J. Carles Maixé-Altés [Maixé-Altés, J. Carles]

University of A Coruña

Postal adress:

Facultad de Economía y Empresa

Campus de Elviña, s/n

15071 A Coruña – Spain

Ph. +34 881012569

e-mail: maixe@udc.es

2nd Workshop on the Evolution of the Retail Trade in the 20th century. Economic, Social and Political Perspectives. 22-23 September 2016, Uppsala University, Department of Economic History, Uppsala Centre for Business History (funded by Jan Wallanders Och Tom Hedelius Stiftelse & Hakon Swenson Stiftelsen

Retail trade and payment innovations in the digital era: a cross-industry and multi-country approach

Abstract

This paper incorporates a novel approach, as it identifies a cross-industry (retail trade and retail banking) and multi-country (USA, Western Europe countries and Japan) approach to the influence that payment innovations have had on both industries in the 1970s and 1980s, which is critical to understanding the evolution of retail trade and banking in recent decades. This focus is set within a broader analytic framework, namely that of digital convergence. Some of the lessons learned within this frame of reference from the computer industry fuel the hypothesis regarding the success of certain corporate initiatives, based on strategies that have emerged from technological cross-industry solutions.

Keywords: retail trade, payments, banking industry, innovations, Western Europe, US, Japan

1. Introduction

In the field of retail industries during the second half of the 20th century, certain topics have been somewhat neglected by historians. The themes of retailers and consumers, as well as innovations and changes in both technology and organization, raise relevant questions that require some sort of a response. This paper incorporates a novel approach, namely an intersectoral perspective. In short, this proposal identifies a cross-industry approach to the influence payment innovations have had on retail banking[1] and retail trade,[2] and how both industries interact in relation to the changes in payment systems. The aim of this paper is to go beyond the scope of the existing literature by exploring both the retail trade and banking sectors in different competitive environments. At this point, new evidence from inedited sources provides us new insight into retail trade and payment innovations in the digital era.

The ground-breaking study by James W. Cortada has indicated the importance of researching how information and communication technologies (ICTs) are applied across different industries.[3] On this basis, this proposal intends to delve more deeply into the influence that the new computer-based payment technologies have had on the payment services implemented by both industries, introducing an intersectoral focus that enables us to assess the existence (or non-existence) of common strategies. This focus is set within a broader analytic framework, namely that of digital convergence, as proposed by David B. Yoffie.[4] Some of the lessons learned within this frame of reference from the computer industry fuel the hypothesis regarding the success of certain corporate initiatives. These initiatives are usually based on a creative combination of complementary technologies that have emerged from cross-industry solutions.

This paper draws from the premise that, in general, the literature is agnostic in terms of the processes of convergence or cooperation between the financial industry and retailers, especially on behalf of those authors who have studied some of the important payment networks (as in the case of David Stearns with regard to Visa International Services Association (VISA), and Susan Scott and Markos Zachariadis, in terms of the Society for Worldwide Interbank Financial Telecommunication (SWIFT).[5] This work thus proposes studying the behavior of both industries from a historical perspective with the aim of obtaining results in relation to digital convergence. The intent is to detect the extent to which both industries remained detached from one another or the point to which they cooperated and sought out common solutions with regard to payment services.

This means considering different countries and geographic areas, in short, different competitive environments, which are significant in terms of the introduction of digital technologies and developments in payment systems. The sample consists of the USA,

certain countries in Western Europe (in particular, Belgium, France, Germany, Italy, Netherlands, Sweden, Switzerland and the UK) and Japan, thus making it a sufficiently varied and homogeneous sample (of those countries belonging to the developed world) to enable us to draw some conclusions. The period being studied covers two decades from the second half of the 20th century that have proven crucial in the payment system revolution that began in the 1960s. These two decades (emergence in the 1970s and diffusion in the 1980s) constitute a period in which the literature coincides in recognizing that important changes occurred, which affected both the banking industry and retail trade.[6]

The World Savings and Retail Banking Institute (WSBI) Archive in Brussels includes extensive and inedited documentation on technological committees and working groups specialized in different fields of ICT, automation, payment systems, management information systems, retail trade organizations and related topics.[7] This research has also examined the surviving records of supermarkets, retailers, banks and savings banks, as well as contemporary material. Similarly, this study has used numerous contemporary secondary sources.

This paper will be organized as follows: section two will briefly discuss the different rhythms in the adoption of computers by retail trade and banking industries. Section three will present how industry boundaries in the USA made technological cross-industry solutions difficult. Section four will analyze the European landscape, and section five will examine the Japanese case; finally, this paper will provide some conclusions.

2. Different timing in the adoption of computers by the retail trade and banking

There is sufficient evidence to demonstrate that most of the technological and organizational innovations that have occurred since the mid-twentieth century in

companies are related to digital technologies and computers. If we consider the influence of computerization from the perspective of the different industries, we will see that, as many authors have indicated, the introduction and adoption of these technologies and their applications have varied noticeably from one industry to another.[8] These differences have occurred on both a chronological level and in relation to specific technologies that might be of interest to each industry.

In the banking industry, the earliest technological developments occurred in the area of bank office automation. First, in the inter-war period, mechanical devices such as calculating and book-keeping machines were introduced, in addition to other electro-mechanical devices for back-office management. Later, following World War II, some banks started to incorporate the next generation of machines, which are now considered to be the first forays into the field of digital computing technologies.[9] The introduction of second and third generation computers was closely related to the expansion of banking data centers in the 1960s (these large-scale computers need to be located within appropriate infrastructures).These actions were led by the largest banks, which implemented their own computer resources for both back- and front-office operations.[10] During the last half of the 1960s, and more intensely in the 1970s, great advances were made in the computerization of teller terminals and teleprocessing, which promoted the transmission of data between branch offices and the main office and enabled the banking institutions to develop new strategies in payment services and cash transfers. As we will see later, this trend favored some common areas of interests with the retail industries.[11]

The usual focus indicates that the most intense intersectoral relationships on the part of the retail industries were developed with the manufacturing sector. Historically, the manufacturers are the suppliers of wholesalers and retailers. As James W. Cortada

indicates, a reversal in the flow of information was detected between the two industries in the USA economy in the 1980s, thus indicating that the lines of force of the market power were changing. The traditional information flows, circulating from the manufacturer to the retailer, and from the retailer to the customer, were beginning to change with the emergence of ICT. By the mid-1980s, the situation had reversed itself as the result of the point of sale (POS) data, which provided information directly to the retailer about its customers, information that became the basis of the retailer's relationship with the supplier and the manufacturer.[12] In the retail sector, digitalization essentially came about in the 1970s, with the Universal Product Code (UPC)[13] and POS scanning, which were adopted on a large scale in the 1980s.In previous decades, the huge variety of establishments in the sector made its position on computers and their applications less than homogeneous.[14] Unlike the manufacturing industry, an early adopter of these technologies, the retail industry focused its attention on improving the productivity of its staff through solutions such as self-service and self-checkout.[15]

In short, it can be argued that in the 1970s, we can detect some common points of interest in the area of digitalization and payment systems between the two industries, from both the technology perspective and that of their respective businesses. These aspects will be discussed in greater detail in the following sections.

3.Boundaries between industries in the USA

3.1.The payment systems revolution

The development of payment systems in the USA has been influenced by different factors. First, there is the existence of numerous financial intermediaries, such as payment providers and clearing and settlement services.[16] Second, the legal framework governing the payment system and the regulatory structure of the financial institutions that provide payment services are complex.[17] Finally, a variety of payment instruments

and settlement mechanisms are available to discharge payment obligations between and among financial institutions and their customers.[18] However, in relation to this last aspect, it must be emphasized that the greatest volume of payments, especially retail transactions, is characterized by the use of cash or paper-based instruments, particularly checks. This has been one of the dominant characteristics of the payment system in the USA during a large part of the 20th century.

During the decades being studied, checks continued to have considerable weight within cashless payment systems. In 1978, checks represented 92.3% of the cashless transaction volume, while credit card payments represented 7.2%. By the mid-1990s, the weight of check transactions was 77.4% and card transactions had increased to 19.1%.[19] In spite of the fact that checks maintained their strong influence, the decades of the 1970s and 1980s reflect a turning point and the consolidation of new payment systems had an enormous effect on both the banking and the retail sectors. The trend in card use was gradually edging out the use of cash and checks.

[Table 1 near here]

The available statistics reflect this dynamic, especially from the perspective of the two sectors being considered here. According to the Survey of Consumer Finance (SCF), the behavior of families in the USA in both the 1970s and the 1980s reflects an increasing use of cards and also shows a strong preference by families for cards issued by retailers as opposed to bank cards (Table 1). It defines a characteristic of the USA payment system: the strong presence of the so-called charge cards issued by major USA retailers.[20] This trend was reinforced by some deeply-rooted practices among retailers, such as the fact that at the end of the 1970s, very few retail chain stores accepted bank-issued cards.[21] In fact, it was not until 1991 that the number of cards in circulation (both

credit and debit) issued by banking institutions exceeded those issued by retailers (Table 2).

[Table 2 near here]

Another substantial and idiosyncratic factor pertaining to the case of the USA was the slow implementation of electronic funds transfer (EFT) at POS systems. This innovation had created great expectations in the USA at the end of the 1960s in terms of the possibility of instantly transferring funds between the accounts of consumers and merchants, i.e., the use of payment cards at a retail location. However, there were numerous aspects in this practice that contributed to the stalling of these expectations for EFT-POS throughout the 1970s. Particularly important were legal barriers (including the definition of a terminal as a branch,[22] and the federal anti-trust law[23]), proprietary constraints, merchants' objections to the limitation on payment eligibility for their customers, the attractiveness of other payment instruments, such as checks and, in particular, credit cards; and the perceived lack of substantial cost savings.[24] Nevertheless, one decade later, once some of these barriers had started to disappear, the trend changed and a new era began: between 1988 and 1991, they doubled in number, and in the first half of the 1990s, they multiplied by 6 (Table 2).[25]

3.2. Banking industry developments

The two large bank card systems (VISA and Master Charge, created in 1966 and 1967) and the early travel and entertainment cards (American Express, Diners Club and Carte Blanche) promoted the use of convenience credit by consumers over a relatively short period of time.[26] A few short years after their creation, the two large bank cards companies had managed to constitute an expanding market (Table 3). Between 1970 and 1983, the figures reflected an important growth in the their use and a strong

learning capacity on behalf of the banks that integrated the network during its early years of activity.

[Table 3 near here]

As reflected by the data mentioned above, the competition between bank cards and those issued by retailers was very intense. We must not lose sight of the fact that at the end of the 1970s, Sears Roebuck had more cards in circulation than both the large bank credit cards together. However, as indicated by David L. Stearns, initiatives such as VISA changed the way in which consumers and banks related to one another through the cards, transforming a simple credit vehicle of a local nature into an instrument providing access to a global electronic value exchange network.[27] The bank card companies encompassed multiple competing financial institutions that could thus operate while providing services that they could not offer individually. There is little doubt that this was the key to their success.

The revolution in the payment systems that began in the decades of the 1960s and 1970s was due mainly to the development of the digitalization of standardized messages, which were what enabled the compensation between bank accounts linked together in a hierarchical network system.[28] One of the consequences of this innovation was that it opened up the way for the entrance of new banking and non-banking participants in these networks. One example of this situation was the access to VISA by JC Penney Co. in 1979, one of the three large American retail store chains, which generated a heated debate on the participation of other industries in the core of VISA. Instead of signing an agreement with a bank member of VISA like any other merchant would have done, JC Penney signed directly with VISA-USA, so that it became its own merchant acquirer (which implied that the retail store chain joined the network with a bank identification number and a settlement account, like any bank member of VISA).[29]

The reactions and debates that arose revealed the sectoral boundaries faced by the innovations in the payment system in the USA during the 1970s and 1980s.The sectoral boundaries were clearly established, and after this episode the entrance was halted of new retailers into the heart of VISA.[30]

The fragmentation of the institutional structure of personal finance in the USA[31] favored certain collaborative developments in the bank and non-bank card systems. The asymmetry of banking services among urban areas, suburbs and rural areas posed serious problems in providing credit to retail businesses for different banks, particularly the smaller ones. This framework was what favored the development of the charge card associations, which allowed small banks to participate in the card networks, alongside the large banks.[32] They also provided operational support for card payment authorizations, clearing, settlements and fraud control, with an important reduction in costs for their users. Alongside the two large card systems, other organizations also emerged (e.g. the New England Bankcard Association (NEBA), created in 1969 and the BankAmericard Association of Rhode Island (BARI) among others).[33]

3.3.Retailing developments

Retailers in the USA perform a wide range of financial services for their customers, ranging from private label credit cards,[34] check cashing and bill payment to loans for consumer goods.[35] Big retail chains like JC Penney and Sears Roebuck were powerful financial institutions in their own right, and regarded banks as amateurs in the field. One qualified sector representative had publicly expressed that ‘cooperation with the banking industry is of no advantage to us. We require an adequate return on investment, but what most banks propose is that we should pay to provide banking services for others.’[36] For these reasons, USA banks encountered numerous problems in generating

interest among these large groups of retailers in order to cooperate in the development of POS banking.

The sector most permeable to the influence of banks was that of supermarkets. On the one hand, the digitalization of the supermarket POS (machine readable coding and electronic cash register (ECR) equipment with a laser-scanner to read the UPCs) created the technical basis for introducing the EFT-POS systems. On the other hand, supermarket chains, which invoiced more than 50% of all checks signed by individuals in the USA, were interested in cooperating with the banks in order to reduce check fraud losses (estimated to be 0.05% of gross sales). Since profit margins were low, the supermarket industry was very cost conscious, and was much more concerned by these losses than other retailers. With these premises in mind, some options emerged from both industries to substitute cash or check payment with plastic cards, in order to further reduce checkout times.[37] As the BIS indicated in 1978, in its report on the USA: the 'debit card[38] should develop a viable competitive alternative to cash and checks at supermarkets; it will gain a foothold enabling it to compete with credit card use in other types of stores.' However, some voices in the sector expressed their doubts about the intrusion of banks in their territory and showed a preference for intraindustry solutions. This position was evidenced during the 'USA Retail Workshop' (Washington, March 1976).[39]

Another retail trade sector that was also open to EFT-POS banking was local department stores and retail chains. They were still concerned about the impact on in-house credit, even when a debit card was used, since an overdraft on the current account could be used to cover the purchase.[40] Several retailers were linking their in-house ECR terminals directly to the credit authorization networks of the major bank credit cards rather than having a separate authorization terminal. After experiencing some problems

with introducing their own in-house POS systems, these retailers were cautious of accepting a bank's system which might cause further customer dissatisfaction.

3.4.Limited success of intersectoral initiatives in the USA

The evidence presented suggests the hypothesis that there was a low level of intersectoral collaboration between the banking and retail industries in the USA during the 1970s and 1980s, a period when intense innovations were introduced in the payment systems.

Nonetheless, we can cite some initiatives that emerged in the 1970s, even though they were unsuccessful in articulating intersectoral technological convergence. Experimental technical processes were examined, such as the Varitex system, developed by Digital Data System Corp., which processed Master Charge in Tampa, Florida and was also used by different retailers that issued their own cards. Along these same lines of work, DDS's 'Credit Master TM' was being developed, which constituted a new system intended for cash registers and was being applied by certain national department store chains in the USA (Gimbels, John Wanamaker and Bamberger's).[41] Other independent initiatives from financial institutions were seen in service stations (which used terminals produced by General Credit Services, Inc.) and certain airlines, which were developing validation services for fraud control (TRW, Inc., with the aim of providing a coast-to-coast network in the USA). One significant case was the emergence of a dedicated[42] retail system at the POS managed by Credit System, Inc. (Colmar, Pa.). The network had 24 of these systems installed in 100 stores, with 10,000 terminals in use. Based on this initiative, James T. Tilly, Vice President of Marketing for this company, argued that this was the start of a process that could potentially mean a transition from dedicated 'in-store' use to a system in which the financial institutions would also participate in the EFT-POS systems.

By around 1977, the positions between retailers and the banking institutions were very far apart in terms of payment systems in the USA. The prevalent position of the retailers was critical, as summarized by Clifford R. Schumann, Counsel to the National Retail Merchant Association (NRMA):'Banks did not realize the importance of retailers. They are now finding out that POS must be designed to suit the retailer, not the bank.'[43] In short, the industry boundaries made technological cross-industry solutions difficult as far as payment systems go during the last two decades in which they were introduced at a high rate of speed in the USA.

4. A more collaborative landscape in Europe

There is an overall agreement in the literature on the influence that the innovations in retailing in the USA had on their European counterparts. The trend in technology and organizational transfers occurred particularly in the field of self-service and self-checkout, and the advances made in the USA during the inter-war period quickly expanded in Europe following World War II.[44] However, there are more complex factors to consider with regard to the banking industry in the USA and Europe. On the one side, both industries in Europe and the USA had one point in common: their great institutional diversity. In Europe, post offices and postal giro banks were active on a national level in many countries, offering payment services. Commercial banks constituted the most consolidated group, with the thrift institutions not lagging far behind. There was a great variety of them found throughout Europe, including national and regional savings banks, trustee savings banks, building societies, cooperative banks and rural banks.[45] Moreover, there were great differences among the respective banking systems. Table 4 shows some quantitative aspects the enable these differences to be assessed in the early 1980s. In Europe there was a greater banking concentration and thus on average greater access to banking services: the number of accounts per

inhabitant was higher than in the USA, the mean number of banking offices per organization was 10.9, as opposed to 2.7 in the USA and, except for in Italy, the number of inhabitants per office was lower than the average in the USA. These characteristics of the European bank, along with a less complex regulatory system than in the USA, could explain in part their intense involvement in the new payment systems (a discussion that is taken up later); in fact, they manage the bulk of payment instruments in Europe.[46]

[Table 4 near here]

4.1.Old and new payment instruments

In general terms, throughout the 1970s and 1980s, the successive processes to expand the European Economic Community (today, the European Union) favored the spread of the innovations that were occurring in the payment systems, a phenomenon that preceded the creation of the Economic and Monetary Union and the European Central Bank in 1988.The first aspect that must be stressed in relation to European payment systems is the unequal impact of checks, depending on the country. In 1983, while checks were involved in 91.4% of cashless transactions in the USA, they represented between 80 and 85% in France and Italy, 61% in the UK and less than 22% in the rest of the countries (Germany, Netherlands, Sweden, Switzerland and Belgium). One immediate consequence of this trend was, on the one hand, the importance of cash transactions, and on the other, in cashless transactions, the importance of credit transfers (which were highly developed and increasingly automated)[47] and direct debits (more recently implemented in many European countries),[48] both systems which were supported by the banking system and the national giro systems, under the supervision of the national Central Banks.

In this context, Table 5 highlights first the late implementation of credit cards in Europe, which at the end of the 1970s only had a relative weight in the UK, Sweden and

Switzerland (accounting for around 3% of cashless transactions, as opposed to 7.2% in the USA). Second, it shows their rapid establishment throughout the 1980s, in such a way that by the early 1990s in several countries, cards represented a percentage of cashless transactions that was nearly the same as in the USA, and by the middle part of the decade, the card payments in the UK and Belgium already exceeded those in the USA, with Switzerland, France, Sweden and the Netherlands following close behind; among those lagging behind in this trend were Germany and Italy.

[Table 5 near here]

The first steps of cards in Europe were related to the search for instruments that were multilaterally accepted in the different European countries, a demand that increased with the exponential growth of tourism.[49] In this sense, the Eurocheque was undoubtedly the most commonly used card in Europe. It was launched in 1969 as an alternative to traveler's checks in 14 countries, and a decade later, it had become a European currency. A network of 180,000 payment offices was at the disposal of Eurocheque clients in 35 countries. In addition, there were 3.5 million retail businesses that accepted Eurocheques (Table 6). Eurocheques represented a transition to the credit card system in Europe, and this system offered those who would potentially accept checks a guarantee of payment.[50] Thus, unlike in the credit card system, the costly development of a network of appointed retailers was not necessary. Customers, banks and retailers thus had a versatile instrument of payment available to them.

[Table 6 near here]

At the end of the 1970s, the European card market was dominated by Eurocheque, Eurocard, Carte-Bleue and Barclaycard (Table 6).The latter two systems were associated with VISA. Approximately 10 million bank credit cards and 30 million check cards were in circulation in Europe. Since the check card and credit card systems were not mutually exclusive, Eurocheque-issuing institutions in Europe had since

complemented this system of payment with the Eurocard credit card. Through cooperation with Master Charge, Eurocard had gained worldwide acceptance, similar to Carte Bleue and Barclaycard with VISA. The entire banking industry in the Federal Republic of Germany, Denmark, Switzerland, the Benelux countries and leading groups of banking institutions in France, Italy, Sweden and Spain all offered the Eurocard.[51]

Table 7 shows that cards offered by retailers were in the minority in most of the countries studied, unlike in the USA. Only France and Sweden had a volume of retailer cards in circulation that was similar in number to bank credit and debit cards. Both countries maintained a continuous and stable presence in terms of these cards, which are issued by retailer or service providers in order to secure customer loyalty and, in some cases, to grant credit facilities. In France, the card must be issued by a credit institution, even though the retailer's name generally features prominently on the card.[52] In most European countries, it is worth noting that commerce tended to put aside promoting its own initiatives in the form of in-house credit card systems if banks offered instruments that were multilaterally accepted.

[Table 7 near here]

Simultaneously to the development of cards was the implementation of EFT-POS terminals in European retail establishments. Table 8 reflects a much more dynamic movement than what we have observed in the USA. In per capita terms, the use of these terminals was far greater than in retail establishments on the other side of the Atlantic. The higher degree of access to banking services, and thus greater access by Europeans to banking services, promoted contact between banks and retailers, and a less complex regulatory system benefited the national EFT-POS networks. The great leap forward came about in the mid-1980s, led by Belgium and France, and shortly afterwards, in the early part of the next decade, these two countries were joined by the UK and Sweden

(which in 1995 had more than 6000 terminals per million inhabitants, tripling the average in the USA).

[Table 8 near here]

These results mark the different paces with which the new payment instruments were introduced in the developed European states. Given the preeminence of the banking system in their implementation, it is important to summarize and analyze some of the characteristics of the national banking systems. As we have already observed, one common trait was the institutional diversity (which would persist throughout the period studied, although to a lesser extent in the 1990s)[53] and the clear bias that the European banking business had towards retail banking and service banking in the decades being considered. In order for these changes to be implemented, improvements were needed in the banking organizations, such as full automation in central services and branches for accounting purposes, teleprocessing and on-line processes between terminals to provide direct information to customers.[54] These transformations were made possible thanks to the increasing incorporation of software and hardware, which introduced new applications and led to a reduction of costs and an increase in the volume and variety of the banking business.[55] The new payment systems and the services derived from them played a very important role in this area. Along with this dynamic, which we can categorize as internal within the organizations, we must consider the development of certain infrastructures in the field of ICTs that were crucial to the functioning of the new banking networks. These infrastructures, –such as computer centers, clearing centers and giro/messages-switching networks–, were installed in some cases through collaborative interbank agreements and joint companies, while in others, they depended on public initiatives under the supervision of the central banks.[56] The processes for introducing and promulgating the new payment instruments were influenced by both

institutional and technological factors, some on a national level and others on an intra-European level. Here are some determining factors in certain important countries: the UK, Belgium and France showed intense development of new payments systems, while Germany and Italy demonstrated a slower implementation of the new services during the period studied (see Tables 5, 6, 7, 8).

The UK is, without a doubt, the most striking case in the European framework. As a result of market pressures (rapid inflation, with an increase in personnel costs, growth in the volume of their transactions and in the volume of paper to be handled, increased pressure on branches, and a declining base of interest-free current-account deposits), banks were forced to undergo automation and persuade their customers to make greater use of electronic systems. Deregulation was also a key factor in the British system at the end of the 1970s.The results were, first and foremost, the quick implementation of ATMs (providing customers access to their accounts and other services) and the increase in the number of institutions offering payment services.[57] Ultimately, the UK was different from the rest of Europe as far as cashless payments were concerned, both in terms of their fast introduction and their expansion.

Belgium had no real tradition of using payment cards or consumer credit for routine purchases in the 1960s and 1970s,[58] however, the end of the latter decade saw the creation of three competing non-compatible card/terminal networks. In Belgium, large retailers were the first objective of banks for installing POS terminals, however there were two factors that hampered their growth: network incompatibility (which generated rejection on the part of retailers) and the problem of sharing costs between networks and retailers. Throughout the 1980s, a certain balance was gradually introduced in the Belgian networks between competition and collaboration (through the creation of shared

joint technical infrastructures) and the development of interbank standards. This dynamic enabled Belgium to advance decisively towards cashless payments.

France was another of the European countries in which cashless payments readily caught on. In the early 1970s, the country experienced strong banking expansion and reorganization (process automation, especially in terms of checks via computer clearing centers, and the development of extensive cash dispenser and ATM networks).With these premises, by the end of the 1970s and the early part of the 1980s, the use of cards grew rapidly among the public, especially with regard to bank cards; non-bank credit cards also had their market. In 1983, a network of EFT-POS was launched on a national scale, developed parallel to the Interbank Teleclearing System, led by the French Central Bank.[59] The results were the important deployment of new payment systems throughout the 1990s.

In particular, among the European countries that were slower to incorporate the new payment systems were Germany and Italy. Germany had one of the lowest rates of card transactions and use of EFT-POS in all of Europe (Table 7, 8). In fact, in 1983 cashless payments were for the most part credit transfers (57%), direct debits (32 %) and checks (11 %); card payments were insignificant as a percentage of cashless transactions. This situation is explained by the intense role played by sight deposits at credit institutions in payments made by companies and households, along with a clearing system which involved banking institutions and their central banks (as wholesaler of retail finance).[60] This situation began to change in the early 1980s, when the great effort of the Bundesbank and the banking industry was focused on expanding EFT, the introduction of paperless (electronic) check collection procedures, and reducing the volume of checks through the use of the Eurocheque card as a payment debit card. The political reunification process in the early 1990s expanded the market, but it added a segment of

consumers with financial habits that were different from the rest and slowed down the introduction of payment cards. During this new era, the banks began to individually issue the Eurocard as a credit card. In addition, the VISA card began to be issued by a growing number of banks, intensifying the competition between them and the credit card organizations.

In Italy, the key to the slow introduction of the new payment systems was the important role played by checks (with one of the highest rates of usage in all of Europe) and the intensive use of cash, not only to settle small everyday transactions, but sometimes also for high-value transactions. The main changes came from the collaborative effort surrounding the Interbank Society for Automation that managed the interbank transactions and took its first steps in the late 1970s.A national network of cash dispensers was created (Bancomat), as well as an EFT-POS network and a national data transmission network. In the early 1990s, the increase in competition among the payment service providers[61] and the change in habits of consumers increased the number and use of cards, especially bank credit cards (the Interbank Services Company incorporated 675 banks as shareholders in 1992).

4.2. The leadership by the banking industry vis-à-vis retailers

The empirical evidence suggests that banks mainly exercise their control over the payment systems set up in Europe, however, we are going to introduce a few nuances to help understand the role of retailers in that dynamic.

An early snapshot from the perspective of the sector is offered by a select sample of European retailers who gathered at the 'Retail Workshop' in Frankfurt am Main (Germany) in 1976.[62] Some of their points of consensus were:

- The responsibility for the charges associated with the EFT should lie with those who benefit from it, and in a proportional manner.

- Freedom of access for consumers.
- Cash payments still had a long future ahead in the retail sector.
- The retail-bank partnership was generally considered to be a good idea.
- It was largely believed that consumers were not yet interested in EFT.
- There was also a lack of consensus with regard to the appropriateness of retailers installing their own systems that could be used for EFT-system purposes.

This sample therefore suggests the half-hearted enthusiasm shown by European retailers in their own payment systems.

Nevertheless, some pioneering experiences were taking place in Europe in the area of intersectoral collaboration and payment systems. Based on their importance, four case studies will be cited: Barclay Browns' Chester project in the UK; the Caja de Pensiones de Barcelona (‘la Caixa’) and the Corte Inglés Department Store Chain in Spain; the Tivoli Shopping Center in Switzerland; and the Swedish Retailers Federation agreement with banking supervision.[63] In all four cases, collaborative arrangements involving new technology solutions were established between retailers and banks.

The empirical evidence and certain examples suggest that European retailers were a long ways away from rivaling the banking institutions; if anything, they accepted them as providers of payment services that could benefit them. Intersectoral collaboration on new projects was few and far between, with the exception of a few notable examples that did not represent the norm. In short, the European case is very different from the North American situation, and the leadership in payment systems was in the hands of the banking industry. There was no intersectoral confrontation in terms of competition or conflicting interest, and in this sense the attitude was much more collaborative in Europe than in the USA.

5. The miracle of the Japanese retail industry

5.1. The industries

After the 1950s, Japan experienced developments in retail services that brought it closer to the trends previously established in the USA. The development of cashless payment was the result of this remarkable growth of the Japanese retail institutions from the mid-1950s on, especially mass-market and mass-sale supermarkets and self-service retail stores. In 1964, there were 3,620 supermarkets in Japan that occupied 1.3 million square meters of sales floor space. One decade later, their number had multiplied by three, their surface area by 4.2 and their annual sales by 6.2.[64] Their sales volume represented 10.5% of the entire retail sales volume in Japan, followed by a figure of 10.2% for department stores. Two factors related to this industry favored the rapid development of cashless transactions in Japan. First, the growth of supermarket sales had also given rise to a growing concern over the occurrence of an 'occupational disease' on the part of the check-out clerks. This in turn gave an impetus to adopting an improved system of retail, i.e., POS systems. The second factor was the release of public telephone lines for use in commercial data processing systems. POS systems were among the major systems that greatly benefited from the availability of telephone lines as a means of data transmission for exclusive purposes, beginning in 1973.[65]

The banking industry in Japan had its own characteristics that set it apart from the American and European industries. The first factor to highlight would be its extreme institutional diversity and the large number of banking institutions, far more than the European average, but still not reaching the level of the USA (Table 4). There was also a very large number of financial institutions offering payment services. At the end of the 1970s, the state-owned post office had nearly 22,000 offices throughout Japan; Japan's private financial institutions comprised city banks (13 banks), and regional banks (63

banks), both of which dealt mainly with short-term financing; long-term credit banks (3 banks) and trust banks (7 banks) provided long-term financing, together with mutual loan and savings banks (71 banks) and credit associations (466 associations), whose clients were mostly individuals and small enterprises. There were also 466 credit cooperatives and 47 labor credit associations, along with other financial institutions for the agriculture, forestry and fishery. Japan demonstrated a strongly dual nature in its banking system, characterized by large banks and small regional or local banks, although it is significant to note that they all had more or less dense branch networks, depending on the size of the organization (with an average of around 100 branches for the commercial banks, and approximately 11 in financial institutions for small businesses). The average number of branches per institution was somewhere between the average for Europe and North America (6.1 branches).[66] It can be concluded that the level of access to banking services by Japanese society (measured as inhabitants per office) was greater than in the in the USA and on par Europe (Table 4).

One characteristic of the Japanese banking system was its quick and early computerization process, which favored the development of individual or shared infrastructures in the private sector, as well as others of a public nature, that provided cashless payment services and the new payment services. An intrabank network using an online processing system (batch processing)[67] was introduced in 1965; in its early stages, it handled individual business operations, such as deposits and domestic money transfers. An integrated on-line system had been in use since 1975, and by 1983 all city banks and many regional banks had switched to this new system. The most important feature of this intrabank network was an online real-time processing system connecting branch terminals to the computer center via telecommunication lines.[68] These innovations not only affected the productivity of the internal processes of each bank,

they also permitted banks to develop new services in the field of payments. Apart from the private banks' online systems, in 1978, the postal savings administration introduced a computerized on-line system, which in 1984 covered a network of some 20,000 post offices throughout Japan, competing with private banks. In the field of interbank networks, in 1973, the All-Bank Data Telecommunication System (the Zengin System, managed by the Bankers' Association of Tokyo, in collaboration with the Nippon Telegraph and Telephone Public Corporation (NTTC)) was launched. Its great benefit was that it was compatible with private financial institutions, and thus capable of carrying out the message-switching function in domestic transfers (affecting 708 banks with more than 18,000 business offices). The Bank of Japan played a central role in the payment system as the ultimate settlement organization for the government and major financial institutions, through the 172 clearing houses throughout the country.

5.2. The payment systems

With regard to the payment system in the 1970s, it was not customary for individuals or households to receive their income by check. Wages and salaries were normally paid in cash or by automatic credit to the recipient's account. Payments for personal consumption and small business transactions were usually made in cash or by EFT. Checks were mostly used by public authorities and for payments between corporations. The weight of checks in cashless transactions as a whole was similar to that of those European countries who used them the least, and between 1983 and 1990 their use decreased from 18.7% of all cashless transactions to 9.9%, while card transactions increased from 10.3% to 21.8%, which situated Japan far above the USA and European countries in terms of credit and debit card use (Table 5).

Table 7 shows the typology of the cards issued in Japan. Especially important are the cash cards that allow cardholders to operate cash dispensers and ATMs. The number of

these cards in circulation during the period studied exceeded that of credit and debit cards (surpassing the European figures and those of the USA until the end of the 1980s).In the area of cash payments, cash dispensers were established in Japan after 1969, on the initiative of the banks. In spite of the fact that initially, for promotional reasons, they were located in retail locations, they very quickly expanded to bank offices, with City Banks leading the process.[69] Soon afterwards, in 1974, joint companies were created to manage the networks of cash dispensers. The first of these was the Nippon Cashing Service Co. (NCS), in collaboration with the NTTC. A second type of interbank online cash dispenser network was launched in 1980, based on a cooperative agreement among financial institutions. In 1991, a gigantic network of cash dispensers emerged, Multi Integrated Cash Service (MICS), covering virtually every bank in every banking group in the private sector.[70]

The rest of the card operations refer to bank debit and credit cards and cards operated by retailers. In both cases, the volume of cards in circulation exceeded European levels, but fell below the North American results, even though in Japan retailer cards were quite a bit more widespread than in Europe (Table 7).

In 1960, the first system of credit cards issued by credit card companies was established in Japan. This system is the most important one in Japan, and constitutes the mainstream practice of all cashless payments systems. A joint company under the corporate name of Nihon Diners Club was established by Diners Club International, Japan Travel Bureau, Inc., and the Fuji Bank, Ltd. One year later, another credit card company by the name of Japan Credit Bureau (JCB) was established jointly by six banks and the Hokkaido Takushoku Bank, Ltd. Following these pioneering credit card companies, others also came into existence: Diamond Credit, Sumitomo Credit Services, Million Card Service, Union Credit and HCB. By the mid-1970s, there were

seven credit card companies that had issued around 5.5 million cards, and by 1992 nearly 200 bank-affiliated credit card companies existed. The banks that provided support to the card companies expanded their payment networks, connecting their cash dispenser and card networks (legal restrictions led the banks to establish or subsidize independent firms to issue and process credit cards).[71] These companies quickly made strong inroads into the retail market, especially in the Tokyo and Osaka areas. Table 9 shows the trends that were emerging in the Japanese bank card market during the years in which their use and penetration were accelerating.

[Table 9 near here]

Japanese department stores were also advanced in terms of issuing cards. In the early 1960s, the first department store-issued credit card was launched. In 1962, Matsuya Co., Ltd., a medium-sized department store in Tokyo, issued its own card (initially targeting the middle-management of leading firms and top management of small companies).In 1973, the 16 largest department stores in Japan, with a turnover of $5.1 million, billed approximately 10% of their sales on their own cards, a percentage that was unquestionably significant at that time (Tobu stores in Tokyo billed as much as 20% on their cards).[72] From their early beginnings in 1960, some retailers created their own payment infrastructures that were independent from the banks. Marui Co., Ltd., established its first 'installment payment department store-issued card' (IPDSs), the most important of its type among the other 268 IPDS surveyed by the Ministry of Trade and Industry in 1973. The primary concern of each IPDS was establishing an effective, reliable customer credit authorization system. Marui installed Japan's first on line credit authorization system in April 1974 for four branch stores (using 60 POS terminals linked to the company's computer system on dedicated lines).Another type of retailer-

issued card was the so called ‘gasoline sales company-issued credit card’ (GSC-CC), with a total of 3.5 million cards in circulation, issued by seven oil suppliers in 1974.

Besides the bank credit card companies and IPDSs, there were other credit card companies established by other sources of capital. Nippon Shimpan Co., Ltd.(NS), formed in 1951, used to offer indirect installment sales aimed at the personnel of leading corporations and government offices. From 1966 on, NS entered the credit card sales business and by the mid-1970s it had 1.3 million members. With a very competitive strategy, this company emerged on the bank card market. During the second half of the 1970s, it began the installation of a nation-wide on-line POS terminal network with its member-stores. This policy was extended through agreements with The Seibu Retail Group to issue proprietary credit cards that were accepted at Seibu department stores and Seiyu stores, as well as Seibu-related shopping centers.

[Table 10 near here]

The first experience with EFT-POS in Japan began in July, 1972 in the Kagoshima Prefecture, where ECRs were used as POS terminals, installed in the Kagoshima Shimpan member shop (Credit Sales Association), in collaboration with the Kagoshima Bank, Ltd. Other stores joined the experience, both as an innovation in retail and as a main feature for attracting customers (see Table 10). The EFT-POS service in Japan was provided by banks. Banks, customers and retail outlets (supermarkets, gas stations, restaurants, book stores and others) sign contracts in advance for this service. In the early 1980s, the annual demand for POS was greater than 50,000 units and their demand had shifted from supermarkets and department stores to specialty stores (fashion goods, gasoline station, farm co-ops, restaurants, hotels and publishers, among others). The number of EFT-POS increased in the early 1990s, so that by mid-1993, 240 banks

participated together with 19,944 companies, 28,529 retail outlets and 6.2 million users.[73]

Banks played a significant role in promoting POS as a means of payment system, especially because they represented a stimulus for the use of bank cards and attracted new customers, both in the household sector and, in particular, among merchants and among other companies in a general sense.

6. Conclusions

In the introduction to this work, it was argued that the literature is agnostic in terms of the processes of convergence or cooperation between the financial industry and retailers in terms of innovations in the payment system. The arguments presented in this paper suggest that, in general terms, the implementation of said collaboration in common technological projects, which David B. Yoffie refers to as 'digital convergence', was not the general rule. However, this research has enabled us to argue on solid grounds the paths followed by both industries for the introduction and deployment of the new payment technologies, the boundaries that were found for convergence in common projects and which factors guided these paths in the different competitive environments. Ultimately in the cases considered here, very localized digital convergence processes occurred, but on a generalized level, the leadership of one of the industries always ended up being defined in the fray.

The three cases considered, the USA, certain countries in western Europe and Japan, enable us to argue that the boundaries that determined the digital convergence between these industries were driven by institutional factors (the legal framework in the sector) and by the economic and technological leadership of each with regard to the innovations in the payment system. The retail and banking industries in the USA and Japan had a rather bipolar system, in which both industries were powerful in economic terms. On

the one hand, the banking industry in the USA was characterized by a legal framework and a very fragmented institutional structure that promoted boundaries; meanwhile, the Japanese industry had solid shared payment, clearing and settlement infrastructures of a public and private nature that strengthened the banking system. On the other hand, the Japanese retail sector has developed its own infrastructures in the area of clearing and settlement services. This made the Japanese case more permeable to interaction between the two industries, as compared to the boundaries in the case of USA, which promoted strong intersectoral competition. The case of Europe, in spite of its national variety, posits the net leadership of the banking industry as a payment services provider. It is the only case in which we have detected any activity in terms of digital convergence between the two industries, although it must be acknowledged that our sample is limited in this regard. In the European case, it is very interesting to assess the leading role played by the banking industry in terms of the payment system during the two decades studied, as it represents a first step towards the future construction of the Single Euro Payments Area (SEPA), which would be implemented two decades later.[74]

As a result, the problem proposed in this article could be reduced down to a problem of networks, boundaries and gateways, –using the terminology of David L. Stearns–.[75]In other words, first of all, the new payment systems are subjected to very sophisticated network structures that were intensively developed in the 1970s and 1980s. Secondly, intersectoral digital convergence depended on the boundaries established by the legal framework and the market power of each sector. Thirdly, the new payment instruments could be supported by both bank and non-bank networks, and therefore the intersectoral digital convergence depended to a certain point on the existence of institutional and technological conditions such that gateways were opened that permitted access to participants from diverse sectors. In summary, it could be said,

using the aforementioned nomenclature, that in the 1970s and 1980s, the gateways did not work.

Acknowledgements

The author acknowledges the financial support from the Spanish Ministry of Economy and Competitiveness (MINECO), award number HAR2016-75375-R. Also he would like to acknowledge comments from participants at the Second Workshop on the Evolution of the Retail Trade in the 20th Century, Economic, Social and Political Perspectives, at Uppsala University – Uppsala Centre for Business History, 22-23 September 2016; and Nancy Lockkamper archivist of the WSBI Archive. He also thanks editor for the comments received and in the refereeing process that have improved the article. The usual caveats apply.

Disclosure statement

No potential conflict of interest was reported by the author.

References

Alexander, Andrew, Dawn Nell, Adrian R. Bailey and Gareth Shaw." The Co-Creation of a Retail Innovation: Shoppers and the Early Supermarket in Britain." *Enterprise & Society* 10, No.3 (2009):529-558.

Alexander, Nicholas and Gary Akehurst. "Introduction: The Emergence of Modern Retailing, 1750-1950." *Business History* 40, No.4 (1998):1-15.

Balodis, Rihards and Inara Opmane. "History of Data Centre Development." In *Reflections on the History of Computing :Preserving Memories and Sharing Stories*, edited by Arthur Tatnall, 180-203. Heidelberg:Springer-Verlag, 2012.

Bátiz Lazo, Bernardo and Douglas Wood. "A Historical Appraisal of Information Technology in Commercial Banking." *Electronic Markets: The International Journal* 12, No.3 (2002):192-205.

Batiz-Lazo, Bernardo, J. Carles Maixé-Altés, and Paul Thomes. "In Digital we Trust: The Computerisation of Retail Finance in Western Europe and North America." In *Technological Innovation in Retail Finance: International Historical Perspectives*, edited by Bernardo Batiz-Lazo, J. Carles Maixé-Altés and Paul Thomes, 3-12.New York, London:Routledge, 2011.

Bátiz-Lazo, Bernardo, Tobias Karlsson and Björn Thodenius. "The Origins of the Cashless Society: Cash Dispensers, Direct to Account Payments and the Development of online Real-Time Networks, c. 1965-1985." *Essays in Economic & Business History* 32, (2014):100-137.

Berger, A. N., R. S. Demsetz and P. E. Strahan. "The Consolidation of the Financial Services Industry. Causes, Consequences, and Implications for the Future." *Journal of Money, Credit, and Banking* 23, No.2-4 (1999):135-194.

Booth, Alan. *The Management of Technical Change :Automation in the UK and USA since 1950*. Basingstoke:Palgrave Macmillan, 2007.

Bowlby, Rachel. *Carried Away :The Invention of Modern Shopping*. London: Faber, 2000.

Coles, T. "Department Stores as Innovations in Retail Marketing: Some Observations on Marketing Practice and Perceptions in Wilhelmine, Germany." *Journal of Macromarketing* 19, No.1 (1999):34-47.

Cortada, James W. *The Digital Hand. How Computers Changed the Work of American Financial, Telecommunications, Media, and Entertainment Industries, Vol 2*. Oxford ; New York: Oxford University Press, 2006.

Cortada, James W. *The Digital Hand. How Computers Changed the Work of American Manufacturing, Transportation, and Retail Industries.Vol.1*. Oxford ; New York: Oxford University Press, 2004.

Gilbert, R. A. "Bank Market Structure and Competition. A Survey." *Journal of Money Credit and Banking* 16, No.4 (1984):617-644.

Heide, Lars. *Punched-Card Systems and the Early Information Explosion, 1880-1945*. Baltimore:Johns Hopkins University Press, 2009.

Hollander, Stanley C., Kathleen M. Rassuli, D. G. Brian Jones and Laura Farlow Dix. "Periodization in Marketing History." *Journal of Macromarketing* 25, No.1 (2005): 32-41.

Maixé-Altés, J. Carles and Rafael Castro Balaguer. "Structural Change in Peripheral European Markets: Spanish Grocery Retailing, 1950-2007." *Journal of Macromarketing* 35, No.4 (2015):448-465.

Maixé-Altés, J. Carles. "ICT the Nordic Way and European Retail Banking." In *History of Nordic Computing 4*, edited by Christian Gram, Per Rasmussen and Soren Duus Ostergaard, 249-262. Heidelberg: Springer Verlag, 2015.

Maixé-Altés, J. Carles. "The technological option of Spanish savings banks before the Internet, circa 1950-1995." *Investigaciones De Historia Económica - Economic History Research* 9, No.2 (2013):175-186.

Mandell, L. *The Credit Card Industry: a History*. Boston MA:Twayne, 1990.

Martin, Ian. "Too Far Ahead of its Time: Barclays, Burroughs, and Real-Time Banking." *Annals of the History of Computing, IEEE* 34, no. 2 (2012):5-19.

Martin, Ron and David Turner."Demutualization and the Remapping of Financial Landscapes." *Transactions of the Institute of British Geographers* 25, No.2 (2000):221-241.

Sandgren, Fredrik. "From ‘Peculiar Stores’ to ‘a New Way of Thinking’: Discussions on Self-Service in Swedish Trade Journals, 1935-1955." *Business History* 51, No.5 (2009):734-753.

Schröter, H. G. "The Americanisation of Distribution and its Limits: The Case of the German Retail System, 1950–1975." *European Review of History* 15, (2008):445-458.

Sprague, R. E. “Electronic Funds Transfer in Europe: their relevance for the United States,” *Savings Banks International* 3 (1977):29-35.

Stearns, D. L. *Electronic Value Exchange. Origins of the VISA Electronic Payment System*. London, New York: Springer, 2011.

Sylla, R. "Financial Systems and Economic Modernization." *Journal of Economic History* 62, No.2 (2002):277-292.

Wadhwani, R. Daniel. "Organisational Form and Industry Emergence: Nonprofit and Mutual Firms in the Development of the US Personal Finance Industry." *Business History* 53, No.7 (2011):1152-1177.

Yoffie, D. B. “CHESS and Competing in the Age of Digital Convergence.” In *Competing in the Age of Digital Convergence*, edited by D. B. Yoffie, 1-36.Boston MA: Harvard Business School Press, 1997.

Table 1. Percentage of families using credit cards in the USA

	Bank	Travel and entertainment	Merchant	Oil company	All cards
1971	19	5	45	33	50
1977	35	7	50	32	60
1983	42	10	85	28	70

Source: Board of Governors of the Federal Reserve System, Survey of Consumer Finance (SCF); and BIS, Red Book, 1985.

Table 2. Number of payment cards in circulation and EFTPOS in the USA

Cards (in millions)	1988	1989	1990	1991	1992	1993	1994	1995
Cards with a cash function	160.5	166.1	173.0	*427.6	449.1	483.3	540.1	592.4
Cards with a debit/credit function	340.1	377.5	425.8	499.5	517.2	531.1	590.5	650.8
Retailer cards	481.6	475.0	469.1	464.4	470.0	505.0	542.6	587.2
Oil company card	119.2	122.4	122.0	123.4	119.7	117.7	114.2	115.3
Travel and entertainment cards	21.4	23.5	24.5	25.8	24.1	23.4	23.8	24.9
EFT/POS								
Number of terminals	44 750	49 500	60 000	88 000	115 042	196 000	375 500	554 266
Number of networks	37	41	40	23	26	26	25	27

Source: author's own work, based on data from the BIS, Red Book.
Note:* Based on the Bulletin published by the BIS in 1996, with data from 1995, the estimate of cards with a cash function was corrected for the years 1991, 1992 and 1993; the new values multiplied by 2.4 and 2.5 those previously estimated.

Table 3. Bank card statistics (VISA and Master Charge) in the USA

	1970	1975	1978	1983
Accounts (millions)	31.2	39.1	68.0	105.9
Transactions (millions)	330	692	1 500	1 530
Payments (millions)	150	280	500	650
Gross sales (billions of $)	6	20	44	83.7
Credit outstanding at year-end (billions of $)	3	10	19	33.6
Delinquencies (% credit outstanding)	6.7	3.8	3.7	0.8

Source: BIS, Red Book, several years.

Table 4. Deposit-taking industry in Europe, USA and Japan in 1983

	Number of institutions	Number of branch offices	Inhabitants per office	Number of transferable deposit accounts at institutions per inhabitant
Belgium	120	10 183	968	0.8
France	4 065	35 898	1 524	0.8
Germany	4 848	39 836	1 541	0.9
Italy	1 087	12 913	4 398	0.3
Japan	6 942	42 648	2 780	NA
Netherlands	1 124	6 441	2 222	0.9
Sweden	182	3 581	2 318	3.0
Switzerland	431	4 986	1 300	0.5
UK	805	24 574	2 283	1.8
USA	38 280	102 000	2 310	0.3

Source: BIS, Red Book, 1985.

Table 5. Payment by credit card as a percentage of total volume of cashless transactions

	1978	1983	1987	1990	1993	1995
Belgium	--	--	6.5	11.1	16.5	19.7
France	0.8	2.1	7.9	13.1	15.7	17.3
Germany	0.0	0.1	0.6	1.6	2.6	3.6
Italy	0.1	0.5	0.9	2.8	4.1	6.6
Japan	NA	10.3	18.0	21.8	NA	NA
Netherlands	0.4	0.5	1.0	2.0	4.1	13.6
Sweden	2.9	6.9	5.6	6.8	9.8	14.2
Switzerland	2.6	0.5	3.3	7.0	13.8	18.4
UK	3.4	8.0	11.0	14.0	21.0	25.9
USA	7.2	7.1	15.4	15.7	16.9	19.1

Source: author's own work, based on data from the BIS, Red Book, several years.
Note: after 1987 payments by debit card at EFT-POS are also included.

Table 6. Cashless payment instruments in Europe in 1986

	Eurocheque	Cards (number of merchants)	POS (number of merchants)
Austria	High acceptance	17,000 VISA & Eurocard	-
Belgium	High acceptance	23,000 joint ownership of VISA by Banks	10,000 Based on the same system of ATM
Denmark	High acceptance	8,000 VISA & Eurocard	POS network linked to the entire system
France	High acceptance	400,000 Carte Bleue (CB) open to all system cards	70,000 PIN checking facilities on the increase
Germany	High acceptance	70,000 Eurocard & VISA	First steps by banks
Ireland	High acceptance	10,500 VISA & Eurocard	-
Italy	Free in retail areas	80,000 BankAmerica & VISA 60,000 Servizi Interbancari	-
Luxembourg	High acceptance	2,000 VISA & Eurocard	-
Netherlands	High acceptance	14,000 Eurocard & VISA	-
Spain	High acceptance	270,000 proprietary cards: Red 6000, 4B and VISA	5.000

Source: ISBI Archive. Retailer services and associated cards in Europe. Present position of member countries. Business Organization and Automation Committee, December, 14, 1987.

Table 7. Number of payment cards in circulation with different functions in Europe, USA and Japan (in thousands)

	1988			1991			1995		
	Cash	debit/ credit	Retailers	Cash	debit/ credit	Retailers	Cash	debit/ credit	Retailers
Belgium	5 029	5 140	690	6 857	6 967	767	9 461	9 461	1 221
France	17 342	17 258	18 000	19 820	19 743	20 000	24 430	23 617	20 000
Germany	--	23 455	--	--	33 528	1 500	--	74 337	4 800
Italy	--	2 949	--	8 948	12 991	2 323	13 824	20 482	1 655
Japan	176 080	121 077	27 200	201 540	190 648	44 650	260 830	237 472	59 160
Netherlands	--	--	--	9 273	1 950	--	16 419	1 493	--
Sweden	--	3 608	3 130	--	3 769	4 984	6 171	4 742	NA
Switzerland	1 846	2 731	--	3 184	4 147	--	5 610	6 064	--
UK	53 200	27 200	9 300	73 400	49 100	12 000	83 700	59 200	13 000
USA	160 500	340 100	481 600	427 600	499 500	464 400	592 400	650 800	587 200

Source: author's own work, based on data from the BIS, Red Book and ECB, Bluebook, Payment and Securities Settlement Systems in the European Union.

Table 8. Use of EFT-POS terminals in Europe, USA and Japan (in terminals per million inhabitants)

	1983	1987	1990	1993	1995
Belgium	89	1 558	2 828	5 246	7 174
France	183	1 280	3 180	7 435	9 394
Germany	40	109	290	344	856
Italy	--	13	385	1 350	2 683
Japan	--	5	82	168	200
Netherlands	--	26	148	1 606	4 747
Sweden	84	62	711	3 054	6 160
Switzerland	--	87	384	1 433	3 499
UK	--	229	1 916	4 639	8 647
USA	3	177	240	759	2 107

Source: author's own work, based on data from the BIS, Red Book.

Table 9. Percentage of total credit card sales by business sector in Japan, 1968-1973

	Department stores and regular retailers	Restaurants	Hotels, Inns, Golf courses, Air trips, Transports	Others
Apr 1968 - Mar 1969	49.5	27.2	17.5	5.8
Apr 1969 - Mar 1970	54.1	26.0	15.8	4.1
Apr 1970 - Mar 1971	58.0	26.0	13.0	3.0
Apr 1971 - Mar 1972	57.3	26.3	14.1	2.3
Apr 1972 - Mar 1973	57.2	25.8	13.3	3.7

Source: The Japanese Ministry of Finance, Statistics, Tokyo, 1974.

Table 10. Experimental POS Systems in Japan, 1972-1974

Banks and branch office location	POS Installed Stores	POS Terminal	Date of initiation	Main features
The Kagoshima Bank, Ltd.(Kagoshima)	Member-stores of Kogoshima Shimpan (*)	Tateishi Electronics ECR	1972 Jul	Japan's first, using magnetic cards
The Sumitomo Bank, Ltd.(Setagaya)	Summit Store Wakabayashi-ten	COF 310	1972 Aug	Up to 11.1 USD$ per use, up to five uses per day
The Mitshui Bank, Ltd.(Aoba-dai)	Foodmart Aoba-dai-ten	FACOM 3550	1972 Oct	Designed for exclusive bank accounts
The Ni-i-gata Trust Bank, Ltd.(Ni-i-gata)	Kobayashi DS - Daiwa DS	More Electronics	1973 Jan	Managed by a separate service company
The Dai-ichi Kangyo Bank, Ltd.(Saidai ji, Nara)	Jusco Nara Store	FACOM 3550	1973 Apr	up to 3.70 USD$ per month
The Dai-ichi Kangyo Bank, Ltd.(Machida); The Mitsubishi Bank Ltd.(Machida)	Seiyu Stores Machida-ten	FACOM 3550	1973 Mai	Finished in April, 1974 after one year of experimentation
The Tokyo Trust Bank, Ltd.(Takashima-daira)	Matsuzakaya Store - Tobu Store	TK 300	1973 Sep	up to 3.70 USD$ per month; managed by a separate service company
The Tokai Bank, Ltd.(Takenotsuka)	Matsuzakaya Store	OMRON POS terminal	1974 Mar	Testing under way

Note :(*) Kogoshima Shimpan (Credit Sales Association)
Source: ISBI Archive. Battelle Payments Systems Study: Japan.Battelle Institut e.V., Frankfurt am Main, 1975.

Notes

[1] Historically, the banking industry has included a wide variety of banks, such as private banks, merchant banks, clearing banks and commercial banks, which have given preference to meeting the financial needs of businesses, the upper classes and governments. It also includes savings banks, mutual banks and building societies, which from their beginnings in the 19th century, have operated preferentially in the household sector. Throughout the 20th century, most banking institutions gradually introduced diversification of their business and clientele, developing entirely new service patterns to serve customers (retail banking), especially from the 1970s on (see also Sylla, "Financial systems.").

[2] All businesses that sell goods and services to customers fall under the umbrella of retailing. We can distinguish different types of retailing, such as general retailing (department stores and discount and variety stores), self-service grocery stores and supermarket retailing, focused on providing the convenience of one-stop food and beverage shopping, and the specialty retailing sector, which includes outlets that offer a combination of products and services (see also Hollander et al., "Periodization in marketing history.")

[3] Cortada, *The Digital Hand*, Vol.1 and 2.

[4] Yoffie, "CHESS and Competing."

[5] Stearns, *Electronic Value Exchange*. Scott and Zachariadis, *The Society for Worldwide*.

[6] Ibid.; Bátiz-Lazo, Wood, "A Historical Appraisal;" Maixé-Altés, "ICT the Nordic Way."

[7] The International Savings Banks Institute (ISBI), created in 1924, now known as the WSBI, which since the 1950s has had an enormous impact on the savings banks industry. The WSBI developed an extensive network composed of representatives from national industry associations, individual banks, corporate executives, policy makers and experts connected with the banking, retail and computer industries.

[8] A general overview of this topic can be found in the 3 volumes of Cortada's work, *The Digital Hand*.

[9] Heide, *Punched-Card Systems*; Bátiz-Lazo, Maixé-Altés, Thomes, "In Digital We Trust"; Booth, *The Management*; Bátiz-Lazo, Wood, "A Historical Appraisal;".

[10] Balodis and Opmane, "History of Data Centre Development."

[11]Bátiz-Lazo, Karlsson, Thodenius, "The Origins."Cortada, *The Digital Hand, Vol.1*, 260-262.

[12] Ibid., 260.

[13] Commonly known as the bar code.

[14]As indicated by Cortada in *The Digital Hand*, Vol.1, 261, computing already existed in this industry as early as in the 1950s and the 1960s.

[15] Ibid.

[16] Deposit-taking institutions, interbank associations that cleared checks for their members or operated automated teller machines (ATM) or a POS network connected to the nationwide credit card networks and high-value electronic funds transfer (EFT) systems.

[17] They are chartered at either the state or federal level, and are supervised by one or more agencies at the state or federal level, or both.

[18] Bank of International Settlements (BIS), Committee on Payments and Market infrastructures (CPMI), Statistics on Payment Systems, 1980 (hereafter Red Book).

[19] Ibid. several years.

[20] Cards issues by non-banks indicating that the holder has been granted a line of credit. It enables the individual to make purchases but does not offer extended credit, the full amount of the debt incurred having to be settled at the end of a specified period. The holder is usually charge an annual fee.

[21]Red Book, 1983.K-Mart and Fred Meyer did so, and Macy's accepted American Express to attract tourists. However, large stores like Sears, Montgomery Wards and JC Penney did not accept bank-issued credit cards (Stearns, *Electronic Value Exchange*, 188).

[22] The adoption of the definition of a terminal as a branch implied the application of the McFadden Act, which meant that nationally-chartered banks could only deploy terminals that adhered to the constraints imposed on branches (Red Book, 1985).

[23] This Federal law had been interpreted in some instances to place severe restrictions on sharing arrangements for POS networks (Ibid.).

[24]Red Book, 1980, 262

[25]The number of terminals per capita in the USA remained far fewer than the European average; it was not until the mid-1990s that the USA figures began to reach said average (BIS, Red Book).

[26] Convenience credit is a credit for which there is no overt finance charge.

[27] Stearns, *Electronic Value Exchange.*

[28] Ibid., 209-210.

[29] For more details, see Ibid., 188-191.

[30]An interesting analysis on networks, boundaries and gateways in transactional networks (such as VISA) can be found in Stearns, *Electronic Value Exchange*, 209-217.

[31]See Wadhwani, "Organisational form."

[32] Some small banks had experimented with the charge card model early on (no revolving credit); see Stearns, *Electronic Value Exchange*, 18.

[33] ISBI Archive. Study tour on card business in the United States, June 19-21, 1972 (Dept.III - Ad hoc meeting. Credit Cards and Statistics (1971-77), box 217).

[34] A store-branded credit card that can only be used at specific retailers.

[35]ISBI Archive.POS Banking, Report on a study tour of point of sale banking installations in the USA. Business Organization and Automation Committee, Geneva, 1977.

[36] George Gordin, Senior Attorney of the JC Penney Co., summed up this attitude at the MINTS (Mutual Institutions National Transfer System Inc.) Conference. ISBI Archive. MINTS Strategic planning for EFTS: a CEO guide, Business Organization and Automation Committee, Geneva, 1978.

[37] ISBI Archive. An evaluation of financial service delivery systems. MINTS Research Report 22 (11), 1976.Mutual Institutions National Transfer System Inc., New York (box 30).

[38] Card enabling the holder to have purchases directly charged to funds in the account at a deposit-taking institution (may sometimes be combined with another function, e.g. that of a cash card or check guarantee card - a card issued as a part of a check guarantee system).

[39] ISBI Archive. Report on US Retail Workshop, Washington, D.C., March 2-3, 1976 (Studies on Payments Systems (1975-79), box 30).See also Sprague, “Electronic,” 29-35.

[40]Aware of this concern, both Citibank and Continental Bank were in fact offering the retailer a ‘private label’ service for its own card, with the bank taking responsibility for card production, authorization and the financing of receivables (ISBI Archive.POS Banking, Report on a study tour of point of sale banking installations in the USA. Business Organization and Automation Committee, Geneva, 1977.).

[41] ISBI Archive. Report to the Business Organization and Automation Committee, Payment System Symposium, New York, March 13, 1972 (BA 11).See also Mandell, *The credit card industry*, 24-25.

[42]A dedicated line refers to a telecommunications path between two points; it is a non-shared resource, much like the Internet is today.

[43] ISBI Archive. MINTS Conference, Mutual Institutions National Transfer System Inc., New York, 1976.

[44] Alexander and Akehurst, "Introduction"; Alexander et al., "The Co-Creation"; Bowlby, *Carried Away*; Coles, "Department Stores"; Schröter, "The Americanisation"; Sandgren, "From 'Peculiar Stores'"; Maixé-Altés and Castro, "Structural Change."

[45] See BIS, Red Book, several years.

[46] See Sylla, "Financial Systems"; Gilbert, "Bank Market"; Berger, Demsetz and Strahan, "The Consolidation".

[47]A payment order made for the purpose of placing funds at the disposal of the beneficiary. Both the payment instructions and the funds described therein move from the bank of the payer/originator to the bank of the beneficiary, possibly via several other banks as intermediaries.

[48] A pre-authorized debit on the payer's bank account initiated by the payee.

[49] ISBI Archive. W. Starke, International aspects of credit cards, Proceedings of the 9th International Automation Conference: Automation - Signposts to the '80s, Rome, September 17-21, 1979.

[50] A card issued as part of a check guarantee system. A system to guarantee checks, typically up to a specified amount, that have been validated by the merchant either on the basis of a card issued to the check writer or through a central database accessible to merchants. Validated checks are guaranteed by the issuer of the guarantee card, the drawee bank or the system operator (BIS glossary).

[51]ISBI Archive. Retailer services and associated card in Europe. Present position of member countries. Business Organization and Automation Committee, December, 14, 1987.

[52] European Central Bank (ECB), Bluebook, Payment and Securities Settlement Systems in the European Union, 1995.

[53]An intense process of demutualization affected many industries starting in the late 1980s, such as insurance and building societies, as well as savings banks and other mutual banks. As a consequence, banking diversity was reduced in Europe (see Martin and Turner, "Demutualization.").

[54] Batiz-Lazo, Maixé Altés and Thomes, "In Digital We Trust."

[55] Bátiz-Lazo, Wood, "A Historical Appraisal."

[56] Martin, "Britain's First Computer Centre;" Balodis, Opmane, "History of Data Centre."

[57] The reports by the BIS are very precise in terms of the evolution of the payment scenario and the initiatives undertaken (Red Book, several years).

[58] Ibid., 1985.

[59] Ibid. and ECB, Bluebook, Addendum, 1988.

[60] BIS, Red Book, 1985.

[61]The former diversity of the Italian banking system would become watered down over the decade, with demutualization and bank privatization processes (Amato-Carli Act of 1991).

[62]Among the institutional participants were the food retail organization CIES, and the International Association of Department Stores (IADS), and the list of companies and professionals participating included a thought-provoking sample that represented most of the countries in western Europe.

[63] ISBI Archive. Battelle, Habits and payment systems. Archive of 'la Caixa de Barcelona' (ACB).Informática, CPVA and El Corte Inglés-Tivoli retailer payment system in Europe.

[64] The Japanese Ministry of International Trade and Industry, Tokyo, 1974.

[65] ISBI Archive. Nagata-Battelle, Japan Report. Battelle Payment System Study and Mitsubishi Research Institute, Tokyo, 1975 (Studies on Payments Systems, 1975-1979, box 30).For similar developments in Europe, see Maixé-Altés, "The technological option."

[66] BIS, Red Book, 1980.

[67] The use of asynchronous computer systems and batch processing (non-real time processes), Bátiz-Lazo et al., "The origins," 100-137.

[68] Ibid., 214.

[69] The Japanese Ministry of Finance, Statistics, Tokyo, 1974.

[70] BIS, Red Book, 1980, 1985, 1992.

[71] Ibid., 1985

[72] ISBI Archive. Nagata-Battelle, Japan Report. Battelle Payment System Study and Mitsubishi Research Institute, Tokyo, 1975 (Studies on Payments Systems, 1975-1979, box 30).

[73] BIS, Red Book, 1993.

[74] As a monetary zone in which electronic retail and wholesale payments are considered to be domestic payments.

[75] Stearns, *Electronic Value Exchange*, 209-211.