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A QUALITATIVE EVALUATION OF A CROSS-BORDER IDENTITY MANAGEMENT SYSTEM TO SUPPORT PUBLIC ADMINISTRATION: INSIGHTS AND LESSONS LEARNED

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Abstract

This paper reports on the research experience gained by carrying out an evaluation for a cross-border identity management system to support e-procurement. This evaluation, which took place in the context of an international research project in the European Union, brought together multiple players. The nature and diversity of the stakeholder involved, and the complexity of the systems under evaluation (in particular their social rather than technical complexity) called for a qualitative evaluation approach. Our investigation provided some interesting insights. On the one hand, these concern the challenges of working in an international project team in the context of a research project. The scope of the project, which essentially aimed at supporting public administrations in diverse national contexts in Europe, adds to complexity as the involvement of public bodies in the trials brings to the fore the political agendas of different parties and member states. On the other hand, equally interesting are the opportunities, the benefits and impediments for cross-border digital identity management across European countries as perceived by the stakeholders involved. These findings have, of course, practical implications for the success of the implementation of e-government systems but also implications for the research agenda in e-government.

Keywords: Identity management, e-government, evaluation, social issues.

1 INTRODUCTION

Enabling inter-operable identity management services at a pan-European level is a challenging endeavour. While a number of identity management systems are operational in various European countries, they operate on different technological platforms and standards and within the context of different legal, organizational and policy frameworks. GUIDE (Creating a European Identity Management Architecture for eGovernment) is a recently completed European Union (EU) funded research project (IST-2003-507498), conducting research and technological development with the aim of developing specifications for an open architecture for e-government electronic identity services and transactions for Europe. Twenty three partners have formed a multi-disciplinary team to conduct the necessary technical, legal, political and social research that would enable the specification of a secure open architecture for identity management that ensures interoperability between existing Member States systems and services [www.guide-project.org]. Following this challenging research and development process, the project has recently concluded by testing the architecture specifications in the context of two trial implementations. These trials concerned two different actual cross-border applications; one concerning citizen movement from one EU Member State to another and one concerning cross-border e-procurement applications.

This paper focuses on the evaluation of the second of these trials from the users' perspective, recording and interpreting the response of key stakeholders in the adoption of such a system. In this context, the evaluation process was challenging in itself. This is because, contrary to the predominant IS evaluation practices, where the impact of an information system is reviewed within the boundaries of a single organization or across homogeneous user groups, we had to establish an evaluation protocol to collect the viewpoints of different stakeholders operating in different countries. Some of these stakeholders had some collaboration already in place; others were brought together because of the research projects; others may be called to work together in the future, or share a system with their counterparts, across borders, without necessarily knowing who is contributing the information they are receiving, or conversely, who is receiving the information they are contributing.

2 THE EVALUATION CONTEXT

The e-Procurement trial is the second of two trials that GUIDE has designed for testing its proposed architecture. Three countries participated in this trial, Germany, Spain and Finland. Several countries were contacted in a "Requirements Definition Workshop" held in Vienna on January 2006. After further engagement with Spain from March until June 2006 it was agreed that they would participate with the Catalan Regional Certification Authority (CatCert) acting as an identity provider for the trial. In early July 2006 there was an engagement meeting with the Procurement Office of the German Federal Ministry of the Interior in Bonn where there was interest to participate as the owner/provider of an e-Procurement platform (eVergabe). Subsequent engagement meetings were held with the Procurement office in Cologne in August, October and November 2006. The GUIDE Trials team agreed that the e-Procurement trial would focus on those elements of the IDABC¹ e-Procurement process of most benefit to GUIDE and the participating Member States, i.e., the registration process for eVergabe encompassing the GUIDE Discovery and Authentication services. In July 2006, the Finnish Population Centre and the Finnish Business Register showed interest and agreed to participate.

Weekly Project Board meetings were initiated with the participating Member States in January 2007 and were held until end April 2007. The trial was run with representative functionality (and the evaluation commenced) on March 22nd, 2007. Shortly after, the integration with the Finnish Population Centre and the Business Register was completed. The trial running continued on May 3rd 2007 and a demonstration of the GUIDE interface and functionality was performed for the representatives of the Finnish Population Centre and the Finnish Business Register using an online

¹ IDABC is a Community programme managed by the European Commission's Directorate-General for Informatics. IDABC stands for Interoperable Delivery of European eGovernment Services to public Administrations, Business and Citizens.

teleconference system. The evaluation of the trial was concluded with input from the Finnish participants and discussion of results within the GUIDE consortium.

3 METHODOLOGY: SETTING UP THE TRIAL EVALUATION

The people involved in the trial form a multidisciplinary team and multiple user roles, so qualitative research methods provide an opportunity to appreciate their different perspectives vis-à-vis the results. Since the teams of participants in the three countries were small and we had the opportunity, through a successful engagement strategy, to have discussions with all stakeholders involved, qualitative methods were far better fitted to provide us with the kind of information we needed in order to evaluate the trial in terms of user satisfaction and acceptance. In one instance it was possible to interview together participants from two Member States interested in adopting and using the system (Germany and Spain) in a focus group format. This allowed us to elicit, compare and contrast views from people involved in different roles in the project. While it wasn't possible to ensure the availability of all relevant participants from the third country involved (Finland) in the same meeting, two conference calls were subsequently set up with all the necessary participants. All interview material has been recorded with the permission of participants, which has proven very helpful in reporting and analysing their verbatim quotations.

For the purposes of all interview discussions we produced a semi-structured interview agenda, which facilitated the group discussions as well as the individual interviews. It covered five main areas:

- Motivation for the participant to participate in the trial and expectations from it
- Evaluation of the trial process (how it worked, outcomes, interesting insights, effects on current processes)
- Issues and obstacles that surfaced during the trial (difficulties, resources, restrictions, lessons learned)
- Expected benefits and issues beyond the trial for the participant organizations
- Broader expected benefits and issues beyond the trial (potential users, likely success of the system at a pan-European level)

The participants in the evaluation of the trial covered the full range of GUIDE stakeholders, offering a complete overview of GUIDE “users” across European countries: a representative of the organization offering the e-procurement platform in Germany, two technical people responsible for its maintenance and integration with external systems, and various “customers” of identity management in e-Procurement, including a representative of a certification authority and identity providers from Spain and their IT partners, as well as two representatives of a business identity provider and one of a citizen identity provider from Finland. More specifically, the Procurement Agency of the Federal Ministry of the Interior (Beschaffungsamt) is the owner of the eVergabe e-Procurement platform that was used within the GUIDE trial. CSC is Beschaffungsamt's IT partner, developing applications needed, including the parts necessary for carrying out the GUIDE trial. On the Spanish side, the Catalan Regional Certification Authority (CatCert) acted as the identity provider for Spain. Tecsidel, an IT partner, developed the trial on behalf of CatCert. Participants from Finland in the GUIDE e-Procurement trial evaluation were representatives of the Finnish Business Register and the Finnish Population Centre. The Finnish Business Register (FBR) is the organization that is responsible for the registration of new businesses/enterprises in Finland. The National Board of Patents and Registration of Finland (the NBPR) maintains the Business Register. The NBPR comes under the administrative sector of the Ministry of Trade and Industry. The Finnish Population Centre (FPC) develops and maintains the population information system, certificate services, the guardianship register and the public sector directory service, and provides assistance for organising elections. The Population Centre was founded in 1969 and operates under the Ministry of the Interior. In addition, the trial evaluation was attended and discussed with the project manager and developers from the GUIDE team, originating from the UK, the Netherlands, Greece and Finland. This helped ensuring an accurate understanding of technical issues but also teasing out the collaboration climate between participants.

4 OBSERVATIONS FROM THE ROUND TABLE DISCUSSIONS FOR THE E-PROCUREMENT TRIAL EVALUATION

4.1 Current situation regarding e-procurement

Participants initially commented on the current difficulties with the e-procurement process and thus highlight the reasons that led them to participate in the trial.

Germany mainly faces the problem that the existing e-Procurement platform, the eVergabe, is not used by foreign enterprises.

“You have to apply for a German ID card, to come here to show your passport personally to the ID provider. That is the reason that we don’t have many non-German enterprises participating in the platform. To get some sort of idea how we can make this a lot more easier, the CSC decided to participate in this trial”[CSC]

The interest to get more non-German applicants to use the platform is because in some cases, by German law, it is necessary to have European-scale participation in the e-Procurement process. Additionally, as the German government was chairing the European Union at the time, they supported GUIDE in the area of e-Procurement since it is high on the agenda together with opening the borders. So, it can be seen as a political statement in Europe as well.

The Spanish partners gave their own reasons for participating in the GUIDE e-Procurement trial.

“The main motivation is that we have electronic certificates, we can do plenty of things but they’re not done.[...]So, any initiative that allows the user to use those certificates is positive because it’s a way to teach the people to feel secure with using digital certificates in their normal activities.”[CatCert]

“Personally speaking, it was very interesting to me to be working internationally with such administration and communication. From a technical point of view in Tecsidel we’re working hard on this kind of Identity Management solutions. So, to be able to develop a solution that can work in a European environment it’s very good publicity for us, a good reference.”[Tecsidel]

Both Finnish participating agencies (the FBR and the FPC) entered the trial in the context of providing data needed for the trial (either for business or citizen identification purposes) and were also interested in various aspects of the solution. Similar to participants from Spain, the project was an opportunity to test and advertise work done within their own agencies.

“As the trial needed information of businesses we were asked what kind of possibilities there would be to give company details to check if a company exists and who can represent it. We were lucky because we had just released a new information service product for this kind of purpose so it was easy for us to join this trial and also useful to check our new service in practice. [...] It was a good opportunity for us to gain experience as far as our own service was concerned. We are at the moment launching this new service” [FBR]

“It is a very good way to actually see how this kind of infrastructure can work because we are developing and planning to develop a similar kind of infrastructure in Finland” [FPC]

4.2 Evaluation of the trial and lessons learned

The participants commented both on the ‘process’ of the trial, i.e., the way it was organized as a project, as well as the lessons learned from their involvement in the development of a cross-border information system. The following quotation reflects all participants’ general impression:

“It was very interesting, working in an international environment; we built up a pretty good team, even though we didn’t know each other in person. Looking forward, it would be lots of fun to solve the technical challenges and to do the second part of the trial [i.e., provide further functionality to conclude transactions], but I’m sure we will need a lot of legal advice. The challenge we faced with the added functionality was simply time” [CSC]

In terms of **process**, the Spanish participants identified two key success factors: regular communication amongst participants (e-mails and conference calls, content sharing on a dedicated web space) and the use of standards:

“Very interesting project and, all the communication and working together, it was perfect. I think the architecture has been planned with using standards and with a piece made in Germany, another in Spain etc, it’s the only way of working.” [Tecsidel]

The German participants confirmed this conclusion, but also accentuated the value of a face-to-face meeting, which had only been possible when the trial was over; it would have been much better to get to know the people they were working with earlier. One German participant commented:

“What would have helped would be a kick-off with all that participated so that you don’t have just a voice on the phone. [...] One difficulty when you’re working cross-border is that you need more time for communication, more than usual. Things you usually do face-to-face take far more time when done by the phone.” [CSC]

This comment triggered the following bemused response from his colleague:

“I have had worse experience working with people from the same company in some departments than with this group of people from different countries and organizations”

What was agreed by all participants was that it is difficult as it is essential to get everyone to work on the same speed, due to the multiple projects that everyone is working on. Also, for some of the people involved in the trial, there have been some issues in trying to balance between their participation in a research project and their “real” job. Sometimes there were other things that demanded their time and effort.

From a **technical perspective**, the participants found the trial successful, although they would be keen to test additional functionality. Then again, this would have required additional resources, which their respective organisations were not necessarily prepared to make readily available.

Participants were asked whether (and how) they had any interesting insights regarding their day-to-day work and current processes while being involved in the trial. The German participants highlighted an area they found that the development of the trial helped them improve their practice.

“From the CSC part, we were developing a new release of the eVergabe platform in parallel to the GUIDE trial part and since we did source branching we had to do bug fixes on more than one version. This made clear to us that we should be working on our content management system a little more. That’s one lesson learnt out of the trial, our current process of branching sources and doing things on more than one version could be better”

“GUIDE was also the starting point of making extensive use of virtualization. We used VMware more than before, we had different versions of virtual hosts which we could, on demand, transfer from A to B. Since we don’t have enough servers we did this virtually. The way we did it for GUIDE is and will be used for other cases as well”

For the Finnish participants, who were providing identity data rather than the e-procurement platform things were more straightforward:

“I think that in this trial, development was straightforward. In our IT unit we were interested in the technology and everything worked easily. We also had the permissions to handle the data. It was the best way to show the power of this infrastructure, it can be built quickly, it can be trusted and it can also handle these services and permissions. It is very good in all ways; there is no need to make something different. [...] We have the integration between GUIDE and our population register services and so it would be easy. We didn’t need to build any new technical components, everything was already in place in order to interoperate with GUIDE.” [FPC]

The GUIDE trial didn’t have any impact on the type and form of information held and handled by the organizations or their information systems. The data provided by both FBR and FPC were readily used for the GUIDE trial purposes. In the case of data exchanged between Germany and Spain, despite the use of test data, it was argued that technically there would be no difference had real data been used. This does not mean, however, that it is the technical issues that matter when it comes to the use of identity data.

“From our side it makes no difference also. In fact, the certificates we have seen before [during the trial demonstration], they’re real certificates with test data. So, we use the same services. For example, now we’re using a kind of testing validation system by CatCert because we’re using those other certificates but the structure and the content of the data, everything is the same.” [Tecsidel]

“In the first meeting we talked about legal issues, there were two lawyers in the room. There are open legal problems with real data so we decided not to get involved with that for the trial. From our side there wouldn’t be any difference if real data was used. This is a test card but the trust center does the same process as if it were a normal card”[CSC]

Regarding the technical obstacles that participants had to overcome in order to get the trial to run, there was no particular mention of difficulties.

“There was a lot of discussion. I learnt to know the internal CSC process of routing something through a firewall. It usually takes one week. Normally you can speed things up by calling people but they say ‘well, that is our process and you should wait’. Sometimes you have to be more flexible and try things out because this was obviously not the easiest thing to do. You have to bring everyone to the same communication level and it’s important because if there is a misconfiguration you have to start all over again” [CSC]

The involvement in the GUIDE trial provided lessons for the organisations’ **internal systems** and thus led to some related changes. For the most part, these were considered as useful lessons learned:

“We added functionalities, not new in the technical meaning, but new for eVergabe. Also, the registration form was enhanced, we added ‘getting the data’ and ‘redirection’.” [CSC]

“We didn’t have to make any changes because everything was new. We’ve had experience with another identity provider but they were using older versions of the SAML protocol. For the GUIDE trial we had to start from zero, we used some new open source libraries which was a good experience for us. The development process took no more than two weeks because the hardest part, which was the validation process, was already made by CatCert. The communication between our piece of software and the CatCert validator was also in place. We only needed to build the piece that handled the SAML protocol” [Tecsidel]

Regarding services and integration between various national systems, the FBR is aware of legal and political issues that make the **exchange of information** between different countries and cultures more difficult. For example, information in business registers can be different between countries and that is considered as a serious hindrance. Both Finnish organizations agreed on two main categories of open issues regarding the acceptance of GUIDE:

(i) Existence and future demand for services

The FBR representatives are also involved with the European Business Register (EBR). One of their main objectives for the future is to have more customers use the EBR service on a European level.

“Therefore, at the national level we need to work harder to promote this service and to make sure that the service’s quality is good enough so that people find it useful. We are trying to make it so that more people are aware of its existence” [FBR]

The FBR reported they are ready for the real-life use of GUIDE as long as the business case is satisfied:

“We could start selling our information right away to GUIDE if there would be a company that needed the information and would pay for it. Currently, the information is provided to the Finnish local authorities for a fee” [FBR]

In this sense the FBR shows that high volume of identity-related transactions and demand for services will drive the adoption of new solutions and infrastructures. FBR’s customers have become more international and are asking for more multilingual services and it’s the organization’s view that the situation is changing and that there will be demand for support of cross-border identity transactions, especially if the technology is provided. The FPC supports this view by stating that it is critical to have

an infrastructure that is easy to build and works already. This will give the opportunity for new services to be developed.

(ii) Privacy, data protection policies and legal matters

The FPC gave their view regarding citizen consent and privacy in the transfer of citizen identity data.

“In GUIDE, where we provided our population information, it is important to know where the data is going. We need to have the permission of citizens to use data and this is a formal decision. When the citizens are using this infrastructure they must know what kind of data we are giving through the process and should be able to make the final decision on whether they want to put the data through the service or not, to have the possibility to choose whether to transmit the data or not, to give consent about the use of their data and understand where it is going. In GUIDE citizens can see the data before they make their decision” [FPC]

The FBR is in accordance with this view and again reported the existence of legal, political and social issues that pose possible concerns for the adoption of the GUIDE architecture although it is technically complete.

In the case of the GUIDE trial, the FPC was reassured of privacy by the presence of a project partner, with whom they have had prior cooperation and numerous face-to-face meetings. It was also pointed out that the permission to use and transfer citizen data is a decision that depends on the context of use. If GUIDE becomes adopted, trust would be assured also through the infrastructure itself but there would also be a separate decision for data to be provided in a production environment. Along these lines it was suggested that there is need for a GUIDE administrative organization to handle decisions and permissions.

4.3 Future role and prospects for GUIDE

Participants’ opinions on the future of the GUIDE architecture solution were quite enlightening. Although generally optimistic about the usefulness of the system, its technical feasibility and interoperability with the current heterogeneous information infrastructures in the Member States, several participants also indicated that the most challenging aspect for interoperable e-government services is the readiness of the broader context for the adoption of such services. Legal issues are perceived to be prominent by all parties, whereas issues of privacy were particularly highlighted by FPC.

“To get this productive, what we now did from the eVergabe side, it’s no problem, it’s easy. But that’s only half of the benefit. The benefit would be to have the whole process in GUIDE. To do that, the work is not on the technical implementation side, the work is rather on the legal side – to decide how to translate trust levels from one country to the other, that’s the difficult part. Right now you can register in the platform, you can take part in a tender, you can get all documents, you can communicate with the officials but when you want to make your offer you have to put it in a letter and send it with snail mail.” [CSC]

“We are very interested in being part of [GUIDE] and the permission to have the data is the only requirement for us to move forward.” [FPC]

“GUIDE is a good solution. There might be some issues concerning individual rights, some legal (like if security level is high and to be sure who is asking for the information) and political questions to be answered, or technical issues to be solved if there are different kinds of systems across Europe and the identification system is different. It isn’t so easy to get this kind of homogeneity but GUIDE is a really good start” [FBR]

It was mentioned additionally that GUIDE would have to be trusted that the information that goes through it remains confidential, that there is integrity, etc. but this was also acknowledged as a technical issue that can be ensured by the proposed architecture. There were three angles recognized regarding the approach to GUIDE. The **technical side** does not introduce any particular obstacles. The **organizational side** poses questions such as “who owns GUIDE?” and “who is liable if something goes wrong with GUIDE?” which still remain to be answered. Finally the **business case** for GUIDE

which shows that although there is interest from the Member States, some organization needs to make the first financial step and this still proves to be very difficult.

“GUIDE is working as a gateway to the several identity providers to assure that a signature is valid and follows the rules of that country. In this sense it’s just a proxy. However, it is a proxy that needs to be recognized by everyone” [CSC]

“Political decision will be needed. This is the most difficult thing. In Spain the policy mapping is complicated. Perhaps we will need to do a more specific classification of the digital certificates issued in Spain for all purposes” [CatCert]

“Talking about business cases I think we have to have a political decision and opinion which then makes out the business case. You have someone to drive the process and then if you see people are using this, then the case comes itself. If you don’t do it that way you have a circle and nobody ever starts” [Beschaffungsamt]

Following that, there was also comment on whether GUIDE could work in a pan-European fashion. It was highlighted that there is standardization on behalf of IDABC regarding the processes for tendering an e-procurement and that this would mean that when a system is developed in a country it can be built according to a given philosophy and with the same guidelines that are proposed. It was also argued however, that IDABC may have the guidelines but it has no power to force them. GUIDE also takes the position that each country can develop their system in their own way and then GUIDE acts like a translator between everyone.

“GUIDE is also a vision. There are long term things to get your PIN identity management working. It brings a transition, ‘what needs what in what country’ and that’s the whole point” [CSC]

In tandem with earlier comments about the key enablers in the trial, the participants identified communication and leadership as critical success factors for the addition of other countries to GUIDE:

“Communication: the more people, the more opinions, the more the process of deciding which way to go slows down. The way [forward is] to have fewer countries in this process and decide on the basic construct and propose it for adoption is a better way than having many participants” [CatCert]

“Somebody has to guide the process because otherwise everyone puts an opinion and that would take longer and implementation would be slower. A more practical approach is to focus to solve the kind of needs that can be more generic. The need for an identity system is not a local need but a wider one. You have to make some important decisions at the design phase and that is the hardest part of the process” [CSC]

5 CONCLUDING REMARKS AND INSIGHTS

The qualitative evaluation of the GUIDE e-Procurement trial provided a comprehensive overview of the various trial stakeholders’ views. All participants were encouraged to discuss what they thought was relevant and important regarding the trial, thus their comments addressed multiple issues and are largely consistent across different countries and participants. Some comments and opinions were common for all participating parties while others were country-specific or representative of the different roles participating organizations had in the identity management process. These views offer useful conclusions on the trial itself but also on the current situation and the future prospects of a cross-border identity management system in Europe.

It is clear that all respondents were satisfied with both the process and the outcome of the trial. Specifically, on several occasions they noted that the common targets and expectations of the implementation team, the very good communication, cooperation and project management and the use of agreed standards in the trial development resulted in a smooth workload and limited need for negotiations. Overall, the technical part of the implementation was considered by participants as very successful in view of the project time constraints. GUIDE was successfully and easily integrated to existing applications, and, in the case of Finland, successfully tested with real data as well.

Reflecting on the results of their engagement in the trial process, it is noteworthy that all participants agreed it has been a **learning process** for them personally, but also for the organization they represented. Specifically, they enjoyed working in an international team, got to know some stakeholders of the Identity Management process from other countries in person, and in the case of developers, enhanced their technical skills as well. Furthermore, GUIDE offered the opportunity to participants to think about their own processes and in some cases revisit their business practices.

Despite the positive experience with the trial, the participants identified several issues in current e-procurement practice that will need to be addressed for GUIDE to become fully operational. One important observation that was raised by all participants is the **diversity** existing in the process of e-Procurement in the various Member States. Countries have their own processes regarding e-tendering offers and how these are both submitted and handled. This has implications for managing the development and adoption of the GUIDE architecture in the future. A coordination of national and inter-national efforts is required, and it is clear from the respondent's input that trust will be a major issue during this process, in addition to the pursuit of good **project management** principles (leadership, scaled implementation, communication, and so on).

Social, legal and political issues will need to be resolved. This conclusion is resonant in all interviews. Following from the previous point, it is clear that stakeholders in both trials appreciate that they follow different procedures from their European counterparts. For example, they store data at different levels of detail. There are open issues at many levels, especially when trying to define the circumstances under which a person or a company is recognized as being able to sign and submit an e-tendering offer. Furthermore, participants feel that each country defines its own trust levels regarding digital signatures and certificates, an issue that demands fine-tuning across Member States in order for GUIDE to work at a pan-European level. Importantly, this difference in practices (whether actual or perceived) raises issues of trust in cross-border collaboration. Although this hasn't been always explicitly voiced, it was clear that participants in both trials were somewhat skeptical of processes in other Member States. Similarly, it was stated that the diversity between processes across Member States is often a result of the legal frameworks in place. The legal difficulties were mentioned frequently, although it is worth noting that although legal issues were seen by the trial participants as outstanding, there were few, if any, *specific* suggestions about gaps or legal gray areas.

The only specific area of concern relating to the legal framework, and one that is critical for the acceptance and adoption of the GUIDE solution, is related to **privacy and citizen consent** in the exchange of personal data in cross-border applications. In the context of the trial, it has been the Finnish Population Center that has stressed very strongly its relevance for the adoption of GUIDE in day to day practice. GUIDE needs to be seen as a trusted party, which ensures no citizen attributes are exchanged cross-border without explicit awareness and consent from the individuals involved. Ensuring that this is the case, across the diversity of possible applications that need IdM services and the diversity of systems and practices, is seen as problematic. On the one hand, this is because diverse context present different privacy challenges and require diverse process for ensuring consent. On the other hand, even where privacy issues are resolved, they need to be clearly communicated and understood by all relevant parties. This is not necessarily straightforward; misconceptions can and have been used as a political device for debating against certain information infrastructures and may similarly affect GUIDE adoption in the future.

Another critical aspect for the implementation of GUIDE concerns the motivation for its use. Participants were clearly interested in the developments in IdM, and argued that there is technological readiness for the adoption of the GUIDE solution. Nonetheless, they also acknowledged that current IdM practice is fragmented and the volume of cross-border electronic transactions quite limited. Specifically, the participants referred to examples of implemented systems at a national level (e.g. in Spain) that are underutilized due to the limited range of services currently offered. German participants testified that their platform is very widely used in Germany but there is very little access from abroad. In line with this, the Finnish organizations gave details of the volume in transactions of their organizations that clearly portray that while systems are widely used at the national level, interest in cross-border transactions and exchanges is dramatically lower. The owners of these systems are interested in improving this picture by increasing cross-border traffic. In fact, they anticipate that this

will be the case in the near future with more international collaborations and IdM applications available. There is a paradox here. GUIDE on the one hand depends on such traffic so that there is a business case for this adoption. On the other hand, the very existence of GUIDE as an infrastructure and the potential it offers can become a change agent and enabler in increasing the **volume of cross-border transactions**.

The participants identified some good current practice that could facilitate the development and adoption of cross-border applications. The participants in the trial accentuated the importance of face-to-face meetings with their counterparts, to achieve greater understanding and appreciation of common concerns and different practices. Starting with the trial itself, participants expressed a wish to have met for at least one face-to-face meeting with the whole implementation team at some point in time. Where prior business contact with a GUIDE partner existed, as in the case of Finland, it proved instrumental for a country's participation in the trial process. Furthermore, the German participants highlighted the good practice of representatives of the agencies using the eVergabe platform having a face-to-face meeting once a year to discuss their opinions and suggestions regarding the platform's features and usability. Similar practices are followed in Finland, where the Finnish Business Register maintains close relationships with the European Business Register. Such practices could be further enhanced at a pan-European level with representatives from various Member States collaborating at different levels in e-Procurement or IdM processes. The organization of events that enable the sharing of ideas and discussion of open issues among e-Procurement as well as IdM stakeholders is considered helpful, independently of how well technological solutions may work.

Overall, the evaluation of the GUIDE e-Procurement trial showed that it was a successful process and it set the scene for the future adoption of GUIDE, provided that specific requirements are met (legal revisions and the inclusion of some additional functionality) so that the right context is formed. All participants reported on the value of the GUIDE trial implementation as a learning experience and also as a first step towards the vision of the wider use of identity for multiple processes across Europe. In this respect, GUIDE has been useful in showing the potential of electronically-enabled cross-border identity management and therefore can be used as a mobilization vehicle for the required revision of the legal framework. Additionally, participants commented very positively on the implementation of the GUIDE trial and can therefore be used as change advocates by the EU.

For information systems research, the experience drawn from the evaluation of this trial shows how system implementation cross-border is significantly more complex. The systems developed are not necessarily more complex technically (although they need to bridge multiple platforms and infrastructures), but their development becomes more challenging as diverse processes, established in different cultures need to be understood. Therefore, it becomes imperative that system development skills be matched with project management and human resource management skills. Successful development relies on motivating, establishing and maintaining good relationships in an international project team, that can help understand and coordinate diverse practices. Successful implementation and adoption relies on a good understanding and perhaps revision of the broader change context, embracing relevant legal and social issues. The challenge for our future research endeavours is to appreciate the intricacies and complexities of such contexts and collaborate across disciplines so that they can be successfully managed.

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