

2000

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Recommended Citation

Virili, Francesco and Cantoni, Franca, "The Italian Legislation on Digital Signatures and the Role of Italian Banks as Certificate Authorities: A Strategic Analysis" (2000). *ECIS 2000 Proceedings*. 14.

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The Italian legislation on digital signatures and the role of Italian banks as Certificate Authorities: A strategic analysis.

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Abstract: The recent adoption in Italy of a legislation stating the full equivalence of digital and handwritten signatures gives any institution with the appropriate requirements the opportunity to act as Certificate Authorities (CA) for digital signatures. This rises the question whether the CA role could be of potential interest for the Italian banks. The present analysis is focused on the Italian banking sector; however, some aspects taken into consideration here may be in common with other countries. Porter's five forces model is used to show how the Italian banks could leverage the advantageous cost asymmetries given by their existing distribution channels to pursue simultaneously cost leadership and differentiation, acting as Certificate Authorities. Furthermore, they could build up new complementary services and value for the customers around this role. The lack of specific competences and assets together with a number of tactical and strategical drivers suggests that these new services could be object of outsourcing.

I. INTRODUCTION

The paper is divided into 8 sections. Following this introduction, section No. 2 briefly reviews the essential concepts associated with the terms of 'digital signature' and 'Certificate Authority'. Section No. 3 describes the complex issue of the legislative frameworks on digital signatures: different countries may have divergent perceptions of the necessity for compulsory identification of the parts in various economic activities. Nevertheless, in some areas, like business-to-business transactions, this necessity cannot be denied and a digital signature system with full legal effects may be highly beneficial. Such a system was recently adopted in Italy, giving rise to the question asked here, whether the Italian banks could gain a competitive advantage acting as Certificate Authorities. In section No. 4 the Certificate Authority services are examined, using the well-known Porter's framework for structural analysis; as a result, the main strengths and weaknesses for the banking system's competitors are pointed out. Sections No. 5 and No. 6 take into account direct and indirect benefits of issuing the Certificate Authority services as a complement for the banks' core financial services. Section No. 7 enlightens how to overcome the lack of specific competence and technology recurring to the outsourcing issue. The paper concludes in section No. 8 giving a positive answer to the question assumed: the role of Certificate Authorities could be used, leveraging a privileged access to the distribution channels and with resort to outsourcing, to build up new services and extensive relationships with a high value for the customer.

II. DIGITAL SIGNATURES AND TRUSTED THIRD PARTIES

Digital signatures are electronic substitutes for handwritten signatures based on mathematical theory and on the use of

algorithms. They are created and verified by cryptography and require that the holder of the signature owns a pair key system for signing and for verification. One of the keys is private and the other is public. Compared to other electronic signatures, the digital signatures are more serviceable for legal purposes, for their ability to ensure the message privacy, integrity and authentication together with the signer authentication and non-repudiation. Refer to [17] and [4] for two sounds and thorough introductions on the topic respectively from the technical and from the legal point of view.

In general, the digital signatures system is based on the role of a so-called "Trusted Third Party" (TTP), an institution which originally verifies the identity of the parts and guarantees its authenticity. The concept of trust is determinant here, and there exists a vast literature on the topic; see [5] and [22] for an overview, together with two recent models to interpret the process of IT-based trust creation in electronic markets. Usually the TTP is a Certificate Authority (CA) which could be an individual, organization or agency - public or private - acting as a "notary" to authenticate the identity of users of a public-key system. The CA issues, manages and revokes digital certificates, vouching for the identities of the end user for which they are issued. Furthermore, the Certificate Authority is responsible for the publication of the public keys in a directory and for the maintenance functions associated with them.

III. THE RAPIDLY CHANGING LEGISLATIVE FRAMEWORK ON DIGITAL SIGNATURES

Italy, with the so-called "Bassanini law", (law No. 59, 15 March 1997, art. 15), was the first country in the world to establish a full legal equivalence of digital and handwritten signatures. The same year, the Federal Republic of Germany promulgated its "German Signature Law" (Informations- und Kommunikationsdienste-Gesetz, IuKDG, 1 August 1997). The law states the conditions under which digital signatures have legal value and binding. The regulations were promulgated with the "Verordnung zur digitalen Signatur, 8 October 1997. In Italy, the regulations were published in November 1997 (DPR 513/97) and the technical specifications were finally produced with the D.P.C.M. dated 8 February 1999. The decree specifies, among the others, the technological requirements and the standards adopted: for example, art. 2 defines the admitted cryptographic algorithms (RSA and DSA); art. 3 requires one of the two hash methods in the standard ISO/IEC 10118-3:1998; in art. 4 the minimum

key length is fixed in 1024 bits, etc. Several European countries as well as countries in the rest of the world are now considering or adopting a legal framework for the digital signatures. Initiatives and efforts are being taken to set up a common standard framework: the draft EU- directives proposal (www.ispo.cec.be/ecommerce/legal/digital.htm), the European Electronic Signature Standardization Initiative (ESSI, see the final report with a proposal for an European standard [10]) and the “Draft Uniform Rules on Electronic Signatures” in elaboration with the UN commission on international trade law (UNCITRAL). For a general, constantly updated survey, see [21].

Reference [4] is a comprehensive analysis of the digital signature legislation in the European Community. The authors identify three different approaches: “*In the European Community, some Member States adapted their legal framework to electronic forms of documentation and communication. Different possibilities of adaptation could be found. (1) Rules proclaiming that every time a paper document or penned signature is required by law, this requirement can also be fulfilled by electronic means, such as in Italy (general equivalence). (2) Specific legislation in specific procedures accepting the use of electronic documents and signatures such as in the Swedish customs legislation (sectoral equivalence). (3) General rules concerning evidential value (in civil, administrative, criminal, or all type of litigation) proclaiming that electronic documents and signatures can be used in court, such as the Belgian adaptation of the Civil Code (equivalence in evidence). Other Member States did not approve new legislation to provide electronic signatures with legal consequences but adapted their traditional legislative framework by interpretation in doctrine (jurisprudence) and case law (jurisdiction), such as in the United Kingdom.*”

It’s possible to notice, with Anita Smith [18], that the various legislation frameworks may reflect cultural differences: there are contracts or activities for which, in countries like Italy or Germany, the written form has traditionally been an essential requirement, whereas for instance in UK or in the US the compulsory identification of the parts might have been unnecessary. The author (who, not surprisingly, writes from UK) makes a comparative analysis of the contracts or activities that require the identification of the parts in different countries and concludes, a bit provocative, that “[...] *there are strong reasons why organisations engaging in electronic commerce should not seek to tie each transaction to a specific identifiable individual.*” This is certainly true with reference to commercial transactions of low individual value (such as CDs or books purchases). It is however questionable - as the author herself points out in the discussion - in other important areas of Electronic Commerce such as business-to-business transactions. An example could be the communication between a car manufacturer and its suppliers.

In Italy the digital signature system is now operational, and the Government is acting to enforce the use of electronic documents for administrative acts. The procedure to enable the first Certificate Authorities has newly been initialised with the processing of the first requests. Our regulation explicitly requires that the Certificate Authority is a limited company with the same minimum capital dimension and the same requisites of honourableness requested for Italian banks.

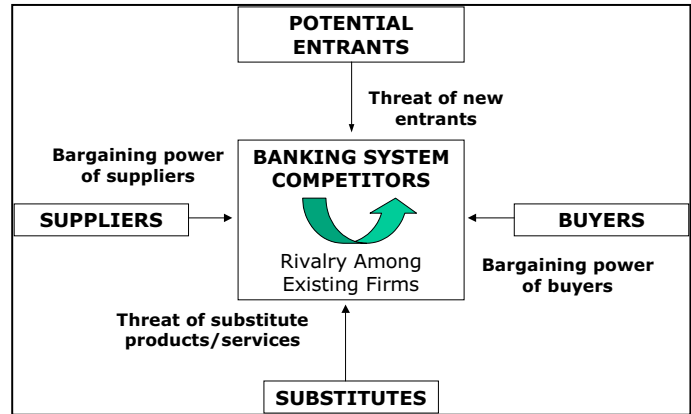


Fig. 1. Porter’s five forces model, adapted from [11], page 4.

A question not necessarily confined to the Italian experience, naturally raises: *how should the banks react to this environmental change?* Should they look at their potential new role of Certificate Authorities as a strategic opportunity or as an unnecessary burden which takes them away from their core business? The following section applies the well-known Porter’s five forces model to try to give an answer to the question.

IV. STRATEGIC ANALYSIS

This study is focused on the Italian financial sector which has some specific characteristics, both from the legal and the economic point of view. It is built on the well-known basic conceptual framework introduced by Michael Porter [11] and applied to the Italian financial sector. For an overview of the relevant contributions on this subject, see Cecilia Rossignoli [16]. Some of the aspects indicated below might be generalized to other countries, especially to the European countries that show similarities on the financial markets. Another interesting issue, not addressed here, would be to find out if the main conclusions would be different for other countries.

Is it of interest for Italian banks to act as Certificate Authorities for digital signatures? We can regard this potentially new activity as a new service (CA service henceforth) that the banks could offer to their customers. Porter’s five forces model helps us to understand the strategic issues related to this question. The model is depicted in figure 1 and it’s generally used for an industrial sector analysis. Here the focus will be specifically on the CA service; the analysis will be broadened in the following sections.

A. Potential Entrants

There is a significant entry barrier for the CA service, which is, to use Porter’s words, the “access to distribution channels” ([11], page 10). The Certificate Authority should be able to physically identify the customers before assigning them keys. This is possible via local branches on the territory. Alternatively, it can be done only by delegating the customer identification to other institutions or offices, (e.g. notaries, local governments, etc) which means delegating a substantial part of the CA service. Another entry barrier which is peculiar in Italy and could be defined as a “cost disadvantage independent of scale” ([11], page 11) is given by the

requisites stated by the Italian law and regulations for the Certificate Authorities. “*The obligations of the Certificate Authorities are so formed that the access to the role is restricted to particularly solid economical subjects, [...] and the banks are the first ones to be considered*” (translated from [1]).

B. Substitutes

The threat of substitution for the CA service could be associated with the services issued by notaries. According to the existing legal framework, the Italian notaries can assume certain functions linked to the digital signatures. An example is the joint certification of authenticity, legality, correctness, and correspondence to the will of parts, for the contracts digitally signed in front of them. Indeed, the physical presence of the contractors is still necessary in order to verify the correspondence to the will of parts. This service, which the Italian law recognises as ‘authentication of the digital signature’ is actually complementary and not substitutive of the CA service (D.P.R. 513/97, art. 16: “*In order to authenticate a digital signature, the public official shall certify that the digital signature was affixed by the signer in the presence of the official following verification of the signer’s identity and the validity of the public key; that the signed document reflects the signer’s will, and that it is not in breach of existing law, as provided for in Section 28(1) of Law No. 89 of 16 February 1913*”). The Italian notaries form a very loose network of independent professionals with low possibilities to build up an economic entity with the requisites stated by the law for the Italian CAs. Instead, they could make use of the Certificate Authorities services to build up on them their own value. Other entities, like the well known Verisign hierarchical network, could attract bank customers and offer an alternative CA service. Verisign is a hierarchical structure with a Certificate Authority on the top issuing the IT services and other conventioned local institutions/officers at the bottom, personally contacting the customers. However, the Certificate Authority should possess all the law requisites necessary. This is not the case now for Verisign in Italy. It is also difficult to build up such a structure in Italy in competition with the quite efficient distribution channels of the banks’ office branches.

C. Bargaining Power of Buyers

The CA service buyers’ power is presumably quite high because of the low buyers’ switching costs, the standardization of the service and the low direct profit presumably generated by low pricing policies which will be discussed herein after. The key of the differentiation might again be the distribution channel. The perceived quality of the CA service could be linked with the easy reach of local offices for first-time authentication. It is quite natural for a bank’s customer to reach the nearest branch office of his/her preferred bank.

D. Bargaining Power of Suppliers

The CA service is based on an important technological infrastructure. The service requires a specific knowledge, specific skills and a specific technology, which are not typically present in the Italian banking structure. The main consequences are that the dependence on technology suppliers would be high and that important investments as well as organizational efforts should be faced. As

enlightened in section VII, outsourcing could be a good way to overcome these types of difficulties.

E. Rivalry Among Competitors

At present, there are not yet active competitors in Italy for the CA service, but the first requests are currently being processed. Presumably, there will be only a small number of big institutions directly issuing technology services for public keys certification. A viable option for the banks, discussed in section VII, might be outsourcing the technology services. On the CA service, there might be a competition among banks and a competition between banks and other actors. Outsourcing could lower the exit barrier given by investments in technology. On the other side, the entry barrier formed by access to distribution channels could be determinant in the competition between banks and other institutions.

F. Generic strategies: cost leadership/differentiation

In the analysis of the five competitive forces given above, one of the key aspects is the availability of the bank traditional distribution channels. With the massive usage of IT and of alternative distribution channels, the banks could have difficulties in finding a way to reduce costs associated with the branch structure, facing important strategic risks, which are named in a recent report by the European Central Bank “worsening excess capacity problems and unsustainable cost structures” ([3], page 35). On the other side, to build up a network of local branches for the CA service distribution, important investments and organizational efforts would be required by non-banking actors, even if the choice would be made to build up a hierarchical service network in conjunction with other affiliated entities. From this point of view, the ready availability of their own distribution channels may enable the banks to point to the cost leadership for the CA service, and to reduce the excess capacity. Moreover, leveraging the easy reach of their local branches, the banks may differentiate themselves from other eventual non-banking competitors. A strong brand name could be leveraged as well. The presence of an advantageous cost asymmetry in the distribution of the CA service is often balanced by the lack of specific competence and IT assets, which has to be overcome (see below, section VII). The (usually rare) coexistence of cost leadership and differentiation in the CA service might move the banks to be aggressive, offering it in bundle with their core business services, setting competitive prices and gaining further indirect advantages (see the following sections). How can the Italian banks further leverage the aspects evidenced above to gain a competitive advantage and improve their competitive position in the financial sector? In the following sections, we will make use of some classical analysis tools introduced in [12] to try to answer to this question.

TABLE I
CUSTOMER ACTIVITIES AND FINANCIAL SERVICES

<i>Digital signature-enabled customer activity</i>	<i>Related financial services</i>
Real estate transactions	Mortgage loans, personal loans
Business to business transactions, contracts, sales	Commercial intermediation, risk hedging, funding, securities ...
Trading	Intermediation; sale of financial products; risk hedging ...

V. THE CERTIFICATE AUTHORITY SERVICE AS A COMPLEMENT

The concept of complementary product/service discussed by Michael Porter in [5], chapter 12, is one of the main factors which makes the CA service potentially interesting for the banks. As known, a complementary service is typically associated by the consumer with another service or product, and the selling of one can promote the selling of another. The use of the digital signature could be associated with activities regulated by the digital counterpart of a written contract, such as the real estate transactions. These activities could represent a fertile ground for the sale of other 'core' financial services such as mortgage loans. Table No. 1 gives a sample list of some of these activities with the corresponding related financial services.

VI. INDIRECT ADVANTAGES: BUILDING EXTENSIVE RELATIONSHIPS AND CUSTOMER NETWORKS

The CA service is basically an identification service with the advantage of making it possible to 'sign' contracts and documents online and of enabling confidential communication. The Certificate Authority, being a bank, could try to add value to this basic offer building additional services around. In today's economy and especially in e-commerce, the creation of new products and services is often possible and preferable to the purely defensive strategy. As Kim and Mauborgne recently pointed out [8], "*Competition based strategy [...] has waning power in today's economy in which, in many industries, supply exceeds demand. Competing for a share of contracting markets is a marginal and "second best" strategy. [...] A "first-best" strategy in today's economy stimulates the demand side of the economy. It expands existing markets and creates new markets*". An interesting possibility to leverage the CA service creating value for the customer would be to create web based customer networks and communities around the main customer activities centered on digital signature. For instance a customer network for real estate contracts with on line services ranging from real estate agencies to contractual and fiscal consultancy, from financing to contacts with architects and interior- or design experts. Some of these services are already starting to be partially offered off-line by a few Italian banks (as Banco Ambrosiano Veneto with the bundle offer named 'mutuo casa'). Similar initiatives could be tailored to specific needs in the corporate market as well. The creation of customer networks not only links the customer to the bank raising his material and immaterial switching costs, but can also help to sustain the prices and to avoid price comparisons with competitors. Grover and Ramanlal [6] call these communities "captive buyers networks". "*In fact, the consumer is part of a captive buyer network because there is time, information and possibly financial cost to exiting the subject and registering for another one to compare products.*"

Issuing the CA service could also contribute to enhance the overall level of the bank's customer satisfaction. A recent study by Krishnan, Ramaswamy, Meyer and Damien [9] states that one of the drivers for customer satisfaction in financial services is the satisfaction withof product offering, followed by the satisfaction with the quality of the services from the distribution channels. Both these aspects may clearly be improved leveraging the CA service.

VII. OUTSOURCING THE CA SERVICE

The continuing growth of new potential services, including the CA service, provides banks with the opportunity to re-assess the question of which activities should remain in house, and which activities should be sourced from outside, whether by purchase or through forms of cooperative agreement [7],[2]. Quinn and Hilmer [15] suggest ways to answer to the question. Two new strategic approaches, when properly combined, allow managers to leverage their banks' skills and resources for increased competitiveness:

1) *Concentrate the bank's own resources on a set of "core competencies"* where it can achieve definable preeminence and provide unique value for customers [14];

2) *Strategically outsource other activities* – including many activities considered traditional integral to the bank – for which the bank has neither a critical strategic need nor special capability [13].

If we apply these approaches to a typical Italian bank issuing the CA service it appears immediately clear that the CA service is usually not a core service. It does not represent a critical strategic need and the bank is not provided with the special capabilities to offer this kind of service (it does not own the technology leadership).

According to the results of a recent survey from "The Outsourcing Institute" [20], behind a bank decision to outsource the CA service, a number of drivers can be individuated: some of them are tactical, others are strategical.

Tactical reasons to recur to the outsourcing are based on the following facts:

1) *It reduces operating costs.* An outside provider's lower cost structure, which may be the result of a greater economy of scale or other advantage based on specialization reduces a bank's operating costs and increases its competitive advantage.

2) *Some resources are not available internally.* New organizations, spin-offs or banking expanding into new geography or new technology should consider the benefits of outsourcing from the very start.

On the other hand, the strategical reasons are:

3) *It improves bank focus.* Freed from devoting energy to areas that are not in its expertise the bank can focus its resources on meeting its customers' needs.

4) *It accelerates reengineering benefits.* Reengineering aims dramatic improvements in critical measures of performance such as cost, quality, service and speed.

5) *It allows the access to world class capabilities.* World-class providers make extensive investments in technology, methodologies and people.

6) *It reduces risk.* Markets, competition, government regulations, financial conditions and technologies all change extremely quickly and outsourcing providers make investments on behalf of many client, not just one.

7) *It frees resources for other purposes..* Outsourcing permits an organization to redirect its resources from non-core activities toward activities that serve the customers.

Swamidass [19] suggests that an evolutionary process in global sourcing consist of three stages: cost minimization, competitive advantage and strategic asset. As customer satisfaction is becoming a central lever for the business tactics, competitive advantages of the banks focus on the ability to create a major value for the customer in terms of quality, service and product innovation. In this study, these three stages are joined together since a bank - externalizing the CA service - could simultaneously minimize the costs, gain and sustain competitive advantage and join the strategic asset.

Practical evidence is given by the service SSB provides to its customers. SSB is an Italian outsourcer of banking services, owned by several major Italian banks. One of its offers, named SSB-CA (<http://ca.ssb.net>) gives the customer the possibility to implement its own Certificate Authority at a low cost and with all the requirements stated by the Italian law and regulations, including the level of logical and physical security. The offer of SSB-CA is built ad hoc in order to satisfy the customer's needs, including the planning and design of a customized CA service, the use of the SSB technological infrastructure and a users help desk.

VIII. CONCLUSIONS

The answer to the research question is positive: acting as Certificate Authority could represent a strategic opportunity for the Italian banks. A critical success factor may be the access to the distribution channels, which could be determinant to reach the cost leadership (and to some extent, differentiation) in these specific services against the non-banking competitors. Another important success factor may be the use of the CA service as a complement, to build up new high value services and extensive relationships with the customers. A third, determinant success factor may be the resort to outsourcing. Further extensions to this analysis could be based on more advanced strategic analysis frameworks and models. Another natural object for further research would be the application of this analysis to other countries, evidencing differences and similarities.

ACKNOWLEDGMENT

The authors would like to thank Andrea Carignani for helpful insights, Roberto Pierantoni for a wonderful after drinking night discussion, Susanne Sköld for proofreading and three anonymous reviewers for their useful suggestions.

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