



Global Acceptance of Mobile ID card

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Abstract: eID cards are being used by various governments. Its potentials in terms of mobility and globalization, however, are not realized to the fullest extent. In this paper, we present eID cards as essentially a mobile tool that can be used for various governments all over the world. The paper first focuses on the existing potential uses of mID card. Then, we present technological and non-technological globalization requirements and challenges in making mID adopted by a wider number of countries and citizens. We conclude the paper with a summary of ideas developed in this paper, which we hope can be useful for policy makers and standards forums.

Keywords: mobile government, mobile government applications, eID card, mID card.

1. Introduction

eID card is a relatively new way to digitally recognize the citizens' identity. The concept has a wide range of advantages and if its development is managed sensibly, we can get more advantages out of it. The Internet communication channels available for mobile devices are still considered as insecure and vulnerable.

The eID card concept is so appealing that some governments have already deployed eID cards solutions. Many governments have started pilot studies. It means that soon we may have wired and wireless devices that might contain our identification information and hence government services will be available to citizens through these eID card enabled devices. This will make eID cards even more powerful and it will also open secure channels for businesses to provide more services to the customers for selling products over the mobile devices.

eID cards could even go beyond mobility. If all governments, providing eID cards to their citizens, have one common interface to interact with each other, then these cards can be accepted worldwide. This means eID cards can be used anywhere, anytime and virtually on every device. Hence, it may be an integral part of ubiquitous society (Web resource [7]). Nonetheless, there is a lot more work need to be done to make eID cards acceptable globally. Interoperability standards for eID card, in particular, need to be developed that, when they are implemented, should be adoptable by all countries and devices. In addition, these interoperability standards should not be dependant on hardware infrastructure but dependant on software infrastructure that is cheap, easy to adopt and easy to amend in future.

This paper is an attempt to highlight the importance of *globalization* of the eID cards. It aims to highlight interoperability standards through which the globalization of eID cards can be achieved and it also suggests guidelines that may be used to design the interoperability standards. In the following sections, after briefly introducing eID card and its uses, we will argue that potential advantages of eID cards are the same for mobile devices, and therefore, mobilization is as important as making eID cards a globally accepted entity. We will end the paper by discussing the technical and non-technical issues that may be faced while providing globalization and standardization.

2. Electronic Identification Card: Its Uses and Popularity

Various countries all over the world, European countries, in particular, are coming up with a concept of electronic Identification Card (eID card). Together with software, Public Key Infrastructure (PKI) cryptography and other services, it enables the organizations to make their online transactions safe, secure and private (Web resource [1]).

Smart card chips are microcomputers and they are small enough that one can keep them in the wallet or mobile phone. They are generally considered as tamper-proof and are accessible through a standard interface that ensures security and specifies the accessible contents. However, they have limited resources and limited storage power (Norman, 2002).

The Subscriber Identity Module (SIM) card-enabled mobile devices can also be used as an eID card to provide identification and authentication (Ahlers, 2003)

2.1 What is eID Card?

eID card is composed of an individual's photograph and it includes a smart card microchip which is embedded inside the card (please see figure 1). This smart card contains the unique digital number encrypted with PKI. It also contains two or more private keys. Furthermore, in order to add more security, these cards also require the PIN code to access them in exactly the same way we use the PIN code for our ATM or for credit cards. (Web resource [6])



Figure 1: A specimen eID cards being used in Finland.
Source: Population Register Center. (2004),
"The ID Card", [online], <http://www.fineid.fi/>

The eID card should have at least two separate private keys and certificates on the smart cards; one key pair (private and its corresponding public key) is used for authentication and encryption, and the other key pair is used for the electronic signature. If an eID card embed other applications (eWallet and secure E-mail for example), then an additional key pair is required for

each additional application. (Web resource [2])

2.2 eID Cards are mID Cards

Smart card technology enables eID cards to be accessible virtually on any device with the most possible secure way. eID cards are now being used on the Internet, mobile devices, Digital TV, and on ATM machines which suggests that eID cards are, in fact, mobile eID cards. (Ahlers, 2003)

Furthermore, future ubiquitous society [7] where everything will be connected through internet and can be accessed anywhere and every time, poses a scenario of future where we would require some concrete solutions available for ensuring security and privacy. An eID card may be plugged-in to cater a secure and reliable framework. However, the interoperability standards should be generic so that all devices, regardless of whether they have the smart card chip inside or not, should be interoperable.

Many developing countries, perhaps, may not be able to afford "eID card" solutions like Finland or Sweden have but because of their already built in infrastructure for mobile devices (Ghyasi, 2004), they can also leverage the benefits of mID card.

The potential of eID card is enormous and it seems inevitable that soon eID cards are going to be accepted virtually anywhere in the world. Globalization and ubiquitous society, perhaps, may come as a revolutionary and it could lead to a transition from "eID card" to "mID card". It thus makes sense to rename "eID card" as "mID card". So from now on, we will use the term "mID card" to refer these cards instead of using "eID card". We will also see how eID card, being an mID card, play a significant role for future mobile governments and ubiquitous society.

We now turn into presenting mobile applications that are currently in operation or governments are foreseeing to launch them soon.

2.3 Potential Applications of mID Card

Let's now take a brief look at the major applications of using mID cards:

- It is now possible to retrieve personal information like health, driving license and criminal record on virtually any device by using the mID card. It provides many advantages to the citizens as well as government officials to access the personal record of a citizen anytime and anywhere. For example, Government officials with a single click can track the criminal record of a citizen in order to prevent fraud, crime and terrorism. (Web resource [6])
- mID can be used as the digital signature. The use of digital signatures will, perhaps, help the business connections more secure and reliable than simple endorsed hand signatures. Unlike hand-written signatures, digital signatures can not be imitated and therefore more secure, safer and may have more official value than hand-written signatures. (Web resource [6])
- Many European countries now accept mID card as the official passport to travel. This helps governments more in identifying the criminals, and terrorists than the traditional paper-based passport as it is more secure and reliable. (Web resource [6])
- mID card can also be used for online shopping and for other services that require authentication. Another advantage of mID card is that it is nearly impossible to copy, steal or be hacked. Contrary to magnetic credit cards, mID are long lasting and easy to manage. mID card also use some sophisticated encryption algorithms to conceal the individual's real digital information. (Web resource [6])
- In future, mID card may also be used as a mWallet to store credential information about your credit cards, passport, serial numbers, etc that can be used to facilitate completion of many electronics transactions. (Tom Ahlers, 2003)

Almost all the European governments have either already launched mID cards for their citizens or they are doing the initial study to implement the mID cards. Let us highlight in the next section what is going on in the European countries and how much efforts are being put to start this venture.

2.4 Examples: Governments Implementing mID Cards

In this section, we will explore three case studies of European countries namely Finland, Austria and UK. Finland and Austria have already started providing services using mID cards, however, in the UK the initial feasibility study is going on. We will also explore the efforts these governments are putting into the standardization for mID cards.

(a) Finnish Government: Working as A Pioneer

The Finnish Government started mID card project in 1999. The most common applications of mID cards are eSignatures, ePassport and other optional services like encrypted email service. The Finnish government was among few governments who have developed their mID card infrastructure based on open standards for interoperability. The FINEID card technology is the

basic building block for many European countries as most of the European countries are using the same infrastructure and technologies in order to address interoperability and standard issues. (Web resource [6], [4], [3])

(b) The Austrian Citizen Card

The Austrian Federal Government started Austrian Citizen Card project in November 2000. A few of the most recent applications are: eSignature, online shopping using mID card, citizens' financial records and information, child allowance, student allowance, criminal record (for employers and entrepreneurs) and on demand electronic delivery of the official documents to the citizens. (Web Resource [5], [3])

The implementation of Austrian mID card is also done using the open standards of smart card so that globalization and interoperability is utilized later on. Many government and private sectors projects are based on mID card solution and most of them are still in planning or about to be launched. (Web resource [4], [3])

(c) UK Aiming Towards Global Solution

Efforts have been launched in the UK as the government of UK is envisioning a *global identity card* solution. The prominent objectives to initiate this venture are to provide maximum security and privacy to their valuable citizens. The mID card may have three types of services in the beginning: driving license service (as many driving license fraud cases are so common in UK), mPassport and entitlement card. Unfortunately, the entitlement card has got no attraction so it may be dropped. New mID ideas are submitted and analyzed on regular basis. There is no clear evidence as how the UK government is foreseeing globalization but the interoperability and globalization is on the top of their agenda. (Web resource [4], [3])

3. Globalization of mID Cards

mID card would be more powerful when all these applications could be accepted world-wide. Globalization is a critical and important aspect for the recent evolution of the mID card. In this section, we will see what efforts need to be done on technical side as well as on non-technical side in order to provide globalization in effective way. We will highlight the non-technical barriers, which are equally important to be addressed and solved for the standardization of mID card. We will also look at the Globalization standards and efforts in more detail. Furthermore, we will also illustrate a model for addressing interoperability issues.

3.1 Mobility: The Integral Part of Globalization

Mobility of mID cards and globalization are complement to each other. Mobilization of mID card is as important as its standardization. However, it is known that mobile devices are the most vulnerable and insecure devices because of wireless architectures. Although much work is being done to provide secure communication channels for wireless but still wireless devices pose a great danger for mobile security and privacy in commercial and personal uses (Ahlberg, 2004).

mID cards, however, can make possible to provide services to citizens where there is a need for the identification of individual or services that should be provided securely and without interfering

the privacy. As stated earlier, mID card can be used with mobile devices to play an important role for future ubiquitous society.

Therefore, realizing the importance and potential of mID cards, many Mobile Government initiatives have been launched to develop security, privacy and individual identification solutions on mobile devices by exploiting mID card concept.

The use of mID card for mobile devices may reduce the security concerns on the mobile devices and may kick off for new areas of use for mobile devices. However, real mobility of mID card can be achieved if and only if we have globally acceptable interoperability standards that must be accepted and implemented world-wide. Thus we can provide real mobility to applications by implementing these standards which consumes mID cards.

3.2 Standards

We should learn lessons from the various standards available for mobile devices and mobile infrastructures that make communication expensive among different infrastructures. There are many frameworks and standards for mobile based data communication like WAP, IMODE etc (Andrew, 2002). The whole scenario suggests that if we had one common standard for mobile infrastructure and if mobile devices had common interfaces for data communication, then the communication through mobile devices would be cheaper and robust.

We are now facing the similar situation in the mID card segment as well. Although, most of the European applications are using similar standards to interact mID cards with each other, however, there is no global standard for mID cards. This really is one of the major issues mID card applications are facing at the moment. However, the good news is that eEurope Smart Card (eESC) is trying to standardize a common interface named as Global interoperability Framework (GIF) (Web resource [3]). Although GIF is highly relying on smart card standards but it will, perhaps, save us from too many different standards in the future. Let's take a brief look at GIF.

3.3 Global Interoperability Framework

In order to address interoperability issues, eEsc has almost finalized the Global Interoperability Framework (GIF) which, hopefully, will be implemented by all governments for their own mID card solutions. GIF is part of the eEurope Smart Card Charter Common Specifications (OSCIE). The major objective that GIF provides is to have a secure and common platform for the smart card manufacturers and e-service providers where they can find the basic concepts and necessary help on the tools, which are necessary to access and develop these e-services. It also provides the guidelines for the security transactions requirements that both parties must comply to execute these transactions safely and securely. Moreover, it also provides the basic set of standards to the software system developers so that they can meet the IAS interoperability standards. In addition to this, e-services have also been providing with the specific set of rules that they can follow to verify the authenticity and validity of mID cards. (Web resource [3])

3.4 Limitations of GIF

Even though the framework provides a secure "*interoperable nucleus*" (Web resource [3]), yet it is confined to technology and processes. It provides standardization framework that makes interoperability possible with smart cards and service providers, however, it does not take care of the applications that runs over the internet. It is assumed that it is the responsibility of service providers to define their own interoperability. For example, think of mID card solution as a generic security solution for future ubiquitous devices [7], where these devices may or may not be using smart card technologies, it predicts a scenario where current eID cards may not be applicable due to the limitation of interoperability standards.

mID card is one service which makes use of smart card technologies, and GIF provides a framework for mID card at the abstract level. Nonetheless, it is apparent that mID cards still require some mature standards for communication. One obvious limitation of the GIF scope is that it provides no interoperability standard between online services of mID cards in various countries. (Web resource [3])

Except GIF, which provides interoperability framework by a tight integration with smart cards, there are no significant global standard efforts to make it possible for interaction of online services between two countries that provide mID cards to their citizens.

Even though it is possible and seems to be an ongoing activity that many European countries are trying to follow a common standard, but the question is that whether it is convenient for the rest of the world to follow the same standards which probably are dependant on particular infrastructures? Will all countries agree to follow the same infrastructure and the same standards that were initiated by Sweden and Finland? Is it possible to have some global standards that we can implement on software level, which make communication among mID cards easy, safe and secure?

Furthermore, mID card may play a significant role if the ubiquitous devices (using smart card or without using smart card) may also be operable through the GIF. In Finland, mID cards can also be used inside the mobile phone devices. In near future, various ubiquitous devices will require the ability to plug-in the mID card so that they can leverage the benefits of mID cards (security, authenticity, mWallet etc). The question arising here is that whether these future devices (particularly devices without smart card) will be capable to use current GIF standards. What if GIF provide a simple interoperability framework for devices without smart cards?

Nevertheless, many circumstances prompt organizations and countries to do not follow this infrastructure oriented standard. For example, if one country can reduce the infrastructure cost by reusing built-in infrastructure, it seems inevitable for this country to choose the cost effective solution. Can GIF come up with some hardware independent interoperability solutions (eID card based on smart card) so that every country should deploy the mID card solution according to their own infrastructure?

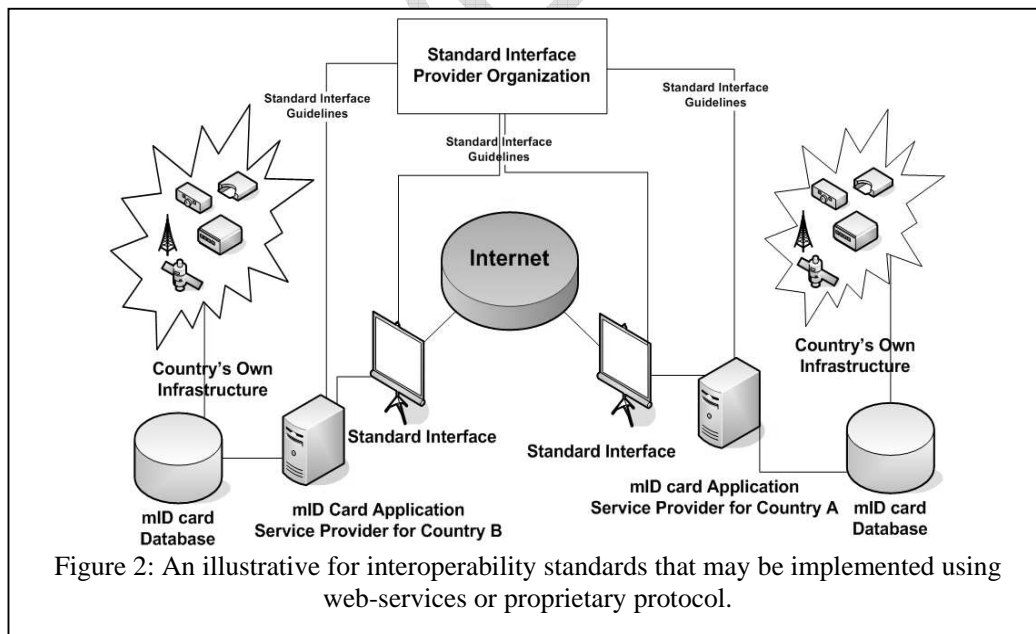
The GIF standard binds the countries to always rely on smart card solutions. Now many questions arise like what if, lets say in near future, we do not want to implement mID card solution using smart card technology? What would happen if in near future some countries want to initiate this project using some other technologies? Is it really feasible for every country to use smart card technology? Can we not provide some standards on software or abstract level?

If answer to the above question is yes, then we can build a common standard so that mID cards can be accepted globally and interaction and transactions among Government to Citizen, Government to Business entities, and Government to Government can become possible without any further obstacles. If GIF consider this scenario then the mID cards will not only be acceptable globally but future devices can also leverage the benefits of security, authentication and many others by using mID cards.

3.5 An illustrative Model for interoperability of mID Cards

Instead of concentrating on common standards for mID cards' infrastructure, we might adopt the latest, state-of-the-art, and cutting-edge software technologies to innovate common standard(s) for mID cards that all countries can easily adopt without making any huge changes in their built-in infrastructure.

The approach is to have one centralized organization that will provide an open and common interface for transactions using mID cards. All governments who want to provide mID cards facilities to their citizens and who want these cards to be accepted globally have to implement this common standard provided by the central organization. Regardless of which technology used for mID cards, it is possible to build an interface which other countries can use to communicate. Although the interface will be uniform, databases of their respective countries will remain decentralized. So whenever a transaction is required, the transaction request will be sent to the intended countries (please see figure 2).



One of the key technologies to implement this kind of standard is use of web services. Web-services are fairly mature in terms of security and reliability. Another way would be to define a globally acceptable protocol (like TCP/IP) for international transaction among mID cards.

The role of mID card Application Service Provider(ASP) can be significant as it will hide the country's infrastructure details, while with the same token, it will provide the standard interface which will be interoperable for other countries and applications to interact. The implementation of an ASP from country to country may vary (as the infrastructure from country to country varies) but the interface to the world will always be same. This will significantly improve the level of interoperability for the mID cards as the standard of interoperability will be hardware independent. Furthermore, future ubiquitous services may also use mID cards by implementing and interacting with the standard interface.

Another interoperability advantage we can achieve using this model is that countries can use different security mechanisms as it is the responsibility of the country's application service provider to provide solution to encryption and decryption. ASPs may also be enhanced or extend its functionality seamlessly. Nevertheless, this model just illustrates a conceptual idea to achieve global interaction among countries and future ubiquitous e-services.

This approach can have many advantages as governments can exploit the existing infrastructure that they already have. This approach once developed, can also provide future ubiquitous devices to use mID card for taking various benefits. The approach is simple, cost effective and relatively easy to implement. This approach will also address the political concerns, country's foreign affair interests.

3.6 Potentials of mID card for mGovernment

Mobile government (Kushchu, 2003) implementations are becoming increasingly popular both for developed and developing countries (Ghyasi, 2004). mID card has a great potential to be part of such efforts. As we have discussed, globalization also implies mobilization which will further enable governments to provide many significant services on mobile devices. This will add great value and much more facilities to the citizens. It is expected that mobile devices will soon take over the wired computing devices and the mobile governments' penetration is therefore important and significant for better and effective citizen relationship management.

One of the important drawbacks for mobile devices is that they are not safe because of their wireless nature, but once the mID cards are used for "mobile transactions", where security is mandatory, the mGovernment services may become more popular. This will definitely bridge the gap between governments and citizens.

3.7 Non-technical Barriers- Privacy Invasion

In the earlier section, we tried to highlight the technical issues that may affect the mID card to be accepted globally. However, there are also some non-technical issues related to mID card that must be addressed before making mID card a global entity. One of the prime issue is privacy.

In many countries, mID card has become reality but many debates are still going on in the world about how assigning identity into the cards may harm privacy and freedom of individuals. These hurdles and threats of privacy invasion make it difficult to globalize the mID cards. Government agencies are trying to show their citizens the positive side of the picture. Their argument is that mID system will enable governments to identify terrorists, bring about a closer citizen-government relationship, and provide better service. This is received as a kind of hypocrisy by some citizens in countries such as USA, England and others in European countries, where terrorist attacks are

still going on though mID cards are implemented in those countries. Spain, one of the recent mID card providing country, is the most recent victim of terrorism. Many independent agencies and NGOs are promoting the idea that identification cards will not only increase the administration power but help the government agencies to look into the private information of citizens. This misperception may overrule the advantages that governments can achieve by implementing mID cards. (Simon Davies, 2001)

Even though globalization may not be as easy as we can imagine but globalization efforts should begin as early as possible so that in the future we have one common standard to globalize and mobilize mID card systems.

4. Conclusions

In this paper we introduced mID card, its uses and consideration for a global implementation both in terms of technological and non-technological factors. The major findings of our study can be summarized as follows:

- The potential of eID card is more than what actually its name suggests. So it's better to name it mID card as these cards are part of mobile technologies and may play a significant role for future ubiquitous devices.
- There is a growing need to standardize the mID cards to make them interoperable among various countries and organizations.
- Mobilization of mID card (i.e. its uses on all devices within a country) is as important as the globalization (i.e. uses in the international arena). It should be available everywhere as well as on all devices so that the real globalization can be achieved.
- As suggested earlier in this paper, the global standards should be implemented in such a way that it is easy for every country to implement. Furthermore, the countries should be free to choose or reuse their built-in infrastructure so that the cost for globalization is minimal and cheap.
- A globalization model presented in Figure 2 may be used to implement the global standard which is based only on software technologies. It implies that we can achieve standardization would be easy and cheap. Nonetheless, the changes in the future to enhance the countries' infrastructure would be easy.

Although the standardization and mobilization is mandatory, there are some issues that must be resolved before implementing this idea. Otherwise it would be difficult to make this idea popular as it is the citizens who are going to use it. The list of issues is:

- Many countries are still unable to launch the project of mID card system as citizens feel uncomfortable in becoming a digital number and against privacy. Governments should implement strong privacy policies to make citizens feel more comfortable.
- Many developing countries are lacking behind in technologies and infrastructure and they are not in a condition to implement eID card infrastructure project, however, if standards can be implemented on software level (as depicted in figure 2) there is reasonable chance that these countries may utilize these solutions.

- There is no on going and concrete global interoperability efforts. Although eEsc is currently working on the interoperability issues regarding mID cards, however, these standards are, unfortunately, dependent on smart card infrastructure.
- There is no world-wide recognized organization which can define standards and then impose these standards.
- The standards should be easy and flexible enough so that, in the future, it could easily be changed and adapt to evolution in the technology. The current interoperability framework is very much dependant on hardware infrastructures.

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Bibliography

Ahmad Farshid Ghyasi, (2004) "*m-Government: Cases of Developing Countries*", submitted to European Conference on E-Government (ECEG 2004), Trinity College, Dublin

Ibrahim Kushchu, (2003), *From E-government to M-government: Facing the Inevitable, in the proceeding of European conference on E-Governemnt*, Trinity College, Dublin, Ireland. (Also available at www.mgovlab.org)

Tom Ahlers. (2003) , "Be smart, be secure", [online], <http://www.hightechfinland.com/2003/communications/mobilitynetworking/setec.html>

Magnus Ahlberg, (2004), "An IT Manager's Insight into Mobile Security", [online], <http://www.net-security.org/article.php?id=631>

Simon Davies, (2001), "Reckless ID card plan will destroy nation's freedom", [online], <http://news.telegraph.co.uk/news/main.jhtml?xml=/news/2001/09/29/wfor229.xml>

Simon Davies - Privacy International, (2004), "Campaigns of Opposition to ID Card Schemes", [online], <http://www.privacyinternational.org/issues/idcard/campaigns.html>

Norman Sadeh, 2002, "M-Commerce", John Wiley Publishers

Andrew Elliott, August 2002, impact on global messaging market, <http://www.biz-lib.com/info/6265.pdf>

Web Resources

- [1] Netscape. (2004) "Understanding PKI", [online], <http://verisign.netscape.com/security/pki/understanding.html>
- [2] Setec, (2003), "EID cards", [online], <http://www.setec.fi/english/identification/eid/>
- [3] eEurope Smart Cards, (2003), "Electronic Identity white paper", [online], <http://www.electronic-identity.org/download/eID-WP-final.pdf>
- [4] eEurope Electronic Identity, (2003), "Electronic Identity in Europe", [online], http://www.electronic-identity.org/e-id_europe.shtml
- [5] Secure Information Technology Center – Austria, (2004), "Austrian Citizen Card", [online], <http://www.buergerkarte.at>
- [6] Population Register Center. (2004), "The ID Card", [online], <http://www.fineid.fi/>
- [7] Takeshi Shinohara (14th May 2001), Ubiquitous Network, Japanese-model Electronic Commerce and Challenges to Sustainable Development, <http://www1.oecd.org/forum2001/briefings/speeches/shinohara-01.PDF>