

Chapter XII

Standardizing Retail Payment Instruments

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The business of payments and the provision of payment instruments have a rich history, which can be drawn upon in a discussion of standardization. In the middle-ages, for example, the mere existence of a wide variety of foreign and local coins led to a flourishing business of money exchange offices and cashiers in the Netherlands. Malpractices of some of these firms, mostly in the form of physical tampering with coins and alloy, resulted in government regulation on a municipal and province level. Yet, as these type of regulations were hard to enforce, the Amsterdam municipal government decided in 1609 to establish a municipal exchange bank, 'de Amsterdamse Wisselbank', originally as a government monopolist. The motivation for doing so was to prevent the regular price-increases of the good coins, to eliminate confusion to the public and to facilitate trade by providing good coins. Later on, in 1621, the regulations were adapted to the actual business practice and private cashiers were allowed – under certain conditions – to conduct business in the city of Amsterdam (van den Berge, 1939, p 34).

The example shows us how a diversity of specifications and a diversity of payment instruments, will lead to the development of separate companies which make money by reducing the confusion for their consumers. It illustrates that the abuse of technological know-how and abilities for the sake of increased economic benefits by a few private companies may lead to government intervention for the sake of public interest. Furthermore it indicates that strong market powers may prevail, even in the case of restricted government regulation. As such the example contains all relevant issues with respect to IT-standardization:

- can it be assumed that the market will standardize if necessary?
- what role should governments play in this process?
- does the end-user play a role in this process?

In this chapter, I will examine the above standardization issues with respect to the retail payment instruments, developed and in use since the beginning of this century. In this time frame bank notes and coin have been widely available to the public as a basic (and standardized) payment instrument. I will however not

include these instruments in this study and limit myself to a study of the standardization of non-cash payment instruments that have been available to the consumer. These payment instruments can be seen as the technical means with which consumers effect money transfers to each other. Examples of payment instruments are the forms for credit transfers or inpayments, the debit- or credit cards or home-banking software. It is my opinion that, given the availability of cash an alternative payment instrument, the standardization processes of non-cash payment instruments can be seen as the 'pure' result of market forces. The study of this process, applied to different types of instruments within one application and industry domain, will hopefully provide additional insight.

An important reason for limiting the study of standardization to the developments in the Netherlands is that the retail payment sector is typically a geographically segmented market, with large differences between countries. Even between countries that are physically very close to each other, there are considerable differences in culture, payment habits, legislation and institutional arrangements with respect to supervision of financial markets and regulation of competition (Revell, 1983, p 80). As these differences have a considerable influence on the dynamics of competition within the financial sector, they also have an important effect on the dynamics of the standardization process. Consequently, even a comparison of Dutch standardization developments with those in Germany or Belgium (that have a similar giro-based payment infrastructure) would have to involve a study of the specifics of these different markets and their different institutional settings. I have chosen not to do so and to limit myself to a longitudinal study of the standardization of retail payment instruments in the Netherlands.

The approach taken in this chapter, is an inductive, bottom-up approach. I will try to highlight the elements of the standardization process, which from a practitioner's view are of utmost importance for enterprises, governments and consumers respectively. In doing so I will outline my assumptions and implicit theoretic notions first, and then provide documented examples. I hope that this approach may stimulate the theory development by the scientific community on this subject.

THE BUSINESS PERSPECTIVE

For a good understanding of standardization, it is useful to establish the different nature of:

- payment systems,
- technical standards,
- business standards,
- business agreements.

In the above list, only the payment system can be seen as a fully specified set-up of people, machines, procedures and payment instruments which results in the transformation of input (payment instruction) to output (payment). The other items in the list must all be seen as conditions or guidelines, which may somehow effect the operational payment system or guide the design of future payment systems.

Payment systems, which are part of the business process of an organization,

are by definition firm specific. Given the characteristics of the organization (centralized or decentralized, using certain processing equipment, assuming certain employee qualifications etc.) the actual payment systems will differ per type of organization. As a result, payment instruments which serve the same purpose for bank A and bank B will have, in many cases, different specifications, geared to the optimal use in those firm-specific business processes. These differences may relate to the account-number structure, the size of the instrument, the option to truncate information etcetera. The effect of these differences is that even small changes in the specification of the actual instrument (use of extra check-digit for example) may involve large changes (and high conversion cost) in the way that the payment instrument is implemented in the business process of the particular organization.

As a result of basic economics, it may be assumed that every provider of payment instruments has standardized its internal processes. Using a similar lay out for all types of payment instructions (such as the credit-transfer, the standing order and the inpayment) of the same institution will for example reduce the number of errors made by customers, using both instruments. It can further allow optimization and standardization of back-office procedures and processes. These in-house technical standards can be seen as guidelines, used to enhance or enforce similar specifications of payment instruments and payment processes within one single institution.

In addition to the in-house standards, competing providers may establish that a certain standard will be adopted as a common guideline for their payment systems. The agreed standard (which can be technical but may also be of a legal or procedural nature) then becomes a business standard. Generally, business standards are established in the context of domestic bankers' association. Examples of those standards, which may cover more than just the technical aspects of payment instruments and processes, are:

- a clearing house arrangement, in which payments are netted multilaterally before being settled between participants,
- a code of conduct with business principles for issuing payment instruments and processing payments,
- requirements as to the minimum content of contract terms,
- the use of a similar layout for certain classes of paper-based payment instruments,
- the use of a similar user interface for certain classes of electronic payments,
- requirements with respect to key management in point of sale systems.

The benefits of agreeing to business standard can be diverse. A co-operative agreement on basic security requirements and certification for bank terminals for example, will allow IT-hardware suppliers to be able to manufacture more standardized equipment for the market, instead of developing separate individual solutions for different banks. Consequently, the market for this equipment may be larger and more open, which will result in lower prices for the equipment. Co-operative agreements on minimum contract terms and redress procedures could serve the purpose of generating trust with the public, by providing clarity with respect to conditions and customer complaint procedures.

In practice only the largest providers of payment instruments have say in the

negotiations on the precise content of the business standards. If one of those large providers does not cooperate, a too significant part of the benefits of standardization cannot be achieved. So although the standardization process may formally involve many players, including government agencies, the large providers are actually the most important players. During the process, the large providers share technical information on the variety of solutions that may be allowed or facilitated in the standard. In general the outcome of the process will not be the standard which technically provides the best solution to the problem which has to be solved (which may be interoperability, but could also be the conversion to a different key management structure), but a technical standard which results in solving the problem under the constraint that the implementation of the standard in the firm-specific business processes of the banks amounts to the same magnitude of conversion cost for each of the large providers.

It is important to note that it is almost impossible to arrive at a proper technical standard if the institutions involved have no operational experience, nor a legacy problem, in the application domain of the standard. Only those institutions that have wrestled with the problem of converting a functional description into a working payment system are really able to appreciate the trade-offs that have to be made in the implementation of the standard. Such trade-offs typically result in a preference for a pragmatic, sometimes unlogical, technical solution to a logic but unexecutable solution.

The importance of distinguishing a technical standard from the payment system itself is that it helps to understand that an agreement on collectively implementing the same technical standard (with a specific purpose) does not imply that the specifications of the payment systems are the same. If banks agree to use a similar message protocol in their Automated Teller Machines, this does not imply that they would all have to buy and use identical hard- and software and establish exactly the same internal procedures. Each institution will determine their optimal way to comply with the standard, given its current technical and organizational infrastructure. Distinguishing standards from payment systems further helps to understand that it is possible that two payment systems, which are based on the same standard, do not have to be interoperable. Every standard requires some further decisions with respect to the specific use of the standard and the way to fulfil the requirements of the standard through a specific implementation of hardware, software and procedures. Those implementation decisions will be geared towards the infrastructures of the entities involved and will be unique for each issuing bank. Imposing a standard is therefore no magic bullet for achieving interoperability.

Having discussed the business standard, I will now focus on a specific business agreement, which is closely related: the business agreement on reciprocal use of payment instruments (often called: agreement on interoperability). Although the existence of business standards will often go hand in hand with decisions to process other institution's payment instruments, this is not necessarily the case. Further co-operation than standardization is a separate business decision, which constitutes of determining:

- the degree of co-operation; this may vary from acting as a remote mail box (sending all instruments and payments immediately to the issuing bank) to

acting fully on behalf of the issuing bank itself (actually performing part of the processing of the payment),

- the application and level of interbank fees applied to the co-operative activities (based on number of instruments / transactions involved).

Both content and conditions of the co-operative agreement will reflect the underlying market position and bargaining power of the participants to the agreement. Consequently the stronger entity in the bargain (larger market share, greater negotiation skills) may exercise more influence over the outcome.

In general it can be observed that institutions with a similar client base and a similar business process (same rate of centralization/ decentralization, same hard/ software platform, same cost/benefit sensitivity) will be the first institutions to agree on standardization and later also interoperability. Similar agreements between institutions that have both commercially and technically a different set-up are more unlikely and will involve longer and more complicated negotiations on both standards and fees when bargaining power is equally divided. Smaller providers will have limited market power and may be unable to significantly influence the standardization process or to negotiate sharp fees. Yet, their benefits in entering these agreements originate from the fact that the cost of provision of the related services by the small institutions themselves may be higher than by buying it from larger competitors.

An important factor, determining bargaining power for institutions is the de facto standard, which could be seen as a working system or product which covers a substantial part of the market. In this respect, three important trends can be identified. The first is that the very important role of the IT-supplier has become smaller vis-à-vis the role of the institution that applies the information technology products. The second trend is that the battle for standards is increasingly taking place on an international scale, as some payment products have developed into regional or international products. The third is the increasing role of government institutions, notably the European regulators (Egyedi, 1996). The above trends increase the playing field and the number of players and make it more difficult to understand the dynamics of the standardization process. However, as far as the role of the provider is concerned, the dynamics remain unchanged and can be summarized as achieving optimal efficiency while limiting the necessary change to the business processes.

Case examples

In the years 1900-1925, the use of non-cash payment instruments increased considerably. The payment process was largely a paper-based administrative process. Private organizations involved in executing payments were the cashiers and banks (Westerman, 1920). The Municipal Giro Institute of Amsterdam was set up in 1916 and a nation-wide Postal cheque and giro-service was established in 1918. In this time-period both Vissering (1907) and Van Vliet (1923) promote the use of a uniform form lay out for executing payment transactions between banks and cashiers in order to execute these transactions more easily and with less errors. Van Vliet (1923) also points out that the use of machines would in the future further increase speed of processing.

From 1925 to 1945, the centralized giro services gained a lot of market share in the retail payment market. Concentration in the banking sector led to a stronger position for a smaller number of nationally operating banks, while regional banks and cashiers slowly lost their business. Wolf (1983) describes how in 1937 the private bankers' association finally adopted a proposal to introduce a uniform payment form, to be used by consumers of the banks. It was agreed that the payment form would not be promoted too actively, in order to prevent cashiers from losing too much business. As for the use of checks, Hammerstein (1998) describes how the Geneva Convention of March 19, 1931 was the basis for the Dutch law on uniform checks, which was applicable since 1934.

After the Second World War, the Postal Giro was the largest player in the retail payments market. When in the 1950s, computer technologies allowed for the introduction of new processing methods and payment order forms, discussion took place between the private bankers and the Postal Giro, to determine if common ground could be found. The differences between the two parties were however too big. Whereas processing of the Postal Giro was centralized and uniform, the processing of payments by private bankers was still too diverse to be able to agree on a single payment form. The Postal Giro therefore decided in 1962 to start using punch cards as the payment form (Wolf, 1983, p 33).

The use of the punch card in a centralized processing structure allowed the Postal Giro to expand its services in terms of volume and customer segments. As a result, the Postal Giro Services accumulated considerable deposits at the cost of the private bankers (who were actually in need of deposits, given the credit-restrictions set by the central bank). The banker's reacted by setting up a banker's giro, developing a unified bankers payment order form (not a punch card), introducing a unified bank number and introducing the guaranteed check for payment at the point of sale system (Wolf, 1983). Also, in order to prevent credit cards from entering the European market, the banks developed the Eurocheque, a guaranteed uniform payment check for cross-border use in Europe (Muns, 1974).

Wolf (1983) describes how for a specific payment product, the inpayment ('acceptgiro'), the private banker's in 1966 decided to adopt the instrument of the postal giro and start discussions on adapting it to the banker's needs later. These discussions led to a preliminary arrangement from 1974 to 1978 (adaptation of the postal giro cards for use by banker's) and a final arrangement (introduction and use of a commonly standardized instrument) from 1978 onwards.

Peekel and Veluwenkamp (1984) describe the characteristics of the centralized processing in the girocircuit of the Postal Giro Services as well as the partly centralized processing in the banker's giro circuit. The standardization that took place to overcome the lengthy time-periods necessary for processing payments between these two circuits concentrated on determining standardized interbank message interfaces in order to allow the institutions to continue to process their payments in their own characteristic way. These interfaces were subsequently implemented for all kinds of payment instructions under the auspices of the steering group National Payments Circuit. The actual design and implementation of these agreements lasted more than twenty years (1975-1998) due to the fact that not only technical but also political and commercial difficulties had to be overcome.

The development of new payment instruments or delivery channels such as automated teller machines and electronic funds transfer at the point of sale shows that differences in processing-structure as well as in cost/benefit structure determined the strategic choices of banks and Postal Giro (since 1986: Postbank). Postbank for example focused at first on substituting check-use for Electronic Funds Transfers at the Point of Sale (EFTPOS) transactions and later on Automated Teller Machines (ATM's). This was due to the branch-contract with Post Offices, as a result of which installation of ATM's would not lead to any cost reduction but to cost increase. Meanwhile other banks invested heavily in the installation and deployment of ATM's. This resulted in a situation in which the Postbank, with the largest market share in number of customers, had the smaller market share in number of ATM's. An interoperability agreement on ATM-use would thus result in large usage of bank-ATM's by Postbank clients and a correspondingly large interbank fee to be paid by Postbank to other banks. Also, in the early stages of development, the on-line to issuer concept of Postbank's ATM transactions was not easily to be implemented in bank ATM's. The actual interoperability agreement on ATM-use was effected more than ten years later in 1998.

The situation for the EFTPOS-application was somewhat different. All large players had a similar market share in terms of processing guaranteed checks by retailers. Therefore, a collective investment in a common product would result in a similar change of cost/benefits for all players involved. Still the banks had to be stimulated by the large oil companies (Shell) and retailers (Albert Heijn) as well as the central bank in order to reach a final agreement on setting up a joint business operation for EFTPOS in 1989. The technical basis for the system was the system developed by the Postbank, which evolved into the interbank de facto standard for EFTPOS.

Similar observations can be made for the development of the electronic purse (Chipknip and Chipper), home banking on the Internet (I-pay) as well as the development of cross-border EFTPOS and ATM-use (edc, Maestro, cirrus). These would show that the international dimension of standardization becomes more important. As a result, interoperability technical business standards for future chip-card based debit- and credit card use have been established (the Europay Mastercard Visa-standard). Also industry initiatives have been set-up to ensure that future standards for electronic purses will take into account the local initiatives developed thus far. The most recent initiative in this respect is the plan to develop a standard that defines a PC-chipcard reader for use with financial applications. One of the driving forces behind this latter initiative is to limit the possibility that hard- or software suppliers with a large market share start the provision of less-secure chipcard readers, which may become a de facto standard.

THE GOVERNMENT PERSPECTIVE

First of all, it should be noted that the government perspective does not by definition have to be uniform. Governmental institutions which influence standardization can range from local government authorities, Ministry Departments, supranational institutions, central banks, secret services to national and international standards developing organizations. Each of these institutions has its own

motivation for steering and guiding standardization. In addition to these institutions, parliament might also exercise influence on the process by approving or disapproving legislation in this domain. The one thing however that most of these regulators have in common is a lack of implementation knowledge with respect to most domains of standardization. In addition some regulators also tend to make analytical and managerial mistakes, which will be discussed below.

One of the most common mistakes made by regulators is what I would call: solving the problem of the observer. If an observer of payment instruments would list the wide variety of solutions and contract terms available in the market, this may appear to be confusing and may call for standardization. Yet, the existence of this variety of solutions may in itself not bother any user or provider. A user will choose the payment instruments that suit him and will not use all payment instruments available in the market. Similarly the providers may make some additional money by providing integrated or standardized solutions if the variety is too big. Still, some regulators find it hard to deal with the wide variety of solutions in the market and therefore urge for standardization. The actual message they are thus sending out is that solving their observers' problem is more important than understanding the market.

Another mistake made by regulators is to formulate interventions in terms of prescribing technical procedures or measures taken, instead of prescribing the desired outcome. A regulator could for example prescribe that certain maximum processing times for payments would have to be met, without specifying the means to arrive at that goal. Such an approach would leave the market parties to decide whether or not to standardize.

As the effect of regulatory interventions may be that market parties have to bear conversion or implementation cost, regulators should be very careful in the nature of their intervention. Their action might result in an arbitrary, possibly very unfair spread of cost amongst market parties in the same market. If not motivated properly, it can be viewed as a random tax burden, imposed by the regulator. Regulators therefore have to decide whether they operate on the assumption that they have a full understanding of the market and its specific problems and characteristics or on the assumption that they are ignorant and that all entities in the market will try to influence and use them to achieve their individual interests. From a fairness point of view the latter assumption is more adequate than the former. Yet in practice the former appears to be more widely held than the latter.

In essence, the challenge for regulators is to refrain from all interventions, which are different from stimulating market parties to standardize. Any other action should be motivated by a distinct problem in terms of a non-functioning market. Even then, the necessary intervention should not be to impose standards but to prescribe functional requirements that solve the problem at hand, leaving open the option to standardize. Regulators that act differently basically spend the tax payer's money on either their own goals and problems (the observer problem) or on providing a competitive advantage to a market party that best succeeds in influencing the regulator. Although these latter expenditures are beyond the mandate of most regulators, some still find motivations to act this way.

Case examples

The prime example of the observer's problem may be found in the domain of European harmonization. Based on the perception that all different technical systems in the countries of the European Community constituted a problem for consumers and enterprises, the Commission focused on harmonizing technical standards among countries. Although this may have helped to create a level technical playing field, it is still an open question to me if this technical issue is the most important barrier to create an internal market without trade barriers.

An example of the requirement formulation problem can currently be observed in the discussions on electronic commerce and the payment instruments applied. Politicians as well as regulators tend to believe that a technical standard is necessary to ensure the availability of a very safe payment method. This can be viewed as a too technical formulation of the requirement or the desire that market parties start offering payment methods which are acceptable to users (leaving open if the acceptability is reached by security measures, fee structure or contract terms).

A historical example of government ignorance is the attempt of secret services to prevent the Data Encryption Standard from becoming an ISO standard (Lelieveldt, 1989). One of the motivations was that this would prevent the widespread use of DES. Although the attempt succeeded in the end, it failed to have the desired effect as applications of DES were already being developed and applied on the basis of the available FIPS standards.

Another example of the same problem is the sponsoring by the European Commission of projects and standardization of a common European electronic purse. As a matter of politics (one electronic euro-purse as well as one physical euro) the goal is understandable. From a business perspective however, there is no business case. Only some 5% of retail payments are cross-border ATM and EFTPOS transactions, which provide the consumer with sufficient cash or payment options. As a result, within Europay the decision was initially made to not standardize the electronic purse. The initiative to develop a Common European Purse Standard (CEPS) was taken up however in reaction to the announcement of Visa, which stated to develop a worldwide purse. Given its political goals, the European Commission became a willing sponsor for this activity.

Examples of process interventions can be observed in the developments of the National Payments Circuit and the EFTPOS system in the Netherlands. Both Ministry of Finance and the central bank stimulated market parties to reach agreement. Similarly the central bank declared to favor a deployment of electronic purses which would make technical differences transparent to the user. As for the interoperability of ATM's no regulatory pressure has been exercised on banks and Postbank to reach an agreement.

THE USER PERSPECTIVE

Although in economic theory the user perspective plays an important role in determining the success of products and services, it should be noted that payments do not constitute a primary need, but are essentially a derived need. Both Aders (1984) and van der Have (1972) describe banking and making payments as a convenience or an experience good as opposed to a search good. Once the choice

has been made for one or the other bank, the use of this bank becomes a habit. Its services are used often and the customer has little motivation to spend time and effort in reconsidering this choice. A strong motivation is needed to change the initial choice. This motivation can be for example a serious problem with the financial services rendered or a 'role change'. Van der Have describes these role changes as getting the first job, getting married, moving to another house, owning a car, moving in with the partner etcetera. These occasions may give rise to changing the former habit.

In practice, the choice of a bank account is still very much determined by the proximity of the bank branch (which ensures easy access) and by the choice already made by the parents of the client (which ensures familiarity with and trust in the services offered). Consequently, the strategy of banks towards retail consumers is focused on increasing the number of services offered to current clients, which increases the burden of changing to another bank. As for future clients of the bank, the focus is to approach those at switch moments in their lives (moving out, getting a job etc.) starting with approaching the very young consumers.

Aders (1984) points out that the homogenous character of bank services and the importance of proximity of the branch to the consumer leads to a situation of homogenous oligopoly. In combination with the fact that retail payment and banking services are a convenience good, the effect of price of specific services on consumer behavior is rather limited. The role of standardization as a factor of consumer choice is even smaller. The primary choice factors -within the range of instruments available in a certain purchasing or payment situation- are risk, control of payment moment and convenience. Of course standardization helps to increase the convenience for consumers, yet convenience and ease-of-use can also be achieved through other means (self-explanatory form layout and interfaces).

As stated earlier, the efficiency considerations of providers will lead to a level of in-house and inter-organizational standardization that is good enough for users. As standardization is not a significant consumer choice factor, providers do not have to consider other than internal efficiency considerations in determining the necessary degree of standardization. Consumers won't switch from bank A to bank B because an instrument is not standardized. In cases where the diversity would really become a burden, some providers will definitely start providing integrated or standardized solutions.

Case examples

In practice, most forms and methods used within a bank are standardized. Also, for the most important external interfaces such as the direct debits, inpayments, standing orders, dialogues for electronic funds transfers and cash withdrawals, business standards are agreed and applied. Yet, the payment form used by the Postbank differs substantially from the forms used by other banks. Even though some 60 % of the population have an account at both Postbank and another bank, standardization has not taken place. Similarly, home-banking applications, Internet-applications and voice-response applications are not standardized between banks. From a technological perspective, two different types of electronic purses are available on the market (Chipper and Chipknip) and where this might pose a problem for the merchant, this is solved by providing a combined terminal which

accepts both types of cards, not by standardizing the chipcard-purse itself. On an infrastructure level, the Dutch banks investigate, however, the development of a standard for a chipcard reader, to be used with the Personal Computer for all sorts of chipcards, including those for financial applications and transactions over the Internet.

CONCLUSION AND RECOMMENDATIONS

Perhaps the most important lesson that can be learnt is that the characteristics of a specific market have a large impact on the dynamics of the standardization process. As payments are a derived convenience good, the importance of standardization to the consumer is rather limited. The dynamics of standardization in this area are therefore heavily influenced by the dynamics of competition between providers in this sector. In this process, providers try to achieve optimal efficiency by adopting technical standards and agreeing on business standards, while limiting the necessary change to the business processes. Important trends that can be observed are the diminishing role for the IT-provider as the supplier of the de facto standard, as well as an internationalization of the battle for standards between providers. A final trend is the increasing role of government institutions, notably the European regulators.

In my opinion the factor which most complicates the standardization process, as far as the market of payments is concerned, is that many regulators tend to assume that standardization can be seen as a useful regulatory tool. Those regulators fail to recognize that they lack the implementation experience in the relevant domain, as well as a good understanding of the dynamics of competition in the market. As such, regulators may become tools in the hand of influential market parties instead of the tools of the taxpayers. Furthermore the priority of regulators may be biased towards solving observer problems and perceived political problems instead of trying to contemplate whether the market at hand is sufficiently competitive (in which case standards will evolve).

So if we are to look at the IT-standardization process and how it can be optimized in theory, the most important recommendations concern the behavior of companies and regulators. In general regulators should refrain from using standardization as a regulatory tool, as it can be assumed that in a well functioning market standardization will take place as a matter of economics or non-standardized solutions will be available to solve any diversity problems in the market. Companies might want to try to be more open in explaining their motivation for joining and influencing certain standardization processes. This will provide regulators as well as users with a better view of the market and the intention of its players.

In practice however, companies and regulators will have few external incentives to change their current behavior as the consumers and citizens lack the knowledge as well as the market and political power to really affect the behavior of those institutions. Any change in the current standardization practices of companies and regulators therefore rests on the intrinsic motivation of these organizations to shape their responsibilities to the consumer or the citizen in an appropriate way.

ENDNOTES

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2. This chapter reflects the professional opinion of the author and may not be interpreted as a policy position of De Nederlandsche Bank.

REFERENCES

- Aders, J. H. J. (1984). *Marketing van betaaldiensten*. Amsterdam: NIBE
- Advokaat, H. G., Have, J. van der & Pauwels, F.L. (1972). *Retailbanking in Nederland*. Amsterdam: NIBE.
- Berge, L. G. van (1939). *Giroverkeer in Nederland*. Den Haag: Uleman.
- Egyedi, T. (1996). *Shaping standardization*. Delft: Delft University Press.
- Hammerstein, E. (1998). *Betalingsverkeer (wissel, orderbriefje en cheque)*. Deventer: Kluwer.
- Lelieveldt, S (1989). *Elektronisch betalen goed geregeld*. Rotterdam: Lelieveldt.
- Muns, E. C. (1974). Banken in vier landen beginnen met het eurochequeproject. *Bank- en Effectenbedrijf* 23 (164), 125-128.
- Peekel, M., & Veluwenkamp, J.W. (1984). *Het girale betalingsverkeer in Nederland*. Amsterdam: postgiro/rijkspostspaarbank.
- Vissering, G. (1907). *Het oude en het moderne giroverkeer*. Amsterdam: J.H. De Bussy.
- Revell, J.R.S. (1983). *Banking and Electronic Funds Transfers*. Paris: OECD.
- Vliet, J. H. van (1923). Normalisatie van het incasso- en girobedrijf bij de bankinstellingen. *De bedrijfseconoom* 2 (5), 99-103.
- Westerman, W. M. (1920). *De concentratie in het bankwezen*. 's-Gravenhage: Martinus Nijhoff.
- Wolf, H. (1983). *Betalen via de Bank*. Amsterdam: NIBE.