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**Diverging Paths to a Network World:
Computerizing Spanish and British Savings Banks, 1960-1990**

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(Work in progress)

Abstract: The development of shared data processing networks and their consequences for new retail banking services from the 1960s to the 1980s in both Spanish and British savings banks are the topic of this research. Each of the two competitive environments responded in its own way to the processes of technological and organizational change. As a result this paper observes cross-country variations in the presence of convergence and globalisation. This approach focus on the impact of computer communication networks as a result of corporate strategy in Spanish savings banks. But relevant aspects of computerization in Britain are considered to highlight the adaptative capacity of technology in different environments. Also this paper considers organizational forms with similar root in their corporate governance to enable a degree of homogeneity of the analysis of technological change.

Keywords: technological change, computer communication networks, computerization, regulatory change, savings banks, retail banks, TSB, collaboration, Spain, UK.

1. Introduction

The adoption of computer technology is often seen as a driver of a broader process of globalization. Computers are agents of abstraction in a technological world which is in the process of globalization. However, the use of computer technology, particularly computer communications networks, is rarely contextualized within idiosyncratic patterns or national traditions. Historical contingency is behind apparently inevitable processes of globalization, and human agency behind the spread of computer technology into new social spaces. Accordingly, the framework of this paper regards the diverging paths to a network world within the context of a globalizing technology.

The development of shared data processing networks and their consequences for new retail banking services from the 1960s to the 1980s in both Spanish and British savings banks forms the subject of this research. Each of the two competitive

environments responded in its own way to the processes of technological and organizational change. As a result, this paper observes cross-country variations in the presence of convergence and globalisation. It focuses on the impact of computer communication networks as a result of corporate strategy in Spanish savings banks. In Britain, relevant aspects of computerization are considered to highlight the adaptive capacity of technology in different environments. In addition, this paper considers organizational forms with similar roots in their corporate governance to enable a degree of homogeneity in the analysis of technological change. (see Maixé-Altés, forthcoming).

Reliance on cash in Spanish retailing and increasing administrative costs spurred Spanish savings banks to embrace computer applications. In the corresponding British case, computerization had little impact among the trustee savings banks (TSB). Early progress in Spain served to raise the strategic priority of a project to design and develop a system for data transmission among saving banks using conventional telephone lines to build domestic interconnections among the savings banks, and to link these to international financial markets. This infrastructure allowed new products, developed in line with the functionality of new Automatic Teller Machines, EFTPOS and debit and credit cards, to be implemented in real time via on-line networks (Bátiz-Lazo and Maixé-Altés, 2010).

The principal goal of this approach therefore, is the analysis of technology and corporate strategy within their social and historical contexts, that is, the dynamics of the design, construction, development, implementation and use of retail financial services (Orlikowski and Barley, 2001; Bridgman and Willmott, 2006).¹ A central feature of this comparison involves the dynamics surrounding first mover advantage: the UK being

¹ See ECB (1999) and OECD (1999).

characterized by deep industrial roots and technological innovation (e.g. LEO and Pegasus) while Spain industrialized well into the 20th century and was typically a net importer of business applications of computer technology. The analytical framework is based on Chandler's ideas on corporate growth and technology (Chandler and Cortada, 2000; Chandler, 2001) and related literature (Whittington and Mayer, 2002). This paper thus shows how researching the uses and purposes of computer technology is every bit a business history (e.g. Haig 2001; Cortada 2006; Yates 1999).

Surviving records from the technological secretariat of the Confederation of Spanish Savings Bank (Confederación Española de Cajas de Ahorro, CECA) include internal papers, minutes of meetings, and memoranda. In addition, further contemporary secondary sources were used. These included data from CECA's Library, including a series of computer-oriented pamphlets called 'Cuadernos de la COAS' and relevant articles from CECA's in-house magazine. Surviving records from British savings banks are difficult to come by. I have opted to examine contemporary secondary sources while looking for the informational, economic and organizational forces that influenced automation (in the form of the adoption of computer technology). Particularly useful for this study are the savings banks' (TSB Banknotes) and manufacturer's (NCR Post) in-house magazines. This data was reinforced by recourse to articles from the Journal of the Trustees Savings Banks Institute and newspaper articles in The Times.²

The remainder of this paper proceeds as follows. The second section describes the different frameworks that were developed in Spanish and British banking with regard to savings banks. Section three considers technology and corporate strategy in both British and Spanish savings banks. The four and five sections analyse the origins

² For TSB sources see Bátiz-Lazo and Maixé-Altés, 2010.

of a computer communication networks in Spain and their functionality in retail banking. The final section summarizes and advances some conclusions.

2. Two different frameworks in Spain and Britain

Savings banks in United Kingdom and Spain originated as retail finance organizations operating through democratic and philanthropic guidelines. With no share capital traded on the stock market, all their profits were either reinvested or in the case of Spanish banks, returned to the community through social spending. Savings banks sought to create thrifty habits amongst small and medium-sized savers like craftsmen, house servants or the growing proletariat, that is, outside commercial banks' target market (Horne 1947; Fishlow 1961; Martínez Soto 2000).

The first savings bank was established in Ruthwell, Scotland in 1810 (Horne 1947, 34). Savings banks then grew throughout the UK and continental Europe. This often as a response of the middle classes to self-help institutions of the proletariat set up along Rochdale co-operative principles (Ross 2002). In Spain savings banks were introduced in 1835, some 25 years after the first savings bank began operations in Scotland, but their number remained low until regulatory reforms of 1874 and 1880. At the end of nineteenth century there were 231 savings banks in UK and 50 in Spain.³

To create trust among potential depositors, the Savings Bank (England) Act 1817 required all such institutions to deposit their accumulated funds with the Commissioners for the Reduction of the National Debt, who held an account at the Bank of England (thus providing cast-iron security) for this purpose (Horne, 1947: 72). The same principles were extended to Scottish savings banks in 1835. Guarantees to depositors introduced by Act of 1817 were reinstated in subsequent legislation (enacted in 1833, 1863 and 1891) (Payne 1967).

³ Horne 1947, 388; Memoria y Cuenta General del Monte de Piedad y Caja de Ahorros de Madrid, Madrid, Tipografía Faure, 1900.

Regulatory changes, therefore, limited the potential diversification of the British savings banks' investment portfolio and foreclosed opportunities for direct lending to retail customers while their business remained in collecting low volume deposits. Funds and operation of the savings banks would be under control of voluntary managers or trustees (hence the roots of the TSB acronym), none of whom was to derive any benefit from that office (Maixé-Altés 2009).

All the features of the rather restrictive business policies in Britain were in stark contrast with the rather liberal regime at the Spanish savings banks. The initial business model of independent non-profit-oriented institutions with independent financial resources was very weak and made the creation of independent savings banks unviable. In 1839 the government of Martínez de la Rosa introduced reforms to use deposits at the savings banks as working capital to support the loans of the *monte de piedad*. The latter dated to the early modern period in Spain. Prior to amalgamation with the savings banks, the *monte de piedad* loaned money against collateral (usually jewellery or clothes) and they were effectively run as charity-oriented pawn brokers (Anton Ramirez 1876: iv; Martínez Soto 2003).

Legislation introduced in 1880, opened the way for the growth of Spanish savings banks as lack of a detailed regulation regarding their investment policies resulted in product diversification and growth of assets at a greater rate than savings banks elsewhere in Europe (Maixé-Altés forthcoming). The number of entities also grew substantially, that is, from 26 savings banks in 1880 to 66 in 1905. At the same time, their proportion of total deposits in Spain increased from 12 per cent in 1880 to 16 percent in 1905.⁴

⁴ Memoria y Cuenta General del Monte de Piedad y Caja de Ahorros de Madrid, Madrid, Tipografía Faure, 1880, 1905; Tortella 1974; Martín Aceña 1985.

Meanwhile in the UK, together the trustees savings banks (TSB) would rank in size with any of the four main London clearing banks. In practice, however, there was little competition between clearing banks and savings banks or even amongst the savings banks themselves. Each individual TSB served a separate geographical area and competition for retail deposits did not become more acute until after the end of the Second World War. A similar development took place in Spain, where individual savings banks limited their activities to specific geographies. Initially, this was because of a lack of organisational capabilities and, later, because of administrative restraints and legislation passed during the Franco regime - until these constraints were gradually dissolved from 1977 onwards as part of the so called the 'Fuentes Quintana' economic reform (Grifell-Tatjé and Lovell 1996; Bátiz-Lazo 2004). By 1962, Spanish savings banks had 27.5 percent of all deposits in Spain.⁵ Meanwhile the TSB had a 9.2 percent of sterling deposits by UK residents.⁶

Both Spanish and British savings banks saw the advent of business applications of computer technology with interest but neither were early adopters (Bátiz-Lazo and Maixé-Altés 2009). It was through collaboration that they decided to tackle the technological challenge posed by computers (Bátiz-Lazo & Maixé-Altés, 2009).⁷ Both British and Spanish savings banks were active in international associations and forums. This is a very important part of their story and how they responded to technological change. In what follows I compare and contrast developments within domestic economies to highlight how idiosyncratic events led to the success and failure of computerization. The TSB were responding primarily to domestic events (i.e. decimalization of sterling and amalgamation into a single entity) whereas Spanish

⁵ Boletín Estadístico del Banco de España (BEBE), Madrid: Banco de España, 1962.

⁶ Committee of London Clearing Bankers or CLCB (1978) Evidence of the London Clearing Bankers to the Committee to Review the Functioning of Financial Institutions (General memorandum of evidence to the Wilson Committee), p. 56.

⁷ As was the case of the insurance industry documented in Yates (2005, 77ff).

savings banks were initially inspired by developments elsewhere in Europe. For instance, during the annual international meetings of savings banks' associations, development around the application technology by Swedish savings banks were often seen as pioneering. Interestingly co-operation was more intense and longer lived in Spain than in the UK.

3. Technology and corporate strategy

From the mid 1950's, the Spanish credit entities began to carry out the mechanisation of numerous activities using resources that had been available for many years including technology involving magnetic tape and punch cards.⁸ Both the Spanish and British Savings Banks were late adopters of these processes, but, once they had been introduced, they were applied rigorously. However, their motives were quite different, in the case of Britain it was necessary to mechanise a large quantity of small deposit operations i.e. operations involving small sums of cash, while in the case of Spain mechanisation came about as a consequence of the diversification of its business (Bátiz-Lazo and Maixé-Altés, 2010).

The introduction of computer communications networks in Spanish Savings Banks was led by the Caixa. This Savings Bank had a very strong presence throughout Catalonia and the Balearic Islands, and historically this was the largest Savings Bank in Spain. Studying this particular entity is very revealing when it comes to analyzing the first steps taken with respect to this technology and the corporate strategy which defined the way in which it developed. Between 1958 and 1962, La Caixa mechanised a large proportion of its operations (card-based electromagnetic tabulating machines and punch

⁸ Savings banks such as those of Granada and others in the Basque Country were pioneers in this field. La Caixa, however, was a little slower in introducing electromechanical processes, and tended to enter into these markets more intensely on the arrival of the following generation of machines (Jesús Ruiz Kaiser, Director of La Caixa Computing and Accounting Department (1963-1974) and Deputy General Manager (1975-1988). Barcelona, interview with author (29 March 2010 and 11 April 2010).

cards), in such a way that it became competitively placed to address the new challenges posed by telematics applications. The construction of an inter-branch network began in 1962-1963 and obtained its first results by the middle of the decade.⁹

In this sense, there was an initial phase in which the Spanish Savings Banks intensively applied the new information and communication technologies within their central services. The desired effects were the rationalization of tasks, a reduction in costs, an increase in productivity and the strengthening of human resources. The strategy consisted of directing those resources that came from the central services and was destined for the territorial and commercial structure (Ruiz Kaiser, 1986).

It was also throughout the 1970's when the CECA initiated a process of internal computerization. In an initial phase, computers were provided for the Statistical Department, with the aim of being able to offer aggregate data from the regional banking business and that of its associates.¹⁰ Subsequently, in the 1970's, computerization came to manage the wholesale banking services that the savings Banks offered. In organizational terms, a key moment in the development of technological systems for the savings banks was the creation of an automation and organization committee (COAS, Spanish acronym) in the offices of the CECA. This was set up in 1969 and was made up of representatives from the savings banks (see Batiz-Lazo & Maixé-Altés, 2009). One of its first objectives was the creation of a system that would interconnect the savings banks (SICA), with an interbank centre in the Madrid-based head office of the CECA. This was the basis of a compensatory payment network that would provide support for numerous services.¹¹

⁹ Memoria Anual de la Caja de Pensiones para la Vejez y de Ahorros de Cataluña y Baleares. Barcelona: CPVA, 1962-1965.

¹⁰ José Esteve, Director of CECA's Computer Department (1962-1995), Madrid, interview with author (12 December 2007).

¹¹ CECA, COAS, Technical Secretariat, minutes 19 February 1970 and 29 May 1971. Esteve Interview, 2007.

The British TSB was a little slow to introduce telematic networks in their branch system. On the one hand, there was a considerable delay in the mechanization processes for basic operations, and, on the other, the rigidity of the system controlled by the TSB Inspectors Committee, whose mandate included overseeing capital expenditure at individuals banks, exacerbated the lenthitude of this process.¹² This policy contrasted with the mechanization processes taken up by some of the savings banks in the second half of the 1950's and developed by the CECA from the beginning of the 1960's (Batiz-Lazo & Maixé-Altés, 2010).

By the mid 1980's, in the Spanish Savings Banks, the structure based on the inter-branch network was mature. At this time, what had come to be known as, *Union de ordenadores* (computer unification) had reached an advanced stage of implantation. This took place via the CECA computer centre, which was soon to complete the inter-bank network for the savings banks. This design was possible thanks to the packet switching network which was of a public nature and offered by the national phone company (CTNE, from 1984 Telefónica).¹³ This network came into existence in 1971, and was in the vanguard of technological advances on the world stage (an analysis of the formation of infrastructures at the service of the computer networks is dealt with in the following section).

[Insert figure 1]

Figure 1 shows the computerization structure of the Caixa branches in the mid 1980's. It clearly reveals the considerable advances in terms of network that had been carried out in the previous decade. It shows the processes that were carried out in real time and subsequently, and the use of local and external networks. 68.3 per cent of the information that the central controller of the bank branch had, came from the branches

¹² TSB Inspectors Committee, No. 69 (1962), see Bátiz-Lazo & Maixé-Altés, 2010: 144,

¹³ CECA, COAS, Technical Secretariat, Reports 1971-1985.

local data base (the majority of this information corresponded to savings transactions and those of current accounts). 31.7 per cent of the information, handled by the same controller, was transferred in real time via a packet switching network using the financial entity's central computer. The centralized data bases were, in the main, made up of, what were termed, special operations (credit and risk information that required the intervention of the central departments), the rest corresponded to accounting, auditing, and other control operations. At this time, operations with ATM's allowed customers to have access to their account balances in real time and from any "cash machine". The SICA system provided a connection to all of the ATM's via central computers in the CECA in Madrid.

By the mid 1980's, the strategy of the strongest Savings Banks was to take a sharp turn. Once the centralization stage of the process had taken place via the use of communication networks, a new phase of decentralization began to take place whose objective was to locally administer an important proportion of local branch operations. In short, there was a concerted effort to prevent the central system from becoming overloaded and creating inefficiencies in the rhythm of work (Ruiz Kaiser, 1986). Both the phase in which there was centralization and the subsequent decentralization phase, allowed the, 'front office' to simplify a number of their routines. The introduction of a withdrawal procedure that simply involved presenting one's bank book and ID card, without the need to sign any document also had a significant impact on savings bank operations. 1980 also saw the introduction of the bank book with a magnetic stripe, which meant that cashiers no longer had to type in customer ID data.

The magnetic stripe system, became extensively used in the ATM's, so that these became accessible either with a card or with the traditional bank book in which

the amounts involved in each transaction were recorded and the final balance shown.¹⁴ With regard to this particular development, the Caixa followed in the footsteps of First National Bank of Chicago. The executives of the Caixa (Josep Vilarasau and Jesús Ruiz Kaiser) had the opportunity to visit the American bank at the end of the 1970's. In the USA, they had the opportunity to see how the ATM bankbook was used (via off line NCR machines). The scanty interest shown by IBM with respect to introducing this service in the ATM's led the Caixa's directors to visit the Post Savings of Japan, which, although it did not, as then, have on line ATM's, they did use the magnetic stripe in their bank book, in conjunction with Fujitsu machines. In this case, the option was in the form of a collaboration contract with Fujitsu who became the supplier of new ATM's, and, as a result, became able to access the markets of the whole of Europe (Ruiz Kaiser, 2010 Interview).

In both cases, Spanish and British, the corporate strategy with regard to the introduction of computers and their effects on back office and later, front office operations should be considered from a dual perspective. On the one hand, the initiatives of the most innovative entities were extremely influential and, on the other, the strategies carried out by the entities that were associated with the Savings Banks, particularly, in the case of the Spanish Savings Banks, by the CECA. In Spain, technological strategy was adapted to business strategy, and not the other way round. In this sense, it was the financial entities that determined the usage of computerization in its operations. However, there was a feedback process that determined that the organizations adapted to the changes brought about by the ICT (Matesanz, 1986). In Britain, on the other hand, corporate strategy was conditioned by domestic circumstances (decimalization, regulatory change and merger policy). Further, because

¹⁴ This is relevant because the clients are accustomed to being able to see their bank balance printed in their bank book. As such, it contributed to the popularization self service.

the TSB carried out computerization and the installation of networks comparatively late, they were able to enjoy the advantages of products that were already well tested and adapted to their needs.

4. The impact of computer communication networks on Spanish banking

In the previous section the public data transfer system was mentioned and how this was used by financial entities. In this section, the article will consider the origins of the system and its advantages and disadvantages from the point of view of the computer communication networks of the Savings Banks and the banking system in general.

The large-scale users in the financial sector acted as the midwife to the birth of computer communication networks in Spain. This was a key factor in the development of this type of network and, logically, there were certain disadvantages derived from the fact that access to these networks was limited to medium and small-scale users from the business sector for quite a long time.

The origins of data transmission in Spain took place at the end of the 1950's and the beginning of the 60's as a consequence of a demand from the North American military command who asked the CTNE for four communication circuits between the Pentagon (WA) and the North American base in Rota (Cádiz). This obliged the Spanish telephone company to search for a rapid solution to such an unexpected demand. It was decided to use conventional telephone lines for the transmission of data (Martín Tardío, 2010).

During this initial stage, the entities demanding these services were large companies such as the national railways (RENFE), the national air company, Iberia, Hidrola (electricity), the large banks and savings banks, particularly, La Caixa and Banco Español de Crédito, BANESTO (Telefónica, 1998: 20-22). Together with these firms, a group of professionals from the telecommunications industry with a nucleus in

the CTNE, created a data network conceived of as the sum of a number of virtual private networks, which provided the members of the group with an enormous amount of communicational freedom.

This system facilitated the mechanization of the Spanish financial system at a faster rate than would have otherwise been possible by using costly circuits. The basis of this system was the analogical telephone network which provided support for sustained data transfer in a circuit switching network.¹⁵ As was seen in the previous section, La Caixa was the first financial entity to request the use of urban circuits in order to connect their branches in the large cities and, subsequently, long distance connections for their branches in the Balearic Islands and in the rest of Catalonia.¹⁶

The following stage involved the implantation of integrated networks, which came about as a direct result of new digital techniques for telecommunications. The demand for these services continued to be lead by the large users, particularly within the financial sector. The sole supplier continued to be the CTNE whom, like the majority of the world carriers, maintained what was then termed, a ‘natural monopoly’ for telecommunications.¹⁷ In 1971 the Special Network for the Transmission of Data was created (RETD, Spanish acronym), which was essentially an intermediate stage prior to the creation of the Integrated Services Digital Network (ISDN) which was developed during the second half of the 1980’s. The RETD was the first public packet switching network in the world (installed by the CTNE in Madrid by the Univac 418-111 team).¹⁸

¹⁵ Circuit switching was a temporary channel of transmission that was exclusively dedicated the transfer of data between nodes and terminals. These transmissions took place at low speed along analogical lines (the modem facilitated the harmonization of the digital and analogical signals). This system generated a lot of interference and problems with the correction of errors. In order to avoid some of these problems it was necessary to change some of the specifications with respect to telegraphic transmissions (Arroyo, 2006).

¹⁶ This was established using IBM 2970 terminals of 134,5 bps and links designed to unite the concentrators with a computing centre of 1.200 bps (Ruiz Kaiser interview, 2010).

¹⁷ See Alchian (1950) on natural monopoly theory and the concept of a representative firm.

¹⁸ The interconnection protocols between nodes were developed in-house, and were based on those of ARPANET, see Adanero (2006). This system was much more efficient than circuit switching. In the new

This process took place at the same time as the development in the United States of ARPANET (which was not commercial), which preceded the installation of the packet switching network in Europe by several years.

In 1970, most of the European telecommunications carriers offered data services within a circuit switching network. In the UK, at the beginning of the 1960's an experimental network named MARKI, based on packet switching was being developed (Adanero, 2006). Its premature appearance in Spain was technologically conditioned to the existence of computers that were capable of sustaining such large networks based on packet switching. This deficit was overcome by maintaining the new network exclusively at the service of the banking system. In short, it was the Savings Banks and banks that laid down the design for these networks in function of their needs (flow of numerous daily operations, at first among the inter-branch networks, later among the Inter-bank networks).

Spain's early choice of the packet switching network system, when there was an absolute predominance of analogical lines, put a brake on the competitiveness of the new system. This proved to be inflexible in the face of new demands that arose in the 1970's from non-banking users. The problem was exacerbated by a framework in which telecommunications were highly regulated and in which the carrier had a monopoly (see López García, 1999). As a consequence, the Spanish phone company moved towards a mixed strategy that combined overlaying analogical and digital lines with the creation of "digital islands", which facilitated higher speeds in the installation of lines in certain areas. The company opted for a viable solution with respect to ISDN without breaks or radical changes. Obviously, the disadvantages stemmed from the dispersion in the

system, the information moved in packets or groups of information, which together with the data itself were included in the control information; the packets were transmitted via the network and subsequently reassembled.

resources for maintenance, the complexity inherent in managing the network and an imperative need for flexibility (Barreiro, 1986).

The first steps in the introduction of this policy were taken in 1978 with the establishment of the Spanish public network IBERPAC. With the creation of this network, the CTNE redefined the structure of the RETD, with the aim of making it an authentic universal network, open to every type of client, and sponsored by the industrial group itself.¹⁹ Between 1978 and 1981, the TESYS technology was developed, a system that involved the creation and use of communication nodes using CTNE's own packet switching technology (see Adanero, 2006; López García, 2003). The characteristics of this network gave the company a certain advantage in terms of leadership in Latin American markets and in other areas. In 1984, the Department of State in the USA stated that "Spain has the most highly evolved data transmission network in the world [...] the majority of the countries in the world still have networks which are at an experimental stage of development ...".²⁰ This was international recognition for the technological success of the project developed by an industrial group which was already known as *Telefónica*.

The ISDN architecture began to be installed in Europe in 1987. It was marketed as a universal public network and expectations were high for the future performance and development of the system. However, in face of the U.S. network which was to become INTERNET, the system that finally prevailed in the 1990's, the future of ISDN proved to be limited. However, Japan aligned itself with the ISDN, and provided service to a good number of clients (10 million en 2001). The slow pace of the establishment of standards on the part of the ISDN, impeded new developments and provoked the loss of

¹⁹ This network, which was much more flexible than the old RETD, facilitated access via telephone, data phone, fax, telex, telex, videotext and computer; making it possible to send information to any type of terminal (Barreiro, 1986).

²⁰ Cited by Adanero (2006: 604).

competitiveness when faced with new technological solutions (Arroyo, 2006).

By the mid 1980's there was a desperate search for computing standards that were capable of facilitating the integration, interconnection and connectivity among all processes, from the networks of micro-computers to interdepartmental and mainframe computing. Within technological circles it was said that: "There is some confusion and some deep-rooted interference" and the researchers told the sales representatives that "we will have a solution you yourselves have one" (Gene Amdahl, quoted by Carbo, 1986: 152). This was a problem that was connected to the network itself and the need to make the communications networks, messaging and mailing all followed certain standards. In Spain, the commercial banks and the Savings Banks acting within this framework, tried to work round the problem by using 'stand alone' equipments, and departmental solutions in their central services (Carbo, 1986).

Simultaneously in Japan, with a banking structure that shared certain similarities with that of Spain, Yuzuru Abe, General Manager of DKB²¹, had placed his faith in the social network (an Inter-bank network made of the banks' clients). He argued that this network was the product of a process of diffusion involving the automation of offices via computerization, the introduction of PC's, the push-button phone and facsimile, the liberalization of lines of communication and the improvements in the services offered by the Nippon Telegraph and Telephone Corporation network (NTT) , see Abe (1986). What stands out is the role that this executive attributes to the Japanese phone company, a company which was very similar to Spain's Telefónica while of course it must be remembered that the industrial environment was very different in both countries.

If one compares the telecommunications network infrastructures in Spain with those of the UK it may be observed that they were substantially different. In the UK the

²¹ Dai-Ichi Kangyo Bank Ltd., a leading bank in the Japanese financial system.

telecommunications service was in the hands of the General Post Office, set up as a governmental department. In 1969 it became a public corporation that maintained a monopoly in the field of telecommunications. In the case of Spain, although the state had a participation in the CTNE, it remained a plc. This meant that, its directors had much greater freedom to deal with the impending technical changes. The CTNE, later to become Telefónica, always did business in which the weight of the technological component was highly significant. However, the greater industrial power of Britain makes a coherent comparison with Spanish backwardness somewhat difficult.

The British telecommunications sector at the end of the 1960's went through a considerable period of change. It created the National Giro, as a state-owned financial institution to operate a national payments system, making use of the post office branch network. It provided an alternative to the traditional cheque-clearing system operated by the major commercial banks. As Booth & Billings (2010) show, it was designed to function from the outset on a computerized basis, a key element in the government's techno-nationalist stance, which sought to nurture the British computer industry against US competition.

5. Banks, computing and networks

The networks and the cases that are presented here underline the importance of financial tradition, and historical contingency which themselves determine a large proportion of the technological development processes, at least while in their early stages. The European financial market in the mid 20th century was quite different from the US market. This distinction may be extended into the differences between Anglo-Saxon Europe and Latin Europe. Perhaps the factors that most affected the two systems were the high levels of cash in circulation in Europe and the relatively sparse network of branches in the US banking system. As a consequence, the level of circulation for bank

cheques in the US was very high, supported by very rigorous legislation in the case of insolvency.

In Spain this panorama was quite the reverse, due to a much stronger propensity for using cash, (greater than in the UK) and mercantile legislation that failed to protect individuals from cheque fraud. In Anglo-Saxon Europe the use of cheques was much more common. In the same way that the countries from the European Community developed the Eurocheque as a harmonizing agent and an instrument to stimulate competition within the system (see Bonhage, 2010), in countries like Spain the development of adequate infrastructure favoured the use of cash cards and ATM's.

Finally, in the European arena, as with Japan, the extensive bank branch network provided an incentive to develop the Inter-branch networks. However, in the USA bank legislation placed a limit on the development bank branches. Another factor that distinguished the two types of system and had repercussions in the establishment of the computer communication networks in Spain and Europe, was the idea of the standing order for regular periodical payments and the use of a bank book belonging to the customer, particularly in the case of the European Savings Banks. This meant that there would be distinctive elements in the European and Spanish demands in particular, that would especially affect the large US computer manufacturers.

The Spanish Savings Banks allow us to illustrate the interaction between its institutional specifics and the progressive configuration of its banking networks. By taking the development of its on line computer networks as a common thread, it becomes possible to extract some lessons on the tensions that exist between technology and business environments in which they are applied; in summary, the resistance of the banking systems to a specific form of standardization.

[Insert table 1]

Table 1 shows the different technological states of development and the

corresponding services offered by the Spanish Savings Banks based on the competitive environment in which they had been developed. From the point of view of computer communication networks there was a transition from a network based on the branches of each bank, to articulated inter-banking networks. Their evolution in the 1990's led to what might be termed the 'social network' (that is, an interbank network that would interact with its clients). In the case of the Savings Banks this phase was to be based on the INTERNET, although, at the end of the previous stage those in charge of technological development had placed their support behind the development of IBERPAC (the genuine Spanish network led by Telefónica) and the ISDN. The move from one to the others involved the evolution of their technological characteristics, the progressive application of a more highly standardized technology and, consequently, the incorporation of new services for bank users.

Initially, the Savings Banks used telematics in order to interact with their branches and they did this by using the computer equipment in the head office or in the computer centres. This strategy aimed to help to centralize operations and basically affected the back office environment (technologically it was based on the circuit switching network). From 1970 onwards, the technological leap to the packet switching system accelerated the incorporation of new services and would develop, on the basic structure of the inter-branch network, some new in-house elements of the new inter-bank network (SICA project, CECA, see table1).

At the end of the 1970's the computer communication networks of the Spanish Savings Banks went through a maturing process. On the one hand, the IBERPAC public network was carrying out advances that improved reliability, and bank clients continued to exert a strong influence in terms of demand. On the other, the Savings Banks were maturing their processes of technological outsourcing through the CECA. The SICA or

the interconnection system between among the Savings Banks, in the form of an inter-bank network, was at this time offering the services that an Inter-bank Centre could offer (joint operations and new services such as cash cards, i.e. the *tarjeta 6000*, and the savings banks payment network). In this way, throughout the 1980's a dense network of ATM's was developed, connected on-line, with numerous additional services (including the bank book reading, via the magnetic stripe, as mentioned in the case of the Caixa).

[insert figure 2]

It should be remembered that in many of the European countries, the UK included, access to an on-line network of ATM's, from different banks and different networks came into effect somewhat late. The collaboration among the TSB, sharing computer services, came after the innovations carried out by the CECA and the Spanish Savings Banks (Bátiz-Lazo & Maixé-Altés, 2010). The agreements with the other commercial or pay-to-use networks in Spain ("4B", made up essentially of the commercial banks) and later, "Servired", favoured the interconnection among these services, and taking advantage of the public network and that of the CECA (see table 1).

The paradigm of this leadership with respect to the UK is described in figure 2. Using a simple indicator, total cash dispensers and ATM's in Spain and the UK from 1965 to 1990 (deployed by savings and commercial banks in Spain, and clearing banks, savings banks and building societies in the UK), it becomes possible to obtain some revealing conclusions. In spite of the fact that the establishment of the ATM's in Spain came 15 years after their implantation in the UK, in only eight years, that is, by the year 1990, both countries had the same number of ATM's (a 60 per cent of Spanish ATM belonged to savings banks). However, the density of the service with respect to inhabitants was much greater in Spain. In 1990 the British population was almost 1.5 times as great as that of the Spanish.

6. Conclusions

The continuity in the evolution of ICT infrastructure noted by Chandler and Cortada (2000: 263) is characteristic of the competitive environments of North America and highly industrialized European nations like the UK. Most of these contributions take on board the Chandlerian perspective of the big business organizations in Europe (Kay 2002; Whittington, Meyer, and Curto 1999; Whittington and Mayer 2002) and that of the large financial firms (Channon 1977, 1978, 1988; Nightingale and Poll 2000). The analysis presented in this paper contributes to this debate, exploring similar ideas in the realm of the non-bank retail intermediaries; SME' with institutional structures that are quite distinct from the rest of the financial intermediaries.

The study of the adoption of computer technologies on the part of certain financial intermediaries holds up to the light the importance of the role of financial organizations as end users of technology. The importance of this technology for the banks, specifically computerization and computer communications networks, was such that it became a central factor in the development of corporate strategy. This paper underlines the importance of the alignment of IT innovation with business strategy and organizations as users of technology.

In both cases, Spanish and British, the corporate strategy with regard to the introduction of computers should be considered from a dual perspective. On the one hand, from the point of view of the initiatives originating in the most innovative entities and, on the other, the strategies carried out by the entities that were associated with the Savings Banks. In Spain, technological strategy was adapted to business strategy, and not the other way round. In this sense, it was the financial entities that determined the usage of computerization in its operations. However, there was a feedback process that determined that the organizations adapted to the changes brought about by the ICT. In

Britain, on the other hand, corporate strategy was conditioned by domestic circumstances. Savings banks in Spain and the UK attempted to assess the costs and benefits associated with the adoption of new technologies and act appropriately but, in so doing, were fully aware of the environment in which they undertook their business. Choice is central to our tale of technological change (Malone, Yates, and Benjamin 1987; Yates 1999).

Research in this paper shows how the Spanish and British Savings Banks performed in competitively differentiated environments, subject to idiosyncratic factors that conditioned the incorporation of new technologies. These factors, which specifically affected the financial system, had a very strong impact, in spite of the fact that these technologies were both advanced and highly globalizing.

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Figures and Tables

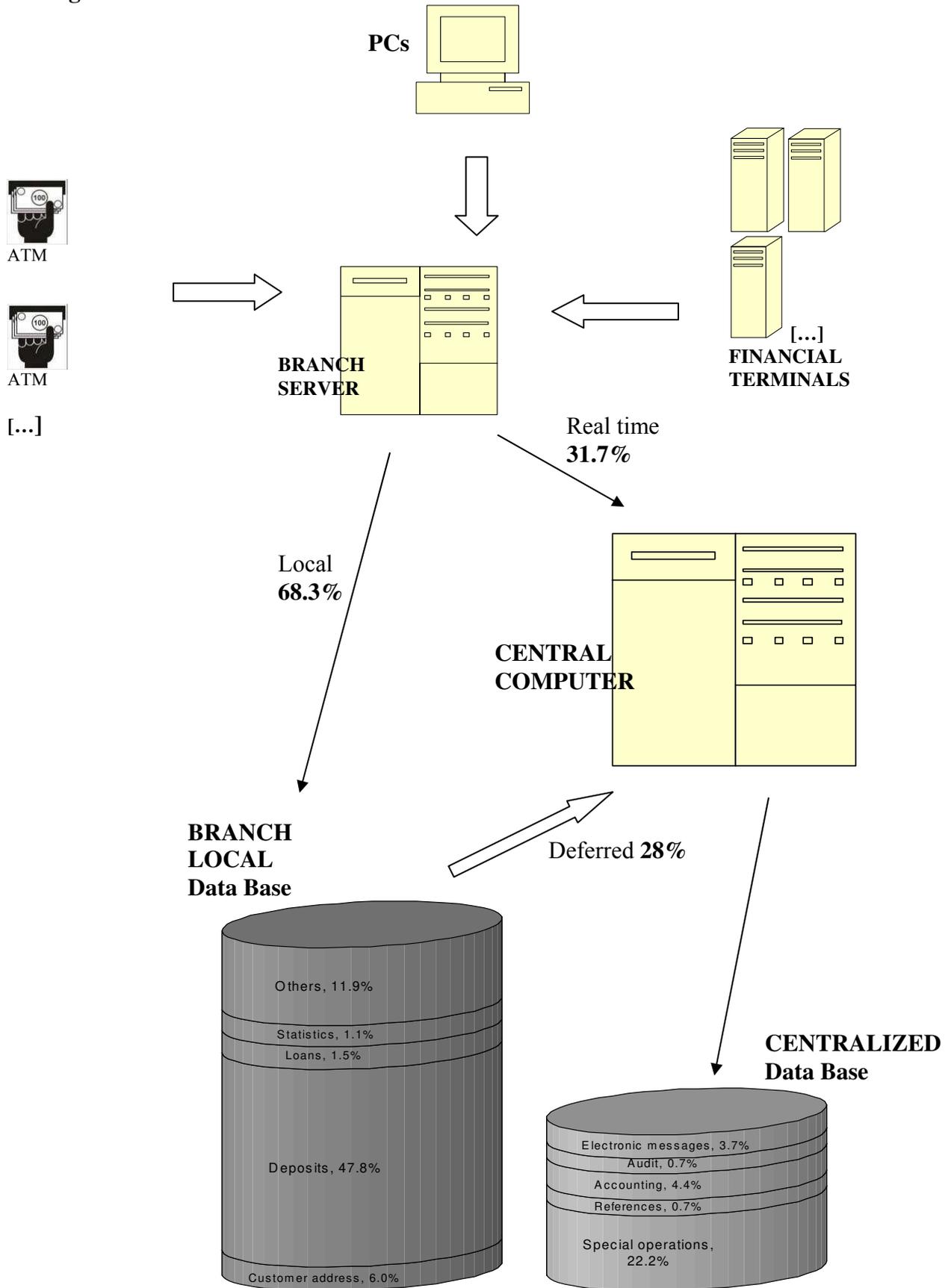


Figure 1. Computer structure of La Caixa branches at mid eighties

Source: Ruiz Kaiser (1986), p. 59, La Caixa, Annual Reports, and author.

Table 1. Development of on-line system in Spanish savings banks, 1958-1990

	Networks	Technology	Service offering	
1958	Off Line	<ul style="list-style-type: none"> ▪ IBM 650 (magnetic drum) ▪ IBM 1410 (Mainframe-second generation) 	<ul style="list-style-type: none"> ▪ Deposits ▪ Securities ▪ Accounting ▪ Loans ▪ Standing order for regular periodical payments ▪ Exchange ▪ Counter operations ▪ SICA (CECA network) ▪ Inter-bank payments ▪ <i>Tarjeta 6000</i> (savings banks card) 	
1960				
1965	Inter-Branch Network	Private virtual network using phone lines (circuit switching)		
1970		RET D – Special Network for the Transmission of Data (packet switching)		
1975				and
1980	Inter.-Bank Payment System	IBERPAC (Spanish technology - packet switching)		<ul style="list-style-type: none"> ▪ Debit and credit card ▪ SWIFT international access ▪ ATM off/on line ▪ EFTOS ▪ 6000 Network connected with VISA and 4B networks
1985				
	Inter-Bank Network	ISDN		
1990				

Sources: CECA Annual Reports; CECA, COAS, Secretaría Técnica, Reports (1871-1985), FUNDESCO (1988), and Ruiz Kaiser Interview, 2010 and Esteve Interview, 2007 and author.

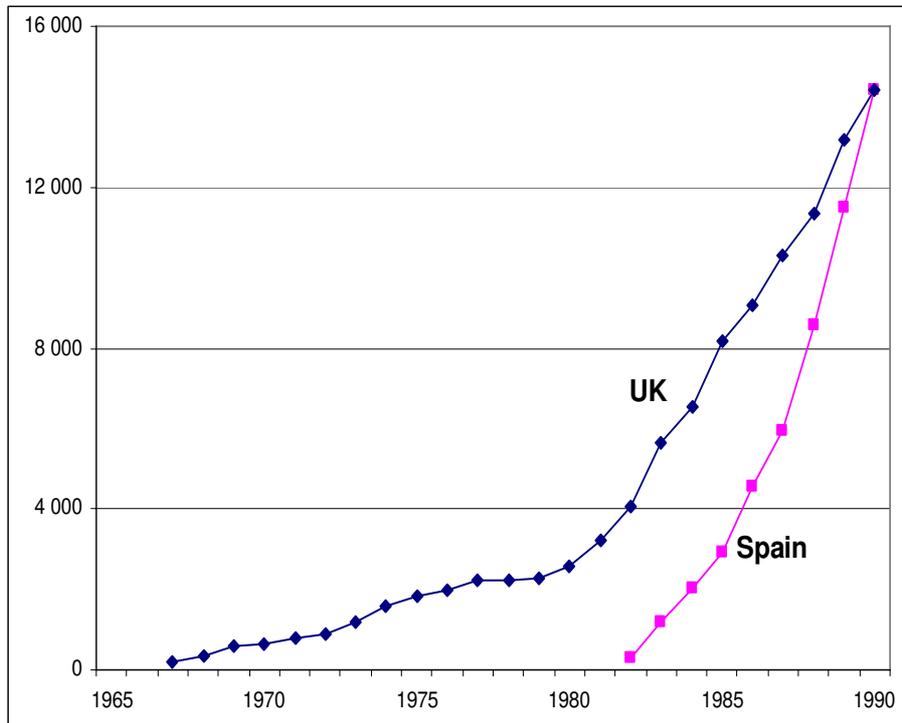


Figure 2. Total Cash Dispensers and ATM in Spain and the UK, 1965-1990

Note: Deployment by savings and commercial banks in Spain; clearing banks, savings banks and building societies in the UK

Sources: CECA, Red 4B, Servired (Spain); CLCB (1978, 57) , Bátiz-Lazo (2009, 15) (UK); and author.