension to answer.

As future work we intend to keep following the development of interoperability initiatives in the multiple countries in order to find out new IFs and gradually produce a thoroughly, up to dated, and richier view of the existent and non existent IFs around the world. We intend also to improve and complete our contact list, either by including contacts of countries for which we haven't yet included it (there were 57 countries for which no contact

information was found) or by replacing the existent contacts of some countries by more relevant contacts that may be found. An additional work, that has already started, is the creation of a web portal, publically accessible, where all the identified IFs are registered. This portal should not only allow for the simple registration of the existence or not of an IF, but should also allow the registration of detailed information, concerning the identification, structure, content, and development, revision and implementation processes, for each IF. Other future works such as the analysis and comparison of the multiple identified IFs, similar to the works mentioned in section 2 performed by [5], [6], [3], [7] and [8] could be done using a more extensive list of countries. Yet other works focused, for instance, on understanding the process of governance of IFs or on how IFs are currently being accepted and adopted by the multiple public agencies in each of the countries, could be pursued.

The inventory presented in this paper, constitutes, in our opinion, a valuable instrument that may serve as the basis to support a stream of research studies about interoperability and particularly interoperability frameworks.

Acknowledgments

Appendix A. IFs inventory

AFRICA

Algeria	?	Egypt	Y	Mali	?	Sierra Leone	?
Angola	?	Equatorial Guinea	?	Mauritania	?	Somalia	?
Benin	?	Eritrea	?	Mauritius	Y	South Africa	Y
Botswana	?	Ethiopia	?	Mayotte	?	South Sudan	?
Burkina Faso	?	Gabon	?	Morocco	?	Sudan	?
Burundi	?	Gambia	?	Mozambique	Y	Swaziland	?
Cabo Verde	?	Ghana	?	Namibia	?	Togo	?
Cameroon	?	Guinea	?	Niger	?	Tunisia	?
Central African Republic	?	Guinea-Bissau	?	Nigeria	Y	Uganda	?
Chad	?	Kenya	?	Réunion	?	United Republic of Tanzania	?
Comoros	?	Lesotho	?	Rwanda	?	Western Sahara	?
Congo	?	Liberia	?	Saint Helena	?	Zambia	?
Côte d'Ivoire	?	Libya	?	Sao Tome and Principe	?	Zimbabwe	?
Democratic Republic of the Congo	?	Madagascar	?	Senegal	?		
Djibouti	?	Malawi	?	Seychelles	?		

AMERICA

Anguilla	?	Chile	?	Guatemala	?	Saint Kitts and Nevis	?
Antigua and Barbuda	?	Colombia	Y	Guyana	?	Saint Lucia	?
Argentina	?	Costa Rica	N	Haiti	N	Saint- Martin (French part)	?
Aruba	?	Cuba	?	Honduras	?	Saint Pierre and Miquelon	?
Bahamas	?	Curaçao	?	Jamaica	?	Saint Vincent and the Grenadines	?
Barbados	?	Dominica	?	Jersey	?	Saint-Barthélemy	?
Belize	?	Dominican Republic	?	Martinique	?	Suriname	?
Bermuda	?	Ecuador	?	Mexico	?	Trinidad and Tobago	?
Bolivia (Plurinational State of)	?	El Salvador	?	Montserrat	?	Turks and Caicos Islands	?
Bonaire, Saint Eustatius and Saba	?	Falkland Islands (Malvinas)	?	Nicaragua	?	United States of America	?
Brazil	Y	French Guiana	?	Panama	?	United States Virgin Islands	?
British Virgin Islands	?	Greenland	?	Paraguay	?	Uruguay	?
Canada	N	Grenada	?	Peru	?	Venezuela (Bolivarian Republic of)	Y
Cayman Islands	?	Guadeloupe	?	Puerto Rico	?		

ASIA

Afghanistan	?	Georgia	?	Malaysia	Y	State of Palestine	?
Armenia	?	India	Y	Maldives	?	Syrian Arab Republic	Y
Azerbaijan	?	Indonesia	?	Mongolia	?	Tajikistan	?
Bahrain	?	Iran (Islamic Republic of)	?	Myanmar	?	Thailand	Y
Bangladesh	?	Iraq	?	Nepal	Y	Timor-Leste	?

Country	IF	Country	IF	Country	IF	Country	IF
Bhutan	?	Israel	?	Oman	?	Turkey	Y
Brunei Darussalam	?	Japan	Y	Pakistan	Y	Turkmenistan	?
Cambodia	?	Jordan	Y	Phillipines	Y	United Arab Emirates	Y
China	Y	Kazakhstan	?	Qatar	?	Uzbekistan	?
China, Hong Kong Special Administrative Region	Y	Kuwait	?	Republic of Korea	?	Viet Nam	?
China, Macao Special Administrative Region	?	Kyrgyzstan	?	Saudi Arabia	Y	Yemen	?
Cyprus	?	Lao People's Democratic Republic	?	Singapore	?		
Democratic People's Republic of Korea	?	Lebanon	?	Sri Lanka	Y		

EUROPE

Country	IF	Country	IF	Country	IF	Country	IF
Åland Islands	?	Finland	?	Lithuania	?	Serbia	?
Albania	?	France	Y	Luxembourg	?	Sint Maarten (Dutch part)	?
Andorra	?	Germany	Y	Malta	Y	Slovakia	Y
Austria	?	Gibraltar	?	Monaco	?	Slovenia	Y
Belarus	?	Greece	Y	Montenegro	?	Spain	Y
Belgium	Y	Guernesey	?	Netherlands	Y	Svalbard and Jan Mayen Islands	?
Bosnia and Herzegovina	N	Holy See	?	Norway	Y	Sweden	?
Bulgaria	Y	Hungary	Y	Poland	Y	Switzerland	Y
Channel Islands	N	Iceland	N	Portugal	Y	The former Yugoslav Republic of Macedonia	?
Croatia	Y	Ireland	N	Republic of Moldova	N	Ukraine	?
Czech Republic	N	Isle of Man	N	Romania	?	United Kingdom of Great Britain and Northern Ireland	Y
Denmark	Y	Italy	Y	Russian Federation	?		
Estonia	Y	Latvia	Y	San Marino	?		
Faeroe Islands	?	Liechtenstein	?	Sark	?		

OCEANIA

Country	IF	Country	IF	Country	IF	Country	IF
American Samoa	?	Marshall Islands	?	Northern Mariana Islands	?	Tonga	?
Australia	Y	Micronesia (Federated States of)	?	Palau	?	Tuvalu	?
Cook Islands	?	Nauru	?	Papua New Guinea	?	Vanuatu	?
Fiji	?	New Caledonia	?	Pitcairn	?	Wallis and Futuna Islands	?
French Polynesia	?	New Zealand	Y	Samoa	?		
Guam	?	Niue	?	Solomon Islands	?		
Kiribati	?	Norfolk Island	?	Tokelau	?		

Legend: Y – Country has an IF   N – Country does not have an IF   ? – Don't know

References

[1] Lallana, E. E-Government Interoperability: Guide. Bangkok, Thailand: UNDP; 2007. http://www.unapcict.org/ecohub/resources/e-government-interoperability-guide

[2] EC. European Interoperability Framework (EIF) for European Public Services. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions - COM(2010) 744 final; 2010. http://ec.europa.eu /isa/documents/isa_annex_ii_eif_en.pdf

[3] Ray D, Gulla U, Dash S, Gupta M. A critical survey of selected government interoperability frameworks. Transforming Government: People, Process and Policy 2010; 5: 114-142.

[4] Lallana, E. E-Government Interoperability: Overview. Bangkok, Thailand: UNDP; (2007). http://www.unapcict.org/ecohub /resources/e-government-interoperability-overview

[5] Lallana E. E-Government Interoperability: A Review of Government Interoperability Frameworks in Selected Countries. Bangkok, Thailand: UNDP; 2007. http://www.unapcict.org/ecohub/resources/e-government-interoperability-a-review-of

[6] Malotaux M, Hahndiek F, Hazejager S. NIFO Project - Final Report. EU Institutions: A report for the European Commission Directorate General for Informatics; 2009. http://ec.europa.eu/idabc/en/document/7796.html

[7] Charalabidis Y, Lampathaki F, Kavalaki A, Askounis D. A review of electronic government interoperability frameworks: patterns and chalenges. Int J Electron Gov 2010;3:189-221.

[8] CSTransform. e-Government Interoperability: A comparative analysis of 30 countries. White Paper. London: UK; 2011. http://www.cstransform.com/resources/ white_papers/InteropAnalysisV2.0.pdf

[9] Charalabidis Y, Lampathaki F, Askounis D. A Comparative Analysis of National Interoperability. In Proceedings of the Fifteenth Americas Conference on Information Systems 2009.

[10] Anseel, F, Lievens, F, Schollaert, E, Choragwicka, B. Response Rates in Organizational Science, 1995-2008: A Meta-analytic Review and Guidelines for Survey Researchers. J Bus Psychol 2010;25:335-349.