DANISH PAYMENTS COUNCIL

REPORT ON NEW PAYMENT SOLUTIONS

March 2014

Report on New Payment Solutions

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Explanation of symbols:

- Magnitude nil
0 Less than one half of unit employed
• Category not applicable
… Data not available

Details may not add because of rounding.

Contents

Preface

Danmarks Nationalbank has established a Danish Payments Council as the framework for the future collaboration on the payments of consumers and firms. The object of the Council is to promote the efficiency and security of these payments for all parties involved, i.e. consumers, firms, banks etc.

This is the Payments Council's first report, and it contains an analysis of future solutions for payments in retail stores, online and at vending machines, etc. The report has been prepared by a working group comprising representatives of the Payments Council participants as well as other stakeholders and experts on payments in Denmark.

The purpose of the report is to map trends, assess the pros and cons of new payment solutions and identify any barriers to rolling out such solutions. The Payments Council hopes that the analyses and findings of the report will contribute to a constructive debate on future payment solutions in Denmark.

I would like to thank everyone who has contributed to this report.

Governor Hugo Frey Jensen, Danmarks Nationalbank
Chairman of the Payments Council

1. Introduction and Conclusions

1.1 BACKGROUND

Essentially, consumers and retailers should have access to secure and efficient payment solutions. Studies show that payments are generally associated with substantial costs, and that there is potential for considerable savings via the solutions that involve the lowest social costs.[1] Moreover, some types of purchases, e.g. online shopping, rely on secure and simple payment options.

Today, the market for payment solutions seems to be characterised by a high degree of innovation, driven by technological advances. Banknotes and coins were the primary method of payment in retail stores for centuries, until consumers began to use cards a few decades ago. Now, new solutions are frequently launched, some of which might one day replace cash and cards, partly or in full.

The framework conditions for new solutions depend on factors such as the existing systems for clearing and settlement of payments. Such systems determine how quickly money can be transferred between bank accounts. These years, the Danish payments infrastructure is being modernised to a considerable degree in order to enable immediate transfers, among other features.[2]

The Danish Payments Council was established in 2012. As the development of the infrastructure was well underway, the Council found that an analysis of the market for payment services in Denmark and new solutions would be useful. Such an analysis was viewed as a good foundation for the discussions in the Council and a more broad-based debate on the development of the Danish payment market.

1.2 ABOUT THE REPORT

In the summer of 2012, the Payments Council established a working group that was to undertake the above-mentioned analysis. The working group was composed of representatives of the Council members and other stakeholders and payment experts in Denmark, cf. Box 1.1. Danmarks Nationalbank chaired the working group and provided secretariat services. The Council also approved the mandate for the working group, which is described in Appendix 1.

According to the mandate, the working group was tasked with

i. identifying trends in the development and rollout of new payment solutions in Denmark and comparable countries,
ii. assessing the costs and benefits of new payment solutions in a socio-economic perspective, and
iii. identifying any barriers to rolling out new payment solutions.

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1 See e.g. Danmarks Nationalbank, *Costs of payments in Denmark*, 2012.

2 Cf. Jakob Mygind Korsby and Peter Toubro-Christensen, Faster payments in Denmark, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2012.

WORKING GROUP MEMBERSHIP Box 1.1

The report on new payment solutions has been prepared by a working group with the following members:

- Mikkel Krogsholm, CFIR
- Tony Jensen, Cellpoint Mobile
- Lars William Wesch, Confederation of Danish Industry (DI)
- Line Stentoft Andersen, Confederation of Danish Industry (DI)
- Arne Rasmussen, MasterCard
- Jan Damsgaard, CBS
- Jakob Lind, TDC
- Henrik Hyltoft, Danish Chamber of Commerce
- Sofie Findling Andersen, Danish Chamber of Commerce
- Jens Lindboe-Larsen, Nets
- Mia Gantzhorn, Danish Competition and Consumer Authority
- Henning Jensen, PlusCon
- Jacob Thiel, Danish Federation of Small and Medium-Sized Enterprises
- Troels Hauer Holmberg, Danish Consumer Council
- Niklas Marschall, Cykel DK
- Helle Stensgaard, Nordea
- Thorkil Braagaard, Association of Local Banks, Savings Banks and Co-operative Banks in Denmark
- Morten Schjøtz-Pedersen, Danske Bank
- Søren Kiilerich, Danske Bank
- Nicolai Schmit, Sydbank
- Tobias Thygesen, Danish Bankers Association

Members from Danmarks Nationalbank were Anders Mølgaard Pedersen (chairman), Eva Wix Wagner, Gustav Kaas Jacobsen, Jon Hasling Kyed and Nicolai Møller Andersen.

The analysis was to comprise new payment solutions used for buying goods and services in retail stores, online and in vending machines, etc. It should not cover solutions used primarily for transfers between private individuals, e.g. Danish banks' new mobile payment services, MobilePay and Swipp, or for collection of payments, e.g. Betalingsservice (direct debit). Moreover, the mandate explicitly excluded "virtual currencies" such as Bitcoin.

In this report, new payment solutions should be taken to mean innovations enabling payment by other means than cash or traditional payment instruments such as cards and cheques. One example is solutions allowing consumers to pay via their mobile phones. In addition, new payment solutions may be innovations which make it possible for consumers to pay using traditional instruments in new ways, e.g. cards with contactless technology.

The analysis included two surveys of payment solutions from the point of view of consumers and retailers, respectively. The consumer survey was conducted in collaboration with Statistics Denmark and consisted of interviews with a representative sample of more than 1,200 Danes aged 16-74 years. The respondents were also asked to record all their payments over a 24-hour period. The survey is described in more detail in Appendix 2.

The survey of retailers' views on payment solutions was conducted with the assistance of a market research agency, which undertook the data collection. The survey contains the responses of 1,000 retailers to questions about both traditional and new solutions. Background data made it possible to break down the responses by retailer industry and size as measured by turnover. The retailer survey is described in Appendix 3.

This report consists of seven chapters. Chapter 2 describes the use of traditional methods of payment in Denmark. Chapter 3 discusses different types of new payment solutions, while Chapters 4 and 5 review the results of the consumer and retailer surveys, respectively. Chapter 6 contains an assessment of the solutions described in Chapter 3 from a socio-economic perspective, while Chapter 7 describes potential barriers to new solutions in Denmark.

1.3 CONCLUSIONS

On the basis of this report, the Payments Council concludes the following about the payment market in Denmark and new payment solutions:

- *The national debit card, Dankort, is the principal payment instrument in Denmark*. Since its launch in 1983, the popularity of the Dankort, including the VisaDankort, has increased steadily. Today, the card is the most frequently used payment method in retail stores, accounting for more than 60 per cent of turnover. It is also the most popular payment instrument for online shopping, and was used by 3 out of 4 Danes for their latest online purchases. The widespread use of the card reflects that it is, without comparison, the most common payment instrument on the consumer side, and that it became a *must-take* card long ago, i.e. a payment card that retail stores cannot refuse in practice. The popularity and widespread use of the Dankort are attributable to the agreed financing model and the Danish rules on fees, entailing that this is a relatively low-cost solution for both consumers and retailers. This has recently been cemented by a new agreement on covering the costs related to the Dankort which ensures that the framework for the future development and financing of the card scheme is now in place.

- *The use of paper-based payments is decreasing*. The share of cash and cheque payments in retail trade has declined significantly. In 1990, this share was estimated at 80 per cent, but by 2012 it had fallen to 25 per cent. Virtually all paper-based payments are made in cash, since cheques are, by and large, no longer used for retail transactions. However, around 40 per cent of the adult population rarely pay in cash, and in general Danish citizens now carry less cash in their wallets for payment purposes than they used to. Moreover, cash is used primarily for payment of small, typically round, amounts as an easy and fast method of payment. Denmark and the other Nordic countries are among the countries with the lowest number of cash payments per capita. This applies even though retail stores have a statutory obligation to accept cash payments. The declining use of paper-based payments has reduced the social costs of payments in Denmark, cf. studies showing that electronic payments are associated with lower costs.

- *Users want fast, low-cost solutions*. Both consumers and retailers attach considerable importance to speed in their assessments of payment solutions. Accordingly, many new solutions aim to reduce the payment time. Another important factor for consumers is that the solutions are perceived as convenient, while the retailers also focus on costs payable to payment service providers. Experience shows that fees also play an important role in consumers' choice of payment method. This has recently been reflected in a slowdown in the use of credit cards, which should be viewed in the light of retailers having been allowed to surcharge consumers for using this card type since 2011. Moreover, retailers also find it important that they are sure of receiving their money, while consumers are less concerned about fraudulent use, etc., because losses are typically not borne by the consumers, but by the retailer and/or the payment service provider. For this reason it may be difficult to induce consumers to use more secure solutions if this e.g. increases payment time.

- *But users are also heterogeneous*. At the same time, both consumers and retailers show considerable variation in their views on payment solutions and degree of readiness for new solutions. For example, consumers can be divided into those who primarily use cash, cards or both. The group that prefers cash payments has an overweight of elderly citizens and people with below-average incomes, who regard cash as e.g. a useful budget management tool. Consumers in this group are generally more hesitant to adopt new payment methods, such as mobile payment, and to buy goods and services online than the rest of the population. Conversely, there is a larger share of young people who have a smartphone and use it for payments and who are frequent online shoppers. Among retailers, there are also different views on payment solutions and wishes and expectations of such solutions across industries and sizes. This also applies to the willingness to participate in the financing of new solutions, since larger retailers tend to be more willing to contribute than small and medium-sized retailers.

- *Frequently used distinctions become less relevant*. Technological advances contribute to blurring often used categorisations as regards payments. One example is the distinction between whether a payment is a card payment, a mobile payment or an online bank payment. For instance, if the payment instrument is a card registered in a digital wallet on a smartphone, it could reasonably be classified as both a card payment and a mobile payment. Another example is the distinction between proximity and remote payments, or physical versus non-physical trade, which has an impact on the Danish rules on fees for using payment instruments. This distinction is also gradually becoming obsolete because several new solutions are used uniformly irrespective of the payment situation at hand. Moreover, some retail measures, e.g. self-scanning solutions, contribute to reducing the difference between proximity and remote payments. An important regulatory task is to ensure that this blurring of traditional distinctions in payments does not lead to inappropriate legislation.

- *Mobile phones are gaining ground as payment instruments*. Several new solutions are based on mobile phones, which are expected to gain ground as payment instruments – both in retail stores and online. This view is shared by retailers, who see contactless payments via smartphones as the most promising new payment solution over a 3-5-year horizon. Moreover, smartphones and

tablets can be used for receiving card payments via a device, called a mPOS terminal, which has been marketed to primarily small retailers so far. Among consumers, around one third currently state that they would pay for their everyday purchases by mobile phone if they could. This share seems to be relatively high, considering that most people have not yet used their mobile phones for this type of payments. However, mobile payments require training and experience and for some users this is not likely to succeed. For the same reasons payments by means of contactless technology are widely expected initially to gain a footing via payment cards rather than by mobile phones.

- *Increasing importance of new actors*. Banks and bank-owned firms have traditionally been the dominant providers of payment services, including in Denmark. This reflects that most payment services entail drawings on a deposit account. But new actors have begun to play a larger role in the payment market in recent years. The main reason is that new payment situations and solutions have created room for – and in some cases required the involvement of – these actors. Moreover, large, global IT providers are expanding their business areas to include payments, while existing global providers try to exploit new technologies and opportunities in order to strengthen their positions. The EU directives on e-money and payment services have created a European legal framework for new providers, which may be authorised as either e-money or payment institutions and provide EU-wide services. Moreover, the European Commission has recently presented a proposal on regulated access to e.g. deposit accounts at banks, and this may improve the opportunities for new actors to provide payment services.

- *The risk outlook changes*. New payment situations and solutions also create new risks. Online shopping is a case in point, as it is associated with risks that do not exist in physical trade. The risk of fraud in connection with online shopping can be reduced by means of strong customer verification, which is used by the NemID solution. But this will typically lead to a more cumbersome payment process for the consumer. In addition, the technology applied may entail new risks, e.g. false scanners for contactless technology and infiltration of smartphones by downloading unauthorised software. Another risk is fraudulent use of cards registered in an app or a digital wallet on a smartphone which the consumer loses. These risks entail a need for consumer information. Conversely, new solutions may also contribute to reducing risks. One example is online banking solutions for payments for online shopping, which are often based on strong customer verification. It could also be new types of user verification or other anti-fraud measures, which may be used together with new solutions.

- *Barriers to new solutions are mainly related to market incentives*. There are different types of barriers to new solutions. Market-related barriers are factors that reduce consumers' or retailers' incentives to use a new payment solution. An example is the difficulties in inducing retailers to join a new solution before consumers have been enrolled, or vice versa. Another type of market-related barrier is factors that limit the incentive for providers to develop and roll out new payment solutions. It could be an existing solution which is very popular among the users and therefore difficult to take market shares from by new providers. In Denmark, such a solution might be the Dankort. Other types of barriers can be infrastructure-related obstacles to the providers' business, or legislative barriers. The report

mentions specific examples of these two types of barriers which may impede new payment solutions. However, the Payments Council does not regard any of these as decisive obstacles to the rollout in Denmark of new payment solutions with a potential broad use among consumers and retailers.

2. Traditional Methods of Payment

2.1 INTRODUCTION AND SUMMARY

Over the last three decades, the way in which Danes pay for the goods and services they buy has changed radically. Cheques are hardly ever used in retail trade any longer, and the use of cash has dropped to just one fourth of the value of payments. Both methods of payment have primarily been replaced by the national debit card, Dankort.

Another trend is an increase in the number of holders and users of international debit cards such as Visa Electron and MasterCard Debit. These cards have been issued in Denmark since 2002 and have gained much ground in the last couple of years. International debit cards are particularly prevalent among under-18s. The reason is that these cards have a balance check which is not the case for the Dankort.

Besides debit cards, a large number of international credit cards have been issued in Denmark. However, the use of these cards remains relatively modest compared with the use of debit cards and has been stagnant since 2011. This should be seen in the light of new rules that allow retailers to surcharge credit card but not debit card payments.

In addition to these shifts in payment patterns in Denmark, online shopping has grown considerably. Measured by the number of Dankort transactions, the annual growth rate has been more than 15 per cent in recent years. This figure includes e.g. payment solutions whereby amounts are regularly drawn on consumers' cards. Virtually all online purchases in Denmark involve payment by card.

Compared with most other countries, use of cards is high in Denmark, while the volume of cash payments is modest. The same picture is seen in the other Nordic countries. This may be attributable to payment habits in individual countries, as well as differences in the prevalence of payment cards and in business structures and shopping patterns, which affect the size of payments.

This chapter describes the use of traditional methods of payment in Denmark, i.e. cash, cheques and cards. First, the Danish payments infrastructure is outlined. This is followed by a description of the prevalence and use of cards and cash in Denmark, based on the available statistics, and finally comparisons are made with other countries.

2.2 THE DANISH PAYMENTS INFRASTRUCTURE

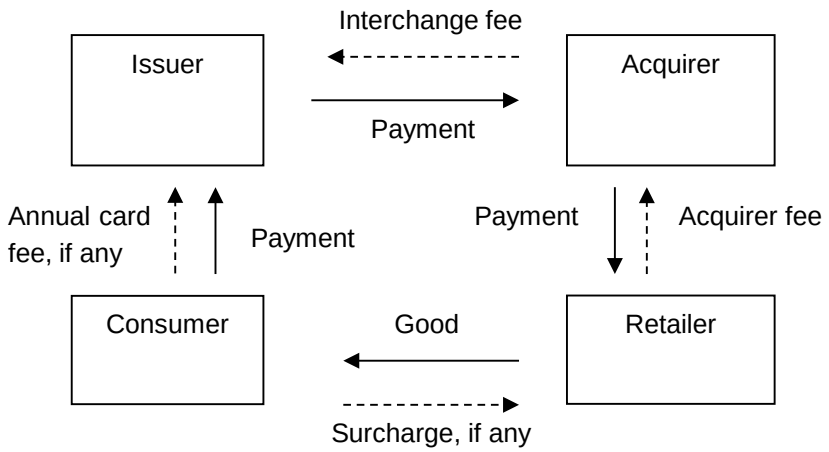
When goods and services are bought in shops or online, funds must be transferred from the consumer to the retailer. This can be done in cash, i.e. using banknotes and coins, or via a bank deposit. Both are financial claims – cash is a claim on a central bank, such as Danmarks Nationalbank, while a bank deposit is a claim on a bank.

Transfer of a bank deposit takes place using a payment instrument, e.g. a payment card. A payment instrument is used to initiate a payment and is typically linked to an account with a payment service provider. In other words, it can be seen as the account holder's access key to the account.

To use a payment instrument, both the payer, i.e. the consumer, and the payee, that is the retailer, must have concluded an agreement with a payment service provider. If the instrument is a payment card, the

consumer's and retailer's providers are known as the issuer and acquirer, respectively, and the aggregate set of agreements usually makes up a "four-party system", cf. Chart 2.1.

A FOUR-PARTY SYSTEM — Chart 2.1



Note: In Denmark, the Dankort is an example of a four-party system. The card is issued by banks, while payments are acquired by Nets, cf. Box 2.1. But Nets does not hold the funds at any time; they are transferred directly from the consumer's account at the issuing bank to the retailer's bank account.

In a four-party system, the parties pay various fees in connection with a payment transaction. The retailer pays an acquirer fee to the acquirer. If permitted, the retailer may opt to surcharge the consumer, that is let the consumer pay the acquirer fee partly or in full. The acquirer normally passes on part of fee received to the issuer in the form of an interchange fee.

Besides the parties shown in Chart 2.1, there are other relevant actors in a card system. These include the scheme owner, i.e. the owner of the rights to the card. Examples are the international card companies Visa and MasterCard, which also play a role in the transmission of data for payments involving their respective cards.

A payment card may also deviate from the four-party system in other ways. For example, it could be a three-party system, whereby the issuer also concludes agreements with the retailers that accept the card.

Payments infrastructure

In Denmark, the banks have a long tradition for cooperating on core infrastructure, i.e. the technical systems and legal agreements required in order to make transfers between bank accounts. All banks in Denmark have access to this infrastructure, including branches of foreign banks.

A key actor in the Danish payments infrastructure is Nets, which was formed by a merger between PBS (Payment Business Services) in Denmark and Nordito in Norway, the owner of BBS, the Norwegian equivalent of PBS. Among other things, Nets provides services to Danish and Norwegian banks and acquires card payments. In Denmark, Nets is also the owner of a number of scheme products offered to customers, cf. Box 2.1.

NETS Box 2.1

Nets is the central supplier of payment services and related services in the Danish payments infrastructure. The company was established in 2010 by a merger between PBS (Payment Business Services) in Denmark and Nordito in Norway, which owned BBS, the Norwegian equivalent of PBS, and the card acquirer Teller. Today, Nets is owned by Danish and Norwegian banks and by Danmarks Nationalbank, whose ownership share is just under 10 per cent.

PBS was established in 1984 with a view to coordinating bank initiatives in the payments area. Two years later, PBS merged with Pengeinstitutternes Betalingsformidlingscenter, PBC, and Pengeinstitutternes Købe- og Kreditkortaktieselskab, PKK, which had both been established a few years earlier with the respective aims of developing and operating the banks' payment systems and undertaking the development of the Dankort.

Over the years, a number of areas were spun off from PBS as new companies. In a period from 2001, the scheme owner rights to the Dankort were held by Dankort A/S, which was owned by the Danish banks, cf. Box 2.3. In 2003, PBS' payroll and staff administration solutions were placed with Multidata – now Bluegarden – while acquiring of international cards was transferred to PBS International.

Today, Nets has subsidiaries in Denmark and Norway. Each of these owns a number of companies providing various infrastructure services. For example, the Danish subsidiary owns DanID, the company behind NemID and other secure online payment solutions, and Teller, which operates in Denmark, Norway and Sweden. Most recently, Nets has acquired the Finnish payment card company Louttokunta, which has been renamed Nets Oy.

Nets' activities span a range of business areas. These include solutions for invoicing and collecting payments, processing of card payments for issuers and acquirers and acquiring of card payments for retailers. In addition, Nets provides solutions for e.g. electronic identification and signing and point of sale payment terminals.

Nets owns the rights to the Dankort and acquires Dankort payments. Nets has the same role in relation to other common bank products, including Betalingsservice (direct debit). In addition, Nets offers card issuer services to Danish banks, and via Teller it is the largest acquirer of payments by international cards in Denmark. Nets also operates the Sumclearing on behalf of the Danish Bankers Association.

The banks' primary system for settlement of retail payments in Denmark is called the Sumclearing. It is owned by the Danish Bankers Association, which has outsourced operations to Nets. The Sumclearing is used for the exchange of liquidity between banks via accounts at Danmarks Nationalbank. This is done in a night-time settlement cycle, in which each bank submits or receives an amount corresponding to its net position.

Calculation of the net positions in the Sumclearing is based on two subclearings of the day's payments. The electronic clearing includes e.g. inpayment forms, cheque payments and cash withdrawals from the banks' ATMs. The PBS clearing nets out payments using Nets' own products, such as the Dankort. Box 2.2 describes the processing of a Dankort payment.

In 2013, the Sumclearing was supplemented with a system for settling credit transfers, the Intradagclearing. The new system enables intraday transfers and is part of an ongoing modernisation of the Danish payments infrastructure. Once the modernisation process has been completed by end-2014, immediate transfers will also be possible on a 24/7 basis.[1]

[1] See Jakob Mygind Korsby and Peter Toubro-Christensen, Faster payments in Denmark, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2012, Part 1.

PROCESSING A DANKORT PAYMENT — Box 2.2

The processing of payments in Denmark is illustrated using a Dankort payment as an example. For other payments, especially those included in the electronic clearing and the Intradagclearing, the process may be slightly different. References below are to Chart 2.2 and the steps shown in the chart.

The consumer initiates the payment by inserting the card in a terminal, entering a PIN and pressing OK. At the same time, Nets checks that the card has not been blocked (step 1). Nets then sends information about the payment to the issuing bank (step 2), and the issuer withdraws the amount from the consumer's account (step 3).

Nets collects the day's Dankort payments and other payments included in the PBS clearing and calculates bilateral gross credit and debit positions for each bank vis-à-vis all other banks (step 4). These positions are sent to the Sumclearing, where they are added to the equivalent positions from the electronic clearing (step 5).

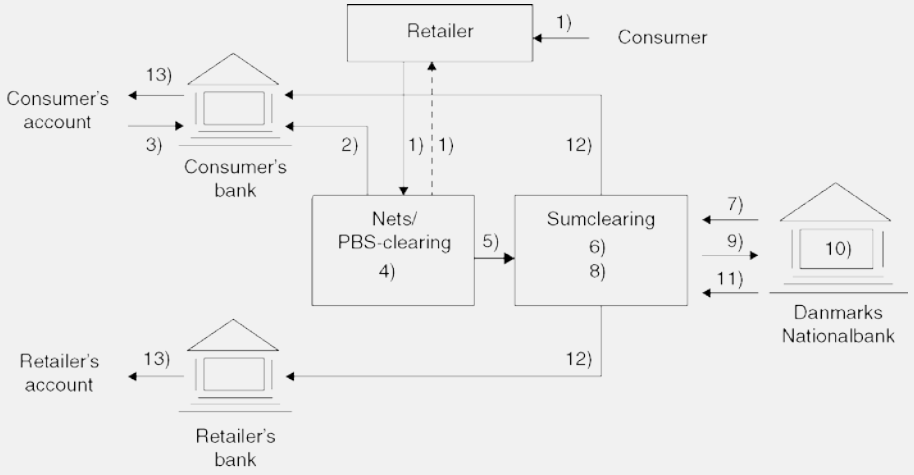
In the Sumclearing settlement, the individual bank's net position against the other banks is calculated (step 6). This net position is compared with the bank's line, which is received from Danmarks Nationalbank (step 7). The line is the funds reserved by the bank at Danmarks Nationalbank for the day's settlement.

Then the Sumclearing checks that each bank's line does not exceed its net (debit) position (step 8). If that is the case, the Sumclearing sends book-entry items to Danmarks Nationalbank (step 9), which deposits the funds to or withdraws them from the banks' settlement accounts (step 10) and sends confirmation to the Sumclearing (step 11).

Subsequently, the Sumclearing informs the banks about the successful settlement (step 12). Afterwards, the banks perform final book entry to the customer accounts, and the amount of the above Dankort payment is deposited to the retailer's account (step 13).

Since Sumclearing settlement takes place at night, the process typically takes one day, i.e. if payment is made on a Tuesday, the money will be deposited to the retailer's account Wednesday.

SETTLEMENT OF A DANKORT PAYMENT — Chart 2.2



Methods of payment

As stated above, traditional methods of payment include cash payments and the use of payment instruments cards and cheques.

Under the Danmarks Nationalbank Act and the Danish Coinage Act, *cash* in the form of banknotes and coins is legal tender in Denmark. This means that – with a few specific statutory exceptions – consumers have the right to use cash to buy goods and services and to release themselves from debt obligations.[1]

Cash differs from other means of payment in several respects. For example, cash requires no technical infrastructure in the payment situation, which makes it suitable for transfers between individuals.

[1] See Louise Buchter and Kirsten Gürtler, Legal tender, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2006.

Moreover, banknotes and coins are bearer certificates, i.e. they can be used by anyone who is in possession of them.

A *cheque* is a written order whereby the issuer, by signing the cheque, permits the withdrawal of an amount – the value of the cheque – from his or her account. Normally, a cheque is freely transferable. In Denmark, the use of cheques has been declining for some years, and today they are used only rarely in retail stores.

As regards payment cards, a distinction is made between debit and credit cards. When a *debit card* is used, the amount is debited from the consumer's account immediately. In practice, debit cards can be issued by banks only, as they require access to withdraw or reserve funds in deposit accounts.

In Denmark, the Dankort is an example of a debit card. The Dankort is the most common and most widely used payment card in Denmark. It is issued by Danish banks, and Dankort payments are acquired by Nets, which also holds the rights to the card, i.e. is scheme owner. Box 2.3 describes the Dankort.

The Dankort cannot be used outside Denmark. However, most Dankort cards are co-branded with Visa, which makes the card usable abroad. When VisaDankort cards are used abroad, it is still, in practice, a debit card, since payments are debited from the consumers' accounts within a few days.

In addition, Danish banks issue other, similar cards that can be used abroad, i.e. international debit cards. The most commonly issued international debit card by banks is MasterCard Debit, which is issued by licence from MasterCard. Previously, the banks primarily issued the equivalent card from Visa, Visa Electron.

Unlike payments using Dankort, the balance is checked when payments are made using international debit cards. This means that consumers cannot have overdrafts, or cannot exceed an agreed credit line. These cards are mainly issued to under-18s, who are generally ineligible for the Dankort unless a person with full legal capacity guarantees any losses.

When a *credit card* is used, the money is not debited from the consumer's account until later, usually once a month. In addition, the consumer may have agreed with the issuer that part of the balance is not paid on the regular settlement date, but carried forward as a loan.

Unlike debit cards, credit cards can be issued by non-banks since they do not require access to a deposit account. In Denmark, other issuers than banks or branches of foreign banks must, however, be approved by the Danish Financial Supervisory Authority as a payment institution or hold a "limited-purpose licence".

The most widely used international credit card in Denmark is MasterCard. Other international credit cards issued in Denmark are Visa and Diners Club. These cards are primarily, but not solely, issued by Danish banks. The same applies to various private label cards, e.g. fuel and store cards, that are combined with an international card.

The above cards are, as a main rule, four-party systems, and payments are acquired by the party with which the retailer has made an agreement. The largest acquirer of international cards in Denmark is Teller, a subsidiary of Nets. In addition, there are a number of other card acquirers in Denmark.

THE DANKORT Box 2.3

The Dankort debit card was introduced in 1983. For some years, the banks had been contemplating introducing a single card, and in 1979 they set up Pengeinstitutternes Købe- og Kreditkortaktieselskab, PKK, which was tasked with developing a Danish payment card. Originally, the idea was that the new card was to be a traditional credit card, but opposition from both consumers and retailers meant that it became a debit card instead.

Initially, Dankort payments were made using a mechanical imprinter and paper vouchers. In 1984, the banks introduced ATMs, enabling Dankort holders to withdraw cash 24/7. Use of online terminals in retail stores for Dankort payments was tested in 1984 and rolled out all over Denmark the following year.

The appearance of the Dankort has changed several times. Originally it had the cardholder's civil registration number on the front, but this was prohibited in 1985. In 1986, the banks chose to put a photo of the cardholder on the card. The photo was removed again in 2004, when Dankort cards were issued with a chip instead as a more secure solution than swiping the card's magnetic stripe.

In 1988, a combined Dankort and Visa card was introduced, the VisaDankort. It functions as a Dankort when used in Denmark, but as a Visa card when used abroad. Furthermore, in 1998 it became possible to use the Dankort for online payments. Then – as now – the process was to enter the card number, the expiry date and the three control digits printed on the card.

Over the years, the owner of the Dankort scheme has changed several times. When PBS merged with PKK in 1986, cf. Box 2.1, PBS took over the rights to the card. In a period from 2001, ownership was placed with Dankort A/S, which had been established for this purpose and was owned by the banks. During this period, the role of acquirer of Dankort payments was undertaken by the banks instead of PBS.

The fees for financing the Dankort scheme have been subject to regulation almost from the beginning. In 1985, a ban was introduced on charging fees to retailers for accepting Dankort payments. This ban remained in force until 1999, when a legal amendment lifted it for non-physical trade, e.g. online sales, but not for Dankort payments in retail stores, i.e. point of sale transactions.

In 2003, it was assessed that a number of conditions for competition in the Danish card market had been met, and an agreement was concluded to cover the costs of using the Dankort in physical trade. From 1 January 2005 acquirers were permitted to charge up to kr. 0.50 per payment to retailers, which in turn were allowed to surcharge consumers a corresponding fee.

This practice was heavily criticised, and in the February 2005 general election a promise was made to prohibit surcharge. So after the election a new Dankort financing model was introduced, whereby retailers paid part of the costs of operating the Dankort system as an annual subscription fee, while no fees could be charged to consumers.

In May 2013, Nets and the Danish Chamber of Commerce concluded a new agreement to cover the costs of the Dankort scheme. Under this agreement, the retailers' share of the costs will gradually increase from half today to full cost recovery in 2018. This means that agreement has been reached on the future framework for financing and further developing the Dankort.

Besides the international cards, various other credit cards are issued in Denmark, including fuel and store cards, but their use is more limited. These cards are mainly three-party systems. A popular payment card is the one from the consumer association Forbrugsforeningen, which also functions as a credit card. Table 2.1 presents an overview of payment cards in Denmark.

PAYMENT CARDS IN DENMARK — Table 2.1

Card	Type	Issuer	Acquirer in Denmark
Dankort	Debit	Banks	Nets
VisaDankort	Debit	Banks	Nets
Visa Electron	Debit	Banks	Various acquirers[3]
Maestro[1]	Debit	Banks	Various acquirers[3]
MasterCard Debit[1]	Debit	Banks	Various acquirers[3]
MasterCard[2]	Credit	Banks	Various acquirers[3]
Visa	Credit	Ikano Bank and Nykredit Bank	Various acquirers[3]
Diners Club	Credit	SEB Kort	SEB Kort
Fuel cards	Credit	Shell, Q8, Statoil, OK Benzin et al.	Various acquirers
Forbrugsforeningen	Credit	Forbrugsforeningen	Forbrugsforeningen
Other store and membership cards	Credit	Various issuers	Various acquirers

[1] Maestro and MasterCard Debit are both debit cards issued under a licence from MasterCard.
[2] Credit cards with the MasterCard logo also include the Eurocard, which is issued by SEB Kort.
[3] Examples of acquirers of payments by international cards in Denmark are Handelsbanken, Nordea, Swedbank, Teller and Valitor.

Legislation

The legal basis for using payment instruments in Denmark is primarily the Payment Services and Electronic Money Act. The Act entered into force on 1 November 2009 and implements the EU Payment Services Directive, which was adopted in 2007. It replaced the Act on Certain Means of Payment from 2000, cf. Box 2.4.

The purpose of the Directive was to create a single market for payment services in the EU and to harmonise a number of provisions with a view to the establishment of SEPA – the Single Euro Payments Area.[1] The Directive is based on a principle of total harmonisation, i.e. member states may not introduce or retain rules that deviate from its provisions.

The Directive introduced legislation in areas not previously regulated in Denmark, such as transfers of funds and deposit and withdrawal of cash. Moreover, the Directive's disclosure requirements were more extensive than those applying in Denmark, whereas the Danish rules on liability in the event of fraudulent use did not need to be amended.

PREVIOUS LEGISLATION IN THE AREA OF PAYMENTS — Box 2.4

The first general act in the area of payments in Denmark was the Payment Card Act from 1984. The background was the banks' establishment of the Dankort system in 1983. Among other things, the Act regulated notification of payment systems, registration of card issuers, disclosure obligations to cardholders and liability in the event of fraudulent use.

In 1994, the Act was expanded to include PC- and telephone-based home banking systems. Such systems began to gain ground in the early 1990s, entailing a need for regulation. In practice, the amendment of the Act was made by including payment systems without cards, but with a code or similar identification.

In 2000, the Payment Card Act was replaced by the Act on Certain Means of Payment. The new Act was to a large extent based on the principles of the Payment Card Act, but basically led to simplification, e.g. because the issuer's disclosure obligations were reduced. The Act on Certain Means of Payment remained more or less unchanged until the introduction of the Payment Services Directive in 2009.

As regards fees, EU member states have wide scope to lay down their own rules. In Denmark, the rules have been amended a number of times, cf. Box 2.3 on the Dankort. Most recently, in 2011, retailers were

[1] See Anders Mølgaard Pedersen, The directive on payment services, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2007.

permitted to surcharge credit card transactions, but not debit card transactions. The current fee rules are described in Box 2.5.

The Directive also introduced a new type of institutions in the EU, i.e. payment institutions. Such institutions may provide payment services as stated in the Directive, but may not receive deposits. Examples include card issuers and acquirers that are not credit institutions, money remitters and telecommunications companies that provide payment services.

DANISH FEE RULES — Box 2.5

The Danish rules on fees for the use of payment cards are found in the Payment Services and Electronic Money Act. They determine what fees the acquirer may charge to retailers, and whether retailers are prohibited from surcharging the payers (consumers). The Danish Competition and Consumer Authority supervises compliance with these rules.

The rules applying to physical trade, i.e. point-of-sale transactions, are shown in Table 2.2. If such transactions involve the use of a payment card with a chip and a PIN, signature or similar payer identification, the acquirer may charge an annual subscription fee to retailers. That is the case for e.g. the Dankort and VisaDankort.

The rules for calculating the annual subscription fee for the Dankort are described in an Executive Order[1] which has just been revised to reflect the new agreement between Nets and the Danish Chamber of Commerce, cf. Box 2.3. It also lays down what each retailer must pay in annual subscription fees, which is based on the number of payments, broken down into eight intervals.

Under the Act, the relevant government minister may lay down special rules for international cards. An Executive Order[2] uses this provision to exempt such cards from the rule that only an annual subscription fee may be charged. Instead, the general provision of the Act applies, which says that fees must not be unreasonable compared with those that would apply under effective competition.

This Executive Order also determines when retailers may surcharge. They may do so when a credit card is used, but not when a debit card, such as the Dankort or an international debit card, is used. If a retailer chooses to surcharge for the use of a credit card, this fee may not exceed the fee paid by the retailer to the acquirer.

The latter rules, known as the "split model", were introduced on 1 October 2011. Before that, there was a general ban on surcharging, but only for cards issued in Denmark. At the same time, there was a ceiling on the acquirer processing fee for international cards issued in Denmark. The reason for amending the rules was that they were assessed to discriminate against other EU citizens and could constitute a breach of the Treaty.

In non-physical trade, e.g. online shopping or purchases from vending machines, the rules are simpler. For all types of payment cards, the acquirer may charge a fee to the retailer, but it must not be unreasonable as defined by the Act. Retailers may pass on such fees to consumers.

FEE RULES IN PHYSICAL TRADE — Table 2.2

	Acquirer processing fee	Surcharging
Dankort and VisaDankort	Fixed subscription	Prohibited
Credit cards without chip issued in Denmark	Fee permitted	Permitted
International debit cards issued in Denmark	Fee permitted	Prohibited
International credit cards issued in Denmark	Fee permitted	Permitted
Debit cards issued abroad	Fee permitted	Prohibited
Credit cards issued abroad	Fee permitted	Permitted

Note: The table shows whether the acquirer may charge a fee to the retailer, and whether the retailer may surcharge, i.e. pass on this fee to the consumer. Where it is permitted to charge an acquirer processing fee, this fee must not be unreasonable, i.e. exceed the fee that would apply under effective competition. Where the retailer may surcharge, the fee charged may not be higher than the acquirer processing fee.
Source: Danish Competition and Consumer Authority.

[1] Executive Order no. 1475 of 22 December 2009.
[2] Executive Order no. 1411 of 28 December 2011.

In addition, an amended Electronic Money Directive was adopted in 2009; this has also been implemented in the Danish Payment Services Act. Electronic money may be stored in the chip of the card or on a server and constitutes a claim on the issuer. Only credit institutions and e-money institutions may issue electronic money.

The Act also has a few specifically Danish provisions. Examples include a requirement that retailers with sales staff must accept cash payments, as well as rules on charge back for online purchases, which entail that consumers have a right to have a payment reversed if the goods are not delivered or are defective.

In July this year, the European Commission presented a proposal for a revised Payment Services Directive. One of the major amendments proposed is to expand regulated activities to include services whereby third-party providers make payments from a customer's bank account. This part of the proposal is described in more detail in Box 3.11 in Chapter 3.

Simultaneously, the Commission presented a proposal for a regulation on interchange fees for card payments. The proposal puts a ceiling on such fees, which is assumed to reduce acquirer processing fees. This should be seen in the context of a proposal to prohibit surcharging in the aforementioned Directive.

2.3 PAYMENTS IN DENMARK

This section elaborates on the use of cash, cards and cheques by consumers in Denmark, as well as retailers' acceptance of these methods of payment. It also describes the development in the use of the various methods of payments and provides an estimate of Danish payment patterns in retail stores and online in 2012.

Number of cards issued

At end-2012, there were approximately 11 million payment cards in Denmark – or approximately two cards per Dane, cf. Table 2.3. Of these, 4.8 million were Dankort cards, including just under 3.7 million VisaDankort, while approximately 3.5 million international cards had been issued, with an almost equal distribution on debit and credit cards. The number of other cards is estimated at 2.6 million.

NUMBER OF PAYMENT CARDS IN DENMARK — Table 2.3

Thousands	Dankort	VisaDankort	International debit cards	International credit cards	Fuel cards	Store and membership cards	Total
1983	447	•	•	…	…	…	447
1993	2,002	409	•	292	…	…	2,704
2001	1,450	1,750	•	500	…	…	3,700
2012	1,119	3,675	1,673	1,884	1,800	820	10,970

Source: Danmarks Nationalbank, Danish Competition and Consumer Authority, Statistics Denmark and PlusCon.

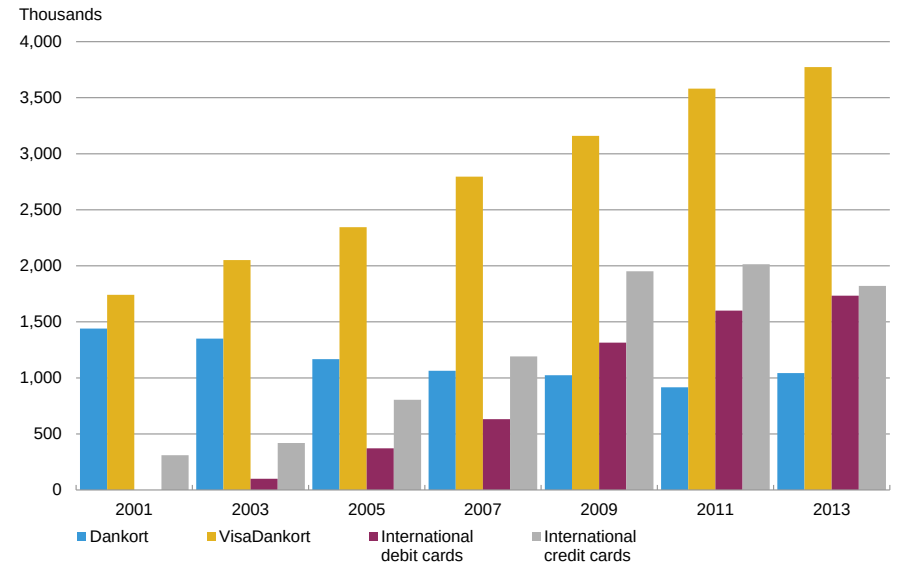
International credit cards were originally primarily issued to employees in firms, i.e. as company cards. But within the last 10 years the number of international credit cards has grown considerably. This is mainly because these cards are also extensively issued to private individuals now, free of charge or against a small fee.

The first international debit cards in Denmark were issued in 2002. This type of card soon became popular, and particularly the period from 2007 to 2009 saw pronounced growth in international debit cards, without an equivalent fall in the number of Dankort cards, cf. Chart 2.3. In the last couple of years, the increase has been more moderate.

The number of other credit cards in Table 2.3 has been estimated on the basis of information from the consumer survey carried out as part of this report. Most of these cards are fuel cards, while around one

third are store and membership cards, including cards issued by the consumption association Forbrugsforeningen.

NUMBER OF CARDS IN DENMARK, YEAR-END Chart 2.3



Note: For 2013, data from the end of the 1st half has been applied.
Source: Danmarks Nationalbank.

Prevalence among consumers

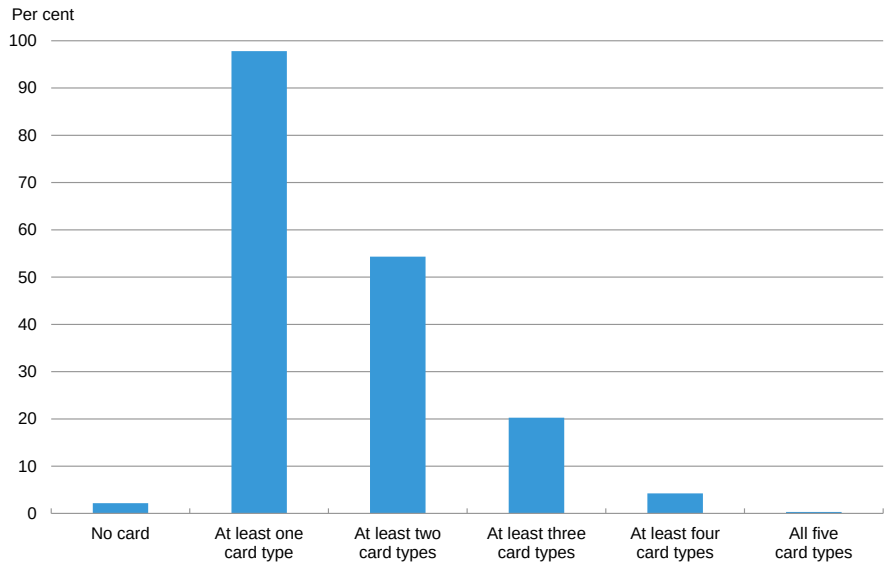
Recent years' growth in the number of payment cards means that virtually all adult Danes now hold a least one card. Based on data from the consumer survey, this is estimated to be the case for around 98 per cent of the population aged 16-74, cf. Chart 2.4. In a similar survey from 2010, the number was around 94 per cent.[1]

More than half of all adult Danes have two or more payment cards, in most cases a Dankort and an international credit card, cf. Table 2.4. On the other hand, it is less common that a consumer holds both a Dankort and an international debit card, so these cards can be seen as substitutes.

A breakdown of card types by ages shows that the percentage with a Dankort and a credit card is highest for Danes over 35 years, cf. Chart 2.5. Under-18s primarily hold international debit cards, where unauthorised overdraft is not possible. The number of 18-24-year-olds with these cards is also relatively high.

[1] See Gustav Kaas Jacobsen and Søren Truels Nielsen, Payment habits in Denmark, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2011.

PERCENTAGE OF CONSUMERS HOLDING PAYMENT CARDS — Chart 2.4



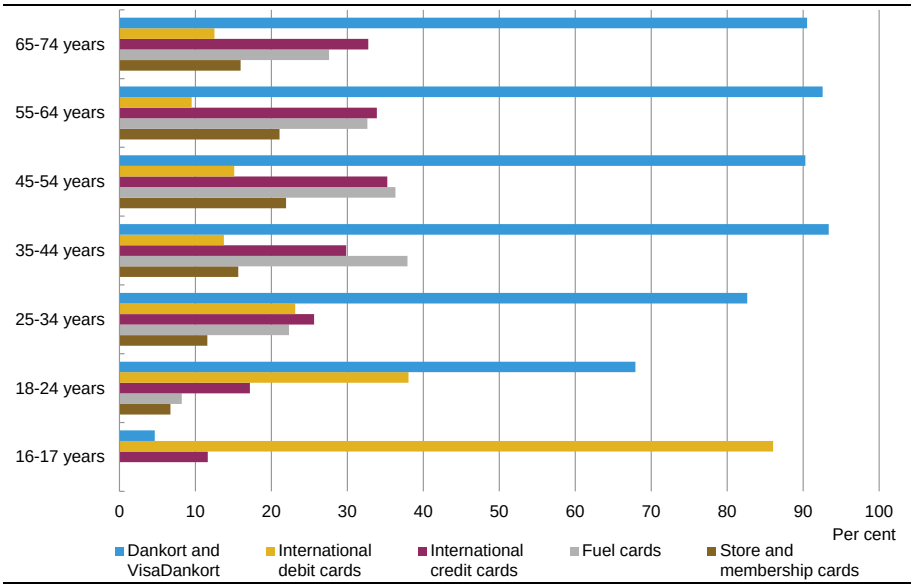
Note: The chart includes Dankort or VisaDankort, international debit and credit cards, fuel cards and store and membership cards.
Source: Danmarks Nationalbank's consumer survey, 2013.

PERCENTAGE OF CONSUMERS WITH ACCESS TO PAYMENT CARDS — Table 2.4

Who also hold:	Dankort and VisaDankort	International debit card	International credit card	Fuel card	Store card or similar
Consumers with Dankort and VisaDankort	100	11	31	31	17
Consumers with international debit card	48	100	14	23	15
Consumers with international credit card	89	10	100	35	19
Consumers with fuel card	93	17	36	100	25
Consumers with store card or similar	92	19	36	44	100

Note: The table shows the percentage of consumers with the payment card in a given row who also hold the card stated in the column in question.
Source: Danmarks Nationalbank's consumer survey, 2013.

PREVALENCE OF PAYMENT CARDS BY AGE GROUPS — Chart 2.5

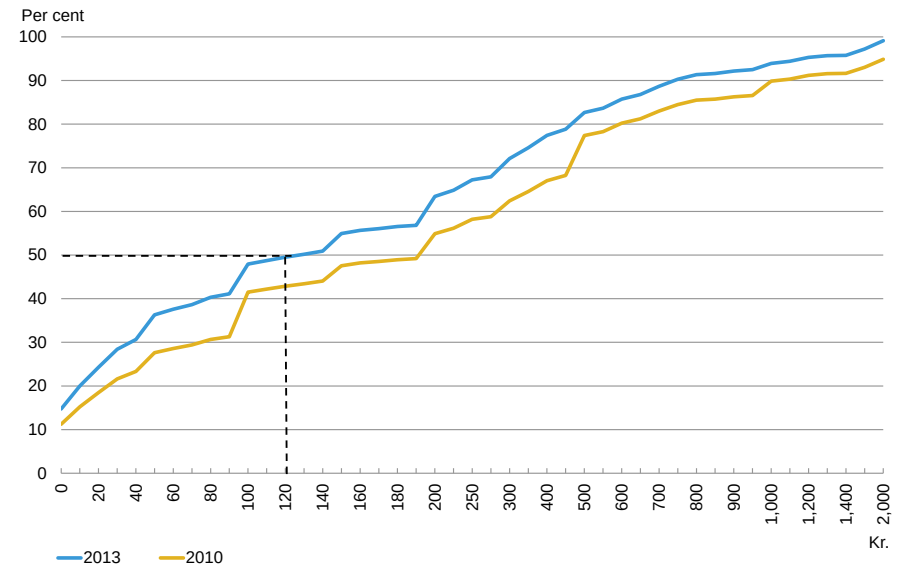


Source: Danmarks Nationalbank's consumer survey, 2013.

Finally, consumers may also hold cash for payment purposes. A measure of the cash held could be the amount in their purses or wallets, which varies from person to person. According to the consumer survey, half of all Danes in 2013 held approximately kr. 120 or less in cash, cf. Chart 2.6.

The chart also shows that there has been a general decline in the Danes' holdings of cash for payment purposes. This is evident if a comparison is made with the equivalent distribution in the 2010 survey. At that time, the Danes' average cash holding was larger than in 2013.

CASH HELD BY DANES FOR PAYMENT PURPOSES — Chart 2.6



Note: The chart shows the accumulated percentage of Danes holding a given cash amount in their wallets. For example, half of all adult Danes in 2013 held around kr. 120 or less in cash.
Source: Danmarks Nationalbank's consumer surveys, 2010 and 2013.

Consumers can acquire cash by withdrawing it at bank branches or from ATMs or by making card payments exceeding their purchases in retail stores. According to the consumer survey, they withdraw most of their cash from banks, but also withdraw cash in retail stores relatively often, cf. Table 2.5.

CONSUMERS' CASH WITHDRAWALS IN 2013 — Table 2.5

Withdrawals	Per person			Total		
	Number	Value (kr.)	Avg. amount (kr.)	Number (million)	Value (kr. billion)	Avg. amount (kr.)
From banks	27	40,000	1,480	114	169	1,480
In retail stores	17	4,500	270	70	19	270

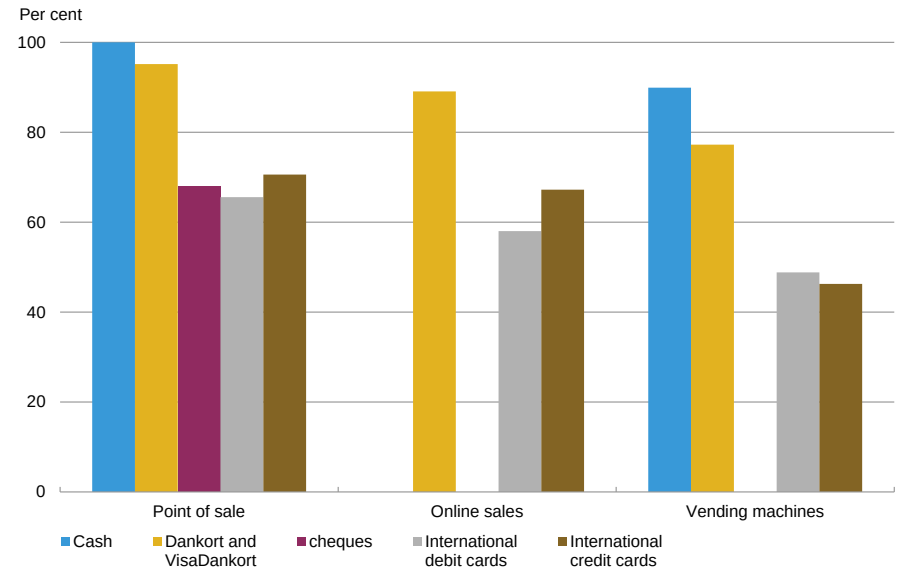
Note: Estimated data. Withdrawals from banks may be from bank branches or from ATMs, while withdrawals in retail stores are card payments exceeding the purchases.
Source: Danmarks Nationalbank's consumer survey, 2013.

Acceptance by retailers

Based on the retailer survey, the share of Danish retailers that accept the various methods of payment can be estimated. Practically all retailers with sales staff accept the Dankort, cf. Chart 2.7. In addition, approximately two thirds of all retailers accept payment by international cards.

The chart also shows that the majority of retailers still allow for payments by cheques. But typically they only provide this information if asked, i.e. they do not advertise it the way they do with payment cards. Assumedly because they prefer customers to pay by card, cf. Chapter 5.

PERCENTAGE OF RETAILERS ACCEPTING VARIOUS METHODS OF PAYMENT — Chart 2.7



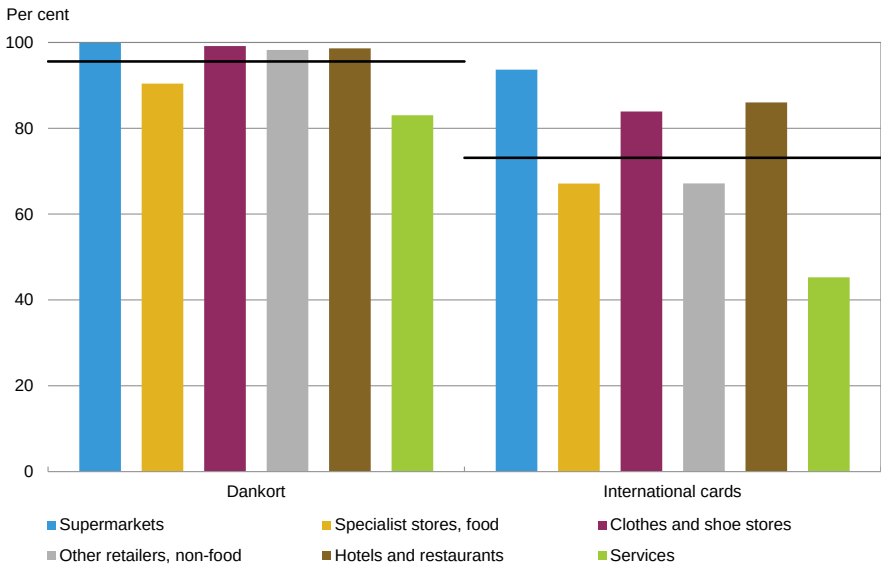
Note: Besides those shown in the chart, retailers accept other methods of payment, including new payment solutions as described in Chapter 3. In addition, many stores with online sales accept bank transfers. A few payment recipients, such as fuel companies, also accept their own cards.
Source: Danmarks Nationalbank's retailer survey, 2013.

As regards online sales, the Dankort is also the method of payment accepted by most stores. More than half of the stores also accept payment by international cards. But in a number of online stores, typically small ones, a bank transfer is the only option.

For sales via vending machines, more than 80 per cent of payment recipients allow payment in cash and almost as many can handle Dankort payments. This reflects that most vending machines give consumers a choice of cash or Dankort. A few payees, e.g. petrol companies, also offer the option of using cards issued by the company itself.

The acceptance rate for cards varies from industry to industry. Nearly all supermarkets, clothes and shoe stores and hotels and restaurants offer payment by Dankort, and many of them also accept international cards, cf. Chart 2.8. Among specialist food stores and stores supplying services, slightly fewer accept the Dankort. Furthermore, in the latter group less than half allow consumers to pay by international cards.

PERCENTAGE OF RETAILERS ACCEPTING CARDS, BY INDUSTRY Chart 2.8

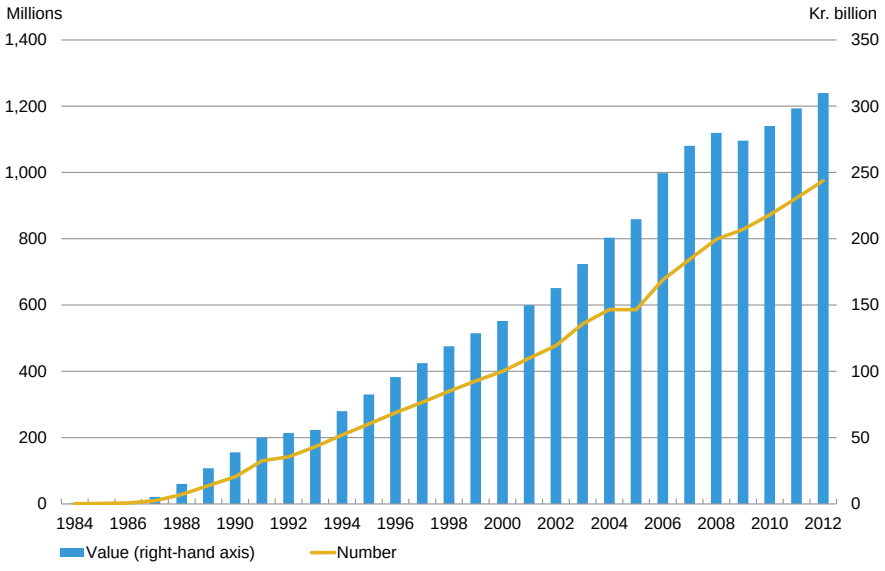


Note: The black line shows the average for all industries taken as one. Box 5.1 in Chapter 5 provides an overview of the types of stores included in each industry. Only stores with sales staff have been included in the chart.
Source: Danmarks Nationalbank's retailer survey, 2013.

Development in payment patterns

Over the last 2-3 decades, a major shift has taken place in the methods of payment used in Danish retail stores. Above all, there has been substantial growth in the use of the Dankort, cf. Chart 2.9. Since the card was introduced, the number of transactions has risen every year – except in 2009, when private consumption fell in Denmark.

NUMBER AND VALUE OF DANKORT PAYMENTS Chart 2.9

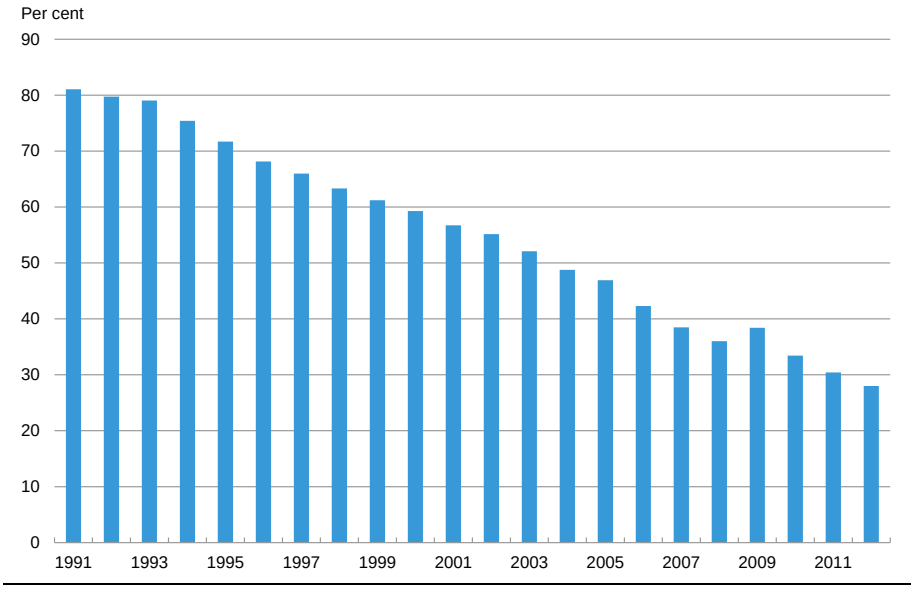


Source: Statistics Denmark.

The increased use of the Dankort has been at the expense of paper-based payments – by cheque or in cash. No statistics are available for the volume of cheque payments in retail stores, but assessed on the basis of information from the consumer survey, retailers receive very few cheques nowadays.

Statistics for cash payments are not available either. However, based on a number of assumptions it is possible to calculate an overall estimate of the use of cash and cheques in retail stores, cf. Chart 2.10. It is seen that these two payment methods' share of turnover has declined from almost 80 per cent to around 25 per cent over the last 20 years.

CASH AND CHEQUE PAYMENTS' SHARE OF RETAIL TURNOVER — Chart 2.10



Note: The share has been calculated by subtracting the value of payments by Dankort and international cards from the estimated retail turnover.
Source: Statistics Denmark and own calculations.

Use of international credit cards in Denmark rose until 2011, but has stagnated since then, cf. Table 2.6. This could be attributable to the new fee rules that came into force in 2011 as described in Box 2.5. Experience shows that consumers respond to fees, so it is likely that some of them have switched to the Dankort to avoid any credit card fees.

NUMBER OF PAYMENTS BY INTERNATIONAL CARDS IN DENMARK — Table 2.6

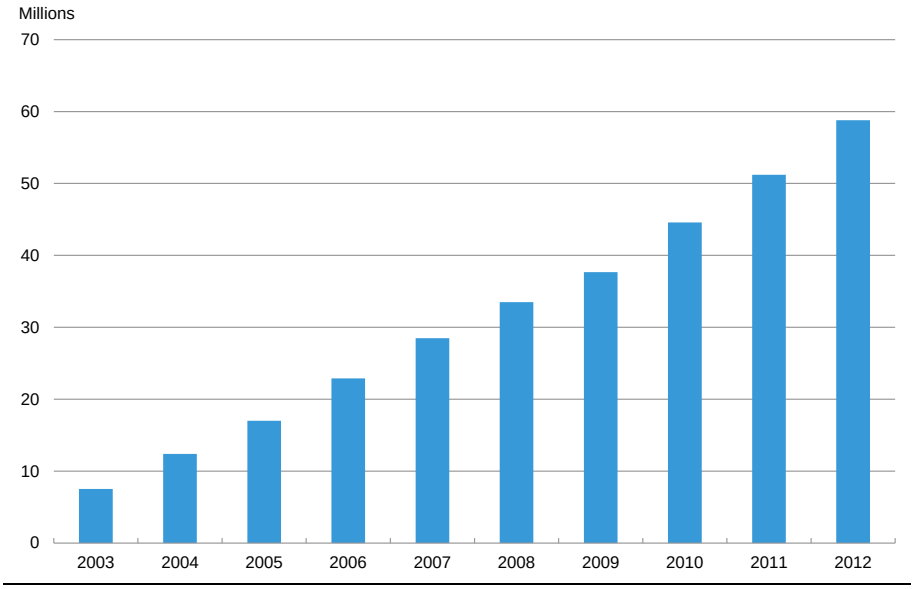
Millions	International debit cards	International credit cards	Total
2004	…	…	10-20
2006	…	…	25-30
2008	…	…	35-40
2009	43	22	64
2010	83	27	110
2011	119	33	152
2012	156	33	188

Note: Prior to 2009, no information is available on the distribution on international debit and credit cards.
Source: Danmarks Nationalbank and Danish Competition and Consumer Authority.

Online shopping

Online shopping has been growing steadily for some years, with the number of online Dankort transactions rising by more than 15 per cent annually, cf. Chart 2.11. By comparison, Dankort payments in retail stores with sales staff have grown by 6-7 per cent annually in the same period.

DANKORT PAYMENTS IN DANISH ONLINE STORES Chart 2.11



Source: Nets and Danish Competition and Consumer Authority.

Some of the registered online Dankort payments are regular bills that are paid by card instead of e.g. direct debit. This is known as automatic card payment. This method of payment is used for e.g. purchases of telecom services and transport, which cannot be said to be online shopping as such.

Another share of the rise in the number of online Dankort payments reflects increased use of providers of digital services such as iTunes and Google Play. Purchases from these providers are often paid for via a Dankort linked to the customer account. These purchases are typically small, so their total contribution to online turnover is relatively modest.

Payments in Denmark in 2012

Based on data from issuers and acquirers of card payments in Denmark and from the consumer survey, an estimate has been calculated of how payments were made in Denmark in 2012. The results are shown in Tables 2.7 and 2.8 (at the end of this chapter) for physical and non-physical trade, respectively. Only payments in cash or by Dankort or international cards are included.

In physical trade, 1.9 billion payments with an aggregate value of kr. 429 billion were made in 2012. Dankort payments accounted for almost two thirds of the value of these payments, while cash accounted for one fourth. Payments by international debit and credit cards amounts for 7 and 5 per cent, respectively, of turnover.

Broken down by industry, the use of cash and cards varies considerably. In supermarkets, the distribution matches the average, but in e.g. stores selling food or providing services, it is more common to pay in cash compared to other industries. Hotels and restaurants have a relatively high number of payments by international cards.

In non-physical trade, an estimated 81 million payments with an aggregate value of kr. 42 billion were made in 2012. Dankort payments accounted for almost three fourths of this value. The average payment was more than twice as large in non-physical trade as in physical trade.

Broken down by industry, a large share of the payments in non-physical trade were purchases of goods and services from providers of telecom services, etc. and transport, including flight tickets. It is

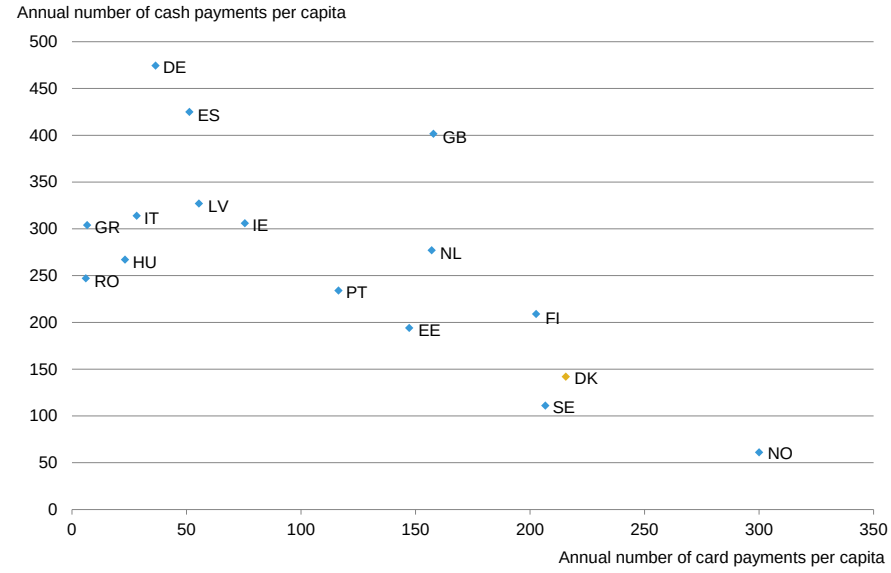
also seen that the amounts for purchase of telecom services, etc., which include e.g. digital services, cf. above, were relatively small.

2.4 PAYMENTS IN OTHER COUNTRIES

The tendency towards increased use of cards and reduced use of paper-based payments is also seen in other countries. However, some countries have come further than others in this process. In some countries, cash and cheques are still used much more than cards, while the opposite applies in other countries.

Chart 2.12 shows the number of cash and card payments per capita in selected countries. The Nordic countries clearly stand out. In Denmark, Finland, Norway and Sweden, consumers make relatively few cash payments, but instead use their cards more frequently than consumers in other countries.

CASH AND CARD PAYMENTS IN SELECTED COUNTRIES — Chart 2.12

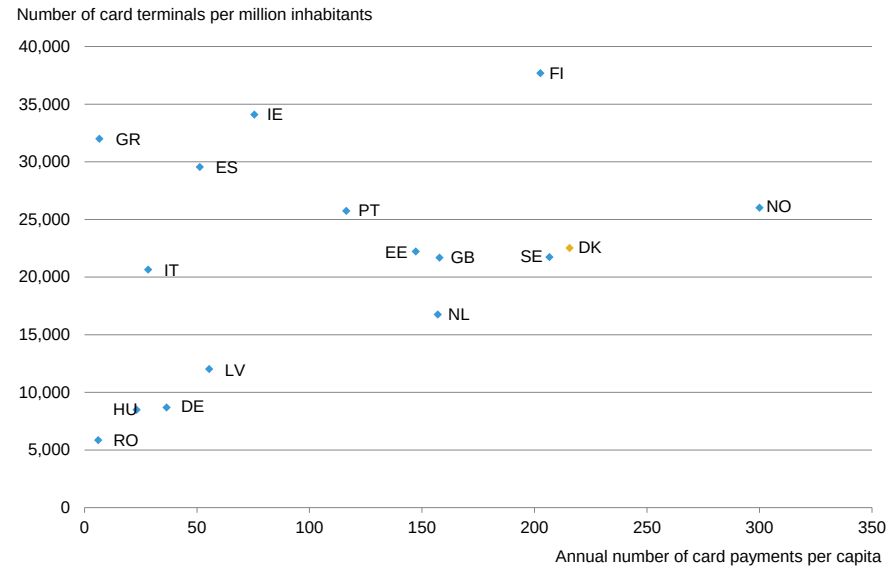


Note: Data for Norway relates to 2007, while data for other countries is from 2011.
Source: European Central Bank and Norges Bank.

These variations may be attributable to several factors. One explanation could be differences in the penetration of card systems, i.e. the number of consumers and retailers that hold and accept cards. In countries where the percentage is high, there are typically many card payments – and vice versa.

No international statistics are available for the percentage of retailers that accept card payments, only for the number of card terminals per capita. If a few countries with many card terminals are disregarded, this data indicates some correlation with the use of cards, cf. Chart 2.13. In those few countries, many terminals may be required due to lack of standardisation.

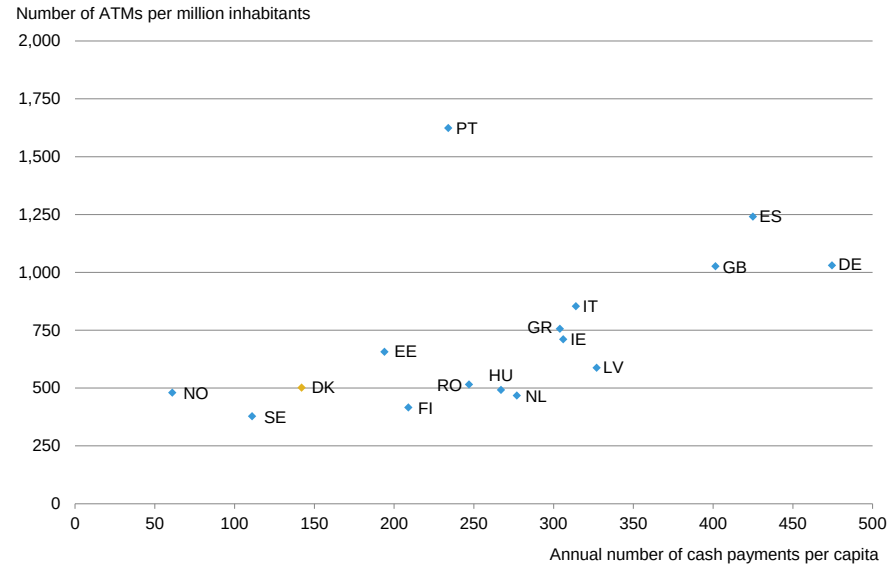
PREVALENCE OF CARD TERMINALS AND CARD PAYMENTS Chart 2.13



Note: Data for Norway relates to 2007, while data for other countries is from 2011.
Source: European Central Bank and Norges Bank.

Other statistics point to a correlation between a high number of ATMs and the use of cash, cf. Chart 2.14. In countries where consumers often pay in cash, the ATMs meet the often higher demand for easy access to ready cash. Many ATMs can therefore indicate higher usage of cash rather than e.g. a well-developed infrastructure.

PREVALENCE OF ATMs Chart 2.14



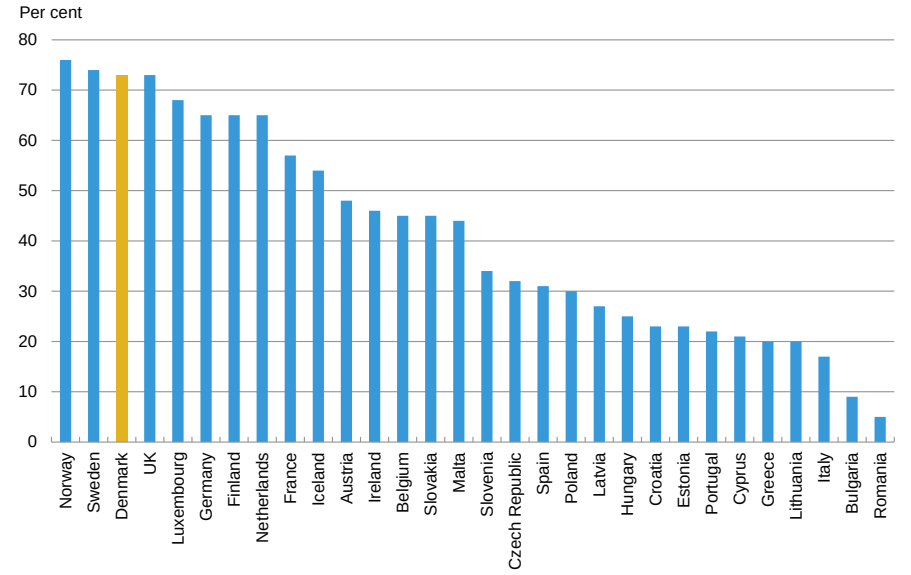
Note: Data for Norway relates to 2007, while data for other countries is from 2011.
Source: European Central Bank and Norges Bank.

Another explanation could be differences in business structures and shopping patterns across countries. As described in Chapter 4, consumers mainly use cash for small purchases and cards for larger purchases. In countries where the number of small payments is relatively high, there will be a tendency for consumers to use cash more frequently.

Finally, the variation in the use of cards and cash may be attributable to national payment habits. Such habits may be deeply rooted and difficult to change. This means that in countries with a strong tradition for paying in cash it may take many years before cards become the preferred method of payment.

In general, the considerable growth in online shopping registered in Denmark is also seen in other countries. However, Denmark is among the European countries with the largest volumes of online transactions, cf. Chart 2.15. Online shopping is also popular in the other Nordic countries and in the UK, Luxembourg, Germany and the Netherlands.

PERCENTAGE OF POPULATION THAT SHOPS ONLINE — Chart 2.15



Note: The chart shows the percentage of the population that in 2012 had shopped online at least once within the preceding 12 months.
Source: Eurostat.

PAYMENTS IN DENMARK IN PHYSICAL TRADE IN 2012 Table 2.7

Millions/Kr. billion/Kr.	Cash			Dankort and VisaDankort			International debit cards			International credit cards			Total		
	Number	Value	Per trans.	Number	Value	Per trans.	Number	Value	Per trans.	Number	Value	Per trans.	Number	Value	Per trans.
Supermarkets	302	41	135	424	101	237	78	10	126	16	6	394	821	158	192
- share of value (per cent)		*(26)*			*(64)*			*(6)*			*(4)*			*(100)*	
Clothing and footwear	14	4	279	44	20	454	9	3	323	2	2	1,222	69	29	421
- share of value (per cent)		*(14)*			*(68)*			*(10)*			*(8)*			*(100)*	
Specialist stores, non-food	79	18	226	133	57	426	20	6	319	3	3	996	235	84	358
- share of value (per cent)		*(21)*			*(67)*			*(7)*			*(4)*			*(100)*	
Specialist stores, food	68	5	72	41	4	124	4	0	97	1	0	270	114	11	93
- share of value (per cent)		*(46)*			*(48)*			*(4)*			*(2)*			*(100)*	
Hotels and restaurants, etc.	82	4	54	106	20	185	25	5	190	6	4	665	241	32	134
- share of value (per cent)		*(13)*			*(61)*			*(15)*			*(11)*			*(100)*	
Services	39	12	307	17	8	460	1	0	288	0	0	828	57	20	355
- share of value (per cent)		*(59)*			*(39)*			*(1)*			*(1)*			*(100)*	
Other	182	23	129	150	62	417	32	6	181	6	4	570	370	95	257
- share of value (per cent)		*(25)*			*(66)*			*(6)*			*(4)*			*(100)*	
Total	766	107	136	915	272	297	169	30	179	34	20	576	1,884	429	225
- share of value (per cent)		*(25)*			*(63)*			*(7)*			*(5)*			*(100)*	

Note: The table shows payments in cash and by Dankort and international cards only. Hotels and restaurants, etc. also include cafes, bars, pubs, pizzerias, grill bars and similar, which explains the relatively low amount per transaction for cash payments.
Source: Danmarks Nationalbank and own calculations.

PAYMENTS IN DENMARK IN NON-PHYSICAL TRADE IN 2012 Table 2.8

Millions/Kr. billion/Kr.	Dankort and VisaDankort			International debit cards			International credit cards			Total		
	Number	Value	Per trans.	Number	Value	Per trans.	Number	Value	Per trans.	Number	Value	Per trans.
Supermarkets and other food sales	3	1	704	0	0	419	0	0	780	3	2	689
- share of value (per cent)		*(86)*			*(5)*			*(10)*			*(100)*	
Retail trade: non-food	8	8	976	3	2	752	1	2	1,544	12	12	984
- share of value (per cent)		*(68)*			*(17)*			*(16)*			*(100)*	
Hotels, restaurants and other services	8	3	326	4	2	348	0	0	689	13	4	346
- share of value (per cent)		*(58)*			*(35)*			*(7)*			*(100)*	
Other	42	19	452	10	3	311	3	2	897	55	24	447
- share of value (per cent)		*(78)*			*(13)*			*(9)*			*(100)*	
- Transport (e.g. airline tickets)	12	5	423	2	1	570	1	1	1,141	15	7	489
- Telecom services, etc.	16	3	186	5	1	157	1	0	423	22	4	190
- Public sector payments and donations	6	5	878	0	0	268	0	0	840	6	5	832
Total	60	31	517	17	7	389	4	5	1,045	81	42	519
- share of value (per cent)		*(74)*			*(16)*			*(11)*			*(100)*	

Note: The table shows payments by Dankort and international cards only.
Source: Danmarks Nationalbank and own calculations.

3. New Payment Solutions

3.1 INTRODUCTION AND SUMMARY

The previous chapter described the use of traditional payment methods in Denmark. Today, the majority of payments at point of sale are made either by cash or by inserting a card into a terminal and entering a PIN – a personal identification number. In the case of online shopping, most consumers use the national debit card, the Dankort, by entering the card details which are visible on the card.

In the years ahead, these types of payment are expected to be replaced, to a greater or lesser extent, by new solutions that incorporate new technological advances. This chapter classifies and describes some of these solutions. Importantly, however, it will not be assessed which will become a success and which will not gain much prevalence.

The chapter distinguishes between the following nine main types of payment innovations:

1. *Contactless technology* which makes it possible to pay by holding an instrument, such as a card or mobile phone, to a reader that registers the payment. The technology is particularly useful for small payments to be executed quickly without a PIN. Contactless payments are not widely used in Denmark. The Danish travel card Rejsekortet and the bridge tag BroBizz are based on this technology.

2. *mPOS terminals*, i.e. a device that enables the acceptance of card payments by use of smartphones or tablets. These terminals are mainly aimed at retailers who receive a limited number of payments but wish to offer their customers the possibility of making payments by card. iZettle is an example of a provider of mPOS terminal solutions operating in Denmark.

3. *Online banking solutions* – used for payment in online shopping. For these solutions, the consumer clicks on an icon in the online shop and is transferred to his or her online bank to authorise the payment. An example of this type is the Dutch solution iDEAL, which is widely used, while its Danish equivalent, the eDankort, is hardly ever used.

4. *Online-based accounts* – are opened with a view to pay for online purchases. These are typically prepaid accounts to which the consumer transfers funds on an ongoing basis. Alternatively, the consumer may choose to link a card to the account. From a legal point of view, the funds held in this type of account are electronic money. PayPal is an example of a provider of online accounts.

5. *Text message payments* – involves sending a text message from a mobile phone. This solution is especially used for the payment of bus and train tickets, parking charges and vending machine purchases as well as digital services such as games and ring tones. Text message payments are mainly offered by telecommunications companies, but Mobilpenge is one example of a solution where settlement is executed via bank accounts.

6. *Payments using apps* – i.e. a piece of software, which is downloaded on a smartphone. As defined in this report, this type of solution is typically used for the purchase of goods and services from individual payees and involves withdrawals from a card which the consumer has linked to the app. The public transport ticket app by DSB is an example of such a solution.
7. *Digital wallets* – involves electronic registration of the consumer's cards. A digital wallet can be placed on a server for use in online shopping or it can be downloaded as an app on a smartphone. Google, MasterCard and Visa are examples of digital wallet providers. In addition, several telecommunications companies have launched solutions that can be categorised as digital wallets.
8. *Prepaid cards* – a value stored on e.g. a chip or registered on a server. The prepaid funds are electronic money if others than the issuer accept them as means of payment. An early example of a prepaid card was the Danish Danmønt, which was discontinued in 2005. Overall, this type of card has only caught on in very few European countries.
9. *Overlay services* – a solution aimed at payments in online shopping. In connection with overlay services the consumer states his or her account number and online banking login and the provider subsequently executes the payment. The Swedish company Trustly and the German company Sofort are examples of providers. Overlay service is still a relatively unknown service in Denmark.

This chapter outlines general trends observed in relation to new payment solutions, followed by a more detailed description of the nine main types of new solutions.

3.2 DELIMITATION

In order to analyse new payment solutions their scope needs to be delimited and, basically, no checklist exists for such delimitation. For instance views on how long a payment solution can be characterised as new after it has been launched may vary. Typically, the type of payment solution that is naturally characterised as an innovation also differs from country to country.

In this report, innovations in the payments area are taken to mean solutions that make it possible to pay by other means than cash or traditional payment instruments such as cards and cheques or enable payments using traditional instruments by new methods. In the following it will be elaborated on what this means in practice in various payment situations.

As far as payments at point of sale are concerned, payments using mobile phone will, for instance, be considered an innovation under this definition. This also applies to payments made by prepaid cards even though these have been issued for many years. In step with the technological developments new advanced types of prepaid cards have emerged, cf. below, which can reasonably be considered as new solutions.

The latter part of the definition requires a clarification of the expression "new methods". In the following, it is taken to mean payments made otherwise than by inserting a card into a terminal and verifying it by signature or PIN. This means that new methods also comprise payments using contactless technology and a mobile phone or tablet as terminal.

In connection with online shopping it will e.g. be considered a new solution when a digital wallet containing the consumer's card is used, but not when payment is made by entering the card details.

Other examples of solutions which are considered as new in the following are payments made using online banking facilities and online-based accounts opened for the purpose of paying for online purchases, e.g. via PayPal.

In addition to payment solutions for use at point of sale and on the Internet, new solutions are launched with the primary aim of making person-to-person transfers. However, this type of innovation is outside the scope of this report, cf. Chapter 1. The banks' mobile payment services, MobilePay and Swipp, are examples of this, although they could become popular with retailers too over time, cf. Box 3.1.

In accordance with the mandate, the analysis was not supposed to describe so-called virtual currencies such as Bitcoin. Virtual currencies cover a broad spectrum of solutions but can be defined as a digital unit for payments that does not exist physically and is not issued by a central bank. This type of currency is only used to a limited extent and primarily in specific online environments. One exception is bonus points earned on flights, etc., which could be considered a kind of virtual currency.[1]

MOBILEPAY AND SWIPP — Box 3.1

Two different mobile payment services, MobilePay and Swipp, for transfers between bank accounts were launched by Danish banks in 2013. Both solutions involve that the payer opens an app on a smartphone, enters an amount and the payee's mobile phone number and verifies the payment by entering a PIN. The payer does not have to know the payee's account number and NemID[2] is not required.

MobilePay is provided by Danske Bank but is also available to other banks' customers. A user registers by stating name, card details and account number. The amount is debited from the payer's account as a card payment and is credited to the payee's account as a credit transfer. Users can also use MobilePay to request payment by other registered users.

Swipp is a solution developed jointly by the all other Danish banks. Payments using Swipp are executed as credit transfers via the new Intradagclearing. Therefore, when registering for this solution the user does not have to link up to a payment card but merely has to enter his or her mobile phone number when registering via an online banking facility.

With MobilePay, users can transfer up to kr. 1,500 on a daily basis and kr. 50,000 annually. With Swipp, the daily limit is kr. 3,000, but a lower maximum can be fixed. Initially, both solutions were only used for person-to-person transfers, but today MobilePay is piloting payments at point of sale, which will also soon be the case for Swipp.

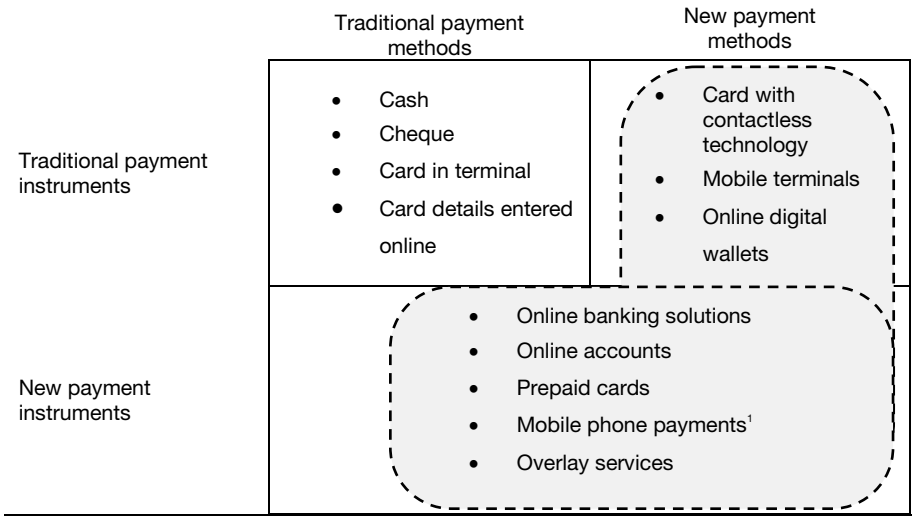
MobilePay was introduced in May 2013 and at the beginning of November 2013 the app had been downloaded more than 690,000 times. In September, an average of 17,000 transfers were made daily using MobilePay, outperforming Swipp, which was launched after MobilePay and still needs to be rolled out by all the participating banks.

[2] NemID, a common secure login on the Internet.

[1] See also European Central Bank, *Virtual currency schemes*, October 2012.

Chart 3.1 shows an illustration of what is considered new payment solutions in this report.

DELIMITATION OF NEW PAYMENT SOLUTIONS Chart 3.1



1 Include text message payments, payments using apps and digital wallets on smartphones.

3.3 TRENDS

Several trends within the development and prevalence of new solutions are seen globally. Among these are[1]:

1. The market for new payment solutions is dynamic but fragmented.
2. Several innovations in the payments area aim at speeding up the payment process.
3. Other providers than banks play an increasing role.
4. Mobile phones are used more and more to make and receive payments.
5. Traditional distinctions in the payments area are being blurred.
6. Major global firms are expanding in the payment market.

This list should not be considered exhaustive, and the trends are described in detail below.

Dynamic but fragmented market

The market for payment services seems to be very innovative these years. Every day new solutions are launched around the world and extended to consumers and retailers or tested in specific environments. To this should be added that the Internet has made it easier to disseminate information about new solutions, amplifying the impression of a dynamic market.

The technological development, which has created new opportunities, is a major contributory factor, e.g. the growing prevalence of advanced mobile phones – smartphones – which are used in connection with several new solutions. Moreover, the users have probably been gradually prepared for new payment solutions in step with using new technologies in other contexts.

1 See also Bank for International Settlements, *Innovations in retail payments*, May 2012.

However, so far only few new solutions have succeeded in capturing significant market shares from the traditional types of payment, and these are mainly solutions that are only applicable at a national level and typically only for specific purposes such as payment of public transportation, etc., and an extension of their use is typically not in the pipeline.

Focus on faster payments

Several innovations in the payments area aim to reduce the payment time, i.e. the time spent on making a payment, as in the case of solutions based on contactless technology. With this type of solution payment is made by holding a device to a reader, which usually reduces the payment time compared to cash payments or payments made by inserting a card into a terminal.

Consumers generally value short payment times, which is demonstrated by the preference for cash in connection with small purchases as this is often faster than paying by card, cf. Chapter 4. This could be a barrier to measures to improve the security of online payments as these typically prolong the payment time.

The wish for faster payments also involves the time it takes to transfer money from the payer to the payee, which depends on the design of the payment system. Several countries have redesigned their national payment systems in recent years with a view to reducing settlement times. As mentioned, this is also the case in Denmark, cf. Chapter 2.

Other service providers than banks play an increasing role

Traditionally, providers of payment services have to a large extent been banks or firms owned by banks, reflecting that a number of payment services are based on deposit accounts, which may only be kept at banks. Moreover, by virtue of their homogeneity, banks have been in a position to establish national and cross-border collaboration agreements, which are preconditions for payment transfers.

In the past few years, other service providers than banks have started to play an increasing role in the payment services market, both as providers of payment services and of more technical services. This trend strongly reflects new solutions that offer other business opportunities and in some cases require the involvement of other providers than banks.

The growing significance of other providers is supported by legislation. The EU has adopted directives regulating new types of payment service providers such as e-money and payment institutions. These institutions are allowed to carry out cross-border activities if they comply with harmonised requirements, including capital requirements and rules for the protection of customer funds.

Payments using mobile phone

As mentioned above, several of the payment solutions that are being launched these years are aimed at mobile phones. Several surveys show that the number of payments made by mobile phone is growing and it is firmly believed that this trend will continue. Also, a new solution involving the use of mobile phones to accept payments by card, cf. main type 2 below, is gaining ground.

A major driver of this trend is the strong prevalence of mobile phones, including smartphones, and their significance to many consumers, who hardly ever leave their phones behind. Add to this the wide

functional applications of the mobile phone; it can be used for e.g. payments via text messages, contactless technology and smartphone apps.

Moreover, the use of smartphones as a payment instrument will be strengthened if they become a more prevalent trading platform in the future due to their Internet access. For this type of transaction it is natural to make payments using the same smartphone as the one used for surfing the Internet for goods to purchase. It could be in the form of an app offered by the payee or a digital wallet, cf. below.

Distinctions are being blurred

A number of traditional distinctions in the payments area are gradually being blurred by new payment solutions. One example is the distinction between payments by card, mobile phone and online banking. For example, a smartphone can now also be used to make online banking payments via a downloaded app, just as it can be used to make payments using the consumer's card if registered in a digital wallet.

Other prevalent distinctions are those between proximity and remote payments or physical and non-physical trade. This distinction is largely rooted in the fact that the two payment situations place different requirements on the solutions used. However, a host of new payment solutions work identically in both situations, for instance in connection with the use of text messages or smartphone apps.

Further, new measures may be in the pipeline in the retail sector that will contribute to playing down the distinction between proximity and remote payments, such as retail stores making computers or tablets available to customers for their purchases. Another example is self-scanning solutions, e.g. unmanned checkout terminals, which are considered non-physical trade under Danish legislation.

Large firms are expanding

These years, large global firms are expanding their activity areas to comprise payments. One such example is Google, the IT provider, which has launched a digital wallet. The motives may differ from those of traditional providers. For example, the purpose could be to collect data that is useful for the planning of marketing and sale of advertisements, rather than earning an interchange fee.

In addition, existing providers of payment services are seeking to gain ground in new areas. A firm such as PayPal has extended its activities from offering a service that was primarily aimed at payments of online shopping and person-to-person transfers to offering solutions for payments in retail stores. PayPal and its activities are described in greater detail in Box 3.5.

In the card area, the large actors appear to be gaining importance. In several countries, national card schemes have been replaced by – or combined with – international cards such as Visa or MasterCard. International card companies also make important contributions to innovation. Both Visa and MasterCard have introduced solutions for contactless payments and digital wallets, cf. below.

3.4 MAIN TYPES

New solutions are being launched practically every day all over the world. Since these solutions largely share the same characteristics from the users' viewpoint, it makes sense to try to group them. In the following, we have divided new payment solutions into nine main types based on the users' perception of the innovations in question:

1. Contactless technology
2. mPOS terminals
3. Online banking solutions
4. Online-based accounts
5. Text message payments
6. Payments using apps
7. Digital wallets
8. Prepaid cards
9. Overlay services

Often, a new payment solution can be grouped under several main types. For example, a prepaid card or a digital wallet on a smartphone can use contactless technology. However, the purpose of the main types is not to make a clear division of innovations in the payment area but rather to set up a framework to clarify similarities and differences.

Main type 1: Contactless technology

For payments using solutions based on contactless technology, the instrument need not be inserted into a terminal or the like but is held close to a reader that registers the payment. The contactless technology is typically built into the chip on the payment card but may also be integrated in a mobile phone or a small sticker attached to the payment instrument.

Contactless technology is based on identification of the payer or the instrument by means of radio waves. The technology is called Radio Frequency Identification, RFID. A particular RFID type called Near Field Communication, NFC, which only works at very short distances (up to 10 cm), is the most widespread contactless technology used for payments.

The NFC technology enables fast and simple payments, particularly if no PIN is required. The technology is therefore particularly well suited for small payments where serving time is a key parameter as the primary objective is the serving of as many customers as possible, for example in connection with purchases of public transport services, groceries as well as food and beverages at sporting and music events.

In addition, the NFC technology is stated to be a precondition for the extension of mobile phone payments in retail stores. The reason is that other types of mobile payments, such as text message payments, are not particularly user friendly at checkout in retail stores. One exception could be a new type of solution called Beacon, which opens up for fast and easy verification of the payer at the checkout, cf. below.

The numerous attempts at launching NFC-based payment solutions illustrate the strong focus on contactless technology. The website NFC World monitors worldwide developments and reports daily on new attempts cases.[1] At end-October 2013, the website had reported more than one thousand NFC-based initiatives, the majority of which were local or national solutions developed for specific purposes.

Initiatives aimed at general use include Visa's and MasterCard's NFC-based solutions payWave and PayPass both of which were launched in Europe in 2012. Contactless cards carrying Visa's or MasterCard's logos have already gained considerable prevalence in several countries. The plan is for payWave and PayPass to be used in connection with Visa's and MasterCard's digital wallets, cf. main type 7.

CONTACTLESS PAYMENTS IN DENMARK — Box 3.2

The prevalence of contactless payments is still limited in Denmark. No widely used payment instruments are based on this technology. The best known examples of payment solutions based on contactless technology are probably Rejsekortet and Brobizz. Moreover, several attempts have been made to use contactless payments at music festivals.

Rejsekortet is a ticketing system for public transportation in Denmark by bus, train and metro. The card has a built-in chip that communicates with card readers by means of contactless technology. The user checks in and out at the start and end of the journey to determine the time and length of the trip. Subsequently, the fare is withdrawn from the user's prepaid account.

Rejsekortet be reloaded in several ways: Online by transferring funds to the prepaid account or at e.g. vending machines at train and metro stations. Alternatively, a so-called reload agreement can be concluded to the effect that a fixed amount is automatically transferred via the user's payment card to the prepaid account when the balance falls below a certain limit.

The company behind Rejsekortet, Rejsekort A/S, was founded in 2003 by a number of Danish transport providers. Today the shareholders are DSB, S-Tog, Movia, NT, Metro, Sydtrafik and Midttrafik. Rejsekort A/S is registered with the Danish Financial Supervisory Authority as an issuer of electronic money with limited authorisation since the prepaid funds can only be used to acquire a narrow range of goods and services, i.e. journeys.

The rollout of Rejsekortet was initiated in 2009 and the card has been in use all over Denmark since 2012. In April 2013 close to 400,000 Rejsekort had been issued and 18.5 million journeys had been made using the card. By comparison, approximately 80 million S-tog (the metropolitan train system in Copenhagen) journeys are registered annually. The paper-based multi-ride tickets will be phased out in the Copenhagen area, among others, during 2014, which is expected to boost the use of Rejsekortet.

Rejsekortet is just one of several similar NFC-based cards aimed at purchases of transport services, which have been launched in several cities and countries in recent years, among these the Oyster card, which is used for payment of public transport in London. It is estimated that, today, more than 80 per cent of all journeys made by bus, the Tube, etc. in London are paid using Oyster.

BroBizz is a payment system for the settlement of transport and parking services. It is based on another type of contactless technology than Rejsekortet and works by placing a small antenna on the car windscreen. When the car enters a toll lane, data is exchanged and the toll is subsequently withdrawn from the payment card linked to BroBizz.

The company behind BroBizz, BroBizz A/S, was founded in 2008 and is owned by Sund & Bælt Holding, a state-owned enterprise. Today, BroBizz can be used for payment at more than 50 roads, bridges, ferries and parking facilities in Demark, Norway, Sweden and Germany, including for crossing the Great Belt Bridge and the Øresund Bridge. At end-2012, BroBizz had 550,000 active users.

A number of *music festivals in Denmark* have also used NFC-based solutions for payments, e.g. at last year's Smukfest festival in Skanderborg, Denmark, it was possible to make contactless payments using a chip woven into the wristband. Prior to the festival, the consumers, i.e. the festival guests, opened and prepaid an account with BigeWallet. More than 15,000 people opened an account and about one fourth of all payments at the festival were made using this particular solution.

[1] See www.nfcworld.com.

In Denmark, contactless technology is still only used to a limited extent in connection with payments. Neither the Dankort nor international cards issued in Denmark carry an NFC chip. The best known examples of Danish payment solutions based on contactless technology are Rejsekortet and BroBizz as well as solutions used in connection with music festivals, cf. Box 3.2.

The use of contactless technology requires readers to register the payment. A large number of Danish retailers are replacing their card terminals in order to meet the security standards laid down by the international card companies. According to the suppliers, several of the new terminals only require a minor software update to accept contactless payments as these terminals have built-in readers.

Beacon is a new type of solution that provides scope for contactless payment. The technology is based on Bluetooth LE technology and works by a scanner recognising other units, e.g. a smartphone, within a distance of 50 metres. Thus, the verification of the consumer at the checkout register can be made by means of e.g. a photo, and the consumer can authorise the payment via a smartphone.

Main type 2: mPOS terminals

A relatively new type of solution is mPOS terminals which enable card payments via smartphones or tablets. A terminal consists of an accessory, i.e. a dongle, which is attached to the mobile phone or the tablet and reads the card. Verification of the payer requires that a PIN is entered on the dongle or a signature is entered on the screen.

The target group for mPOS terminals is mainly small retailers which only receive a limited number of payments and, possibly, change their location of sale frequently. Also, this type of solution often incorporates additional functions that exploit the possibilities offered by smartphones or tables compared to ordinary card terminals.

Providers of mPOS terminals typically act as intermediaries, or so-called supermerchants, between the retailer and the card acquirer, entailing that the retailer does not have to enter into an agreement with an ordinary card acquirer and that the size of the guaranteed amount of a payment and similar terms and conditions depend on the agreement with the provider. The retailer only pays a fee to the provider handling the settlement with the card acquirer.

There are several providers of mPOS terminals around the world, some of which have activities in several countries. The largest provider in the Nordic countries, including Denmark, is iZettle, which also markets its solution in the UK, German, Spain, etc., cf. Box 3.3. iZettle is owned by MasterCard and American Express, among others. The large card companies also have ownership interests in the providers of some of the other solutions.

Mobile terminals can also be used by others than small retailers. In the US, large retail chains such as Home Depot, Nordstrom and Apple have introduced this type of terminal, often motivated by a wish to be able to accept payment out in the store, i.e. away from the checkout point, to speed up services. However, large chains typically enter into an ordinary agreement with a card acquirer.

iZettle	Box 3.3

iZettle is a mPOS terminal provided in Denmark by a company of the same name. The company is registered in Sweden as a payment institution but has activities in all the Nordic countries as well as in the UK, Germany, Spain, etc. iZettle was founded in 2010 and MasterCard and American Express are among the owners.

iZettle can be used by iOS- and Android-based smartphones and tablets. The solution consists of two components: A user interface, which is downloaded as an app, and a dongle, which is plugged into the mobile phone or the tablet to enable it to read the chip on the card.

In Denmark, payments via iZettle are made by inserting the card in the dongle and authorising the payment by signing on the screen. However, outside Sweden, payments by Visa are executed by the cardholder entering his or her phone number on the screen and filling the card details into a form received via a link in a text message.

Since iZettle has not entered into an agreement with Nets in Denmark on the use of Dankort, iZettle can only be used for accepting payment by international cards.

Similar mPOS terminals are used in other countries, e.g. Payleven and Sumup, which are both offered in several European countries. Moreover, a host of national solutions have been developed such as Square, the leading US provider of mobile terminal solutions owned by Visa, among others.

Main type 3: Online banking solutions

An online banking solution is used for payment of online shopping. The normal procedure is that the consumer, when completing a purchase in an online store, clicks an icon and is taken to his or her online banking facility where login is performed as usual. The consumer then approves a form stating the name of the payee and the payable amount. Subsequently the consumer receives a confirmation of the purchase from the online store.

As opposed to overlay services, providers of online banking solutions have concluded agreements with the participating banks and, moreover, the providers are often owned by the banks. Examples of European online banking solutions are BankAxess in Norway, giropay in Germany and eps in Austria. In the Netherlands, close to two thirds of all online payments are executed via a particularly successful solution, iDEAL, cf. Box 3.4.

Compared to online card payments, online banking solutions have a number of pros and cons as described in Chapter 6. One of the differences is that online banking solutions typically cannot be used for cross-border payments, which is a major restraint on this type of solution as a larger share of online purchases, than purchases at point of sale takes place across borders.

Various attempts have been made in Europe to establish a joint online banking solution. For a period of time, a number of banks worked under the auspices of the European Payments Council on a solution based on the SEPA payment standards. This work was discontinued in 2012, though, when the Commission initiated an investigation to determine whether this was in conflict with the European competition rules.

Another initiative, the bank-owned EBA Clearing's solution, MyBank, may be considered an authorisation service. MyBank is also based on the SEPA instruments and offers to send an immediate confirmation to the retailer once a consumer has executed payment of an online purchase via an online banking facility. The service is marketed only by banks in Italy.

Danish banks also offer an online banking solution for payment of online shopping in the form of eDankort, which was introduced in 2003. Like Dankort, eDankort is owned by Nets, which is also the sole

acquirer of the payments, and practically all banks participate in the solution. However, eDankort has never really gained ground. In 2012 it was used for less than 50,000 payments.

In practice there are great similarities between eDankort and iDEAL. The retailers are even guaranteed a larger amount when using eDankort for payments than when using Dankort for internet payments. The reason why the eDankort has never really caught on could be a combination of factors such as a lack of knowledge of the solution, ingrained payment habits and a lack of incentive among consumers.[1]

iDEAL Box 3.4

iDEAL is an online banking facility for payments of online purchases developed jointly by the Dutch banks. It was launched in 2005 by Currence, a firm owned by the Dutch banks. All banks in the Netherlands offer their customers to execute payments via iDEAL. Acquiring of the payments can be made by banks and other providers participating in the solution.

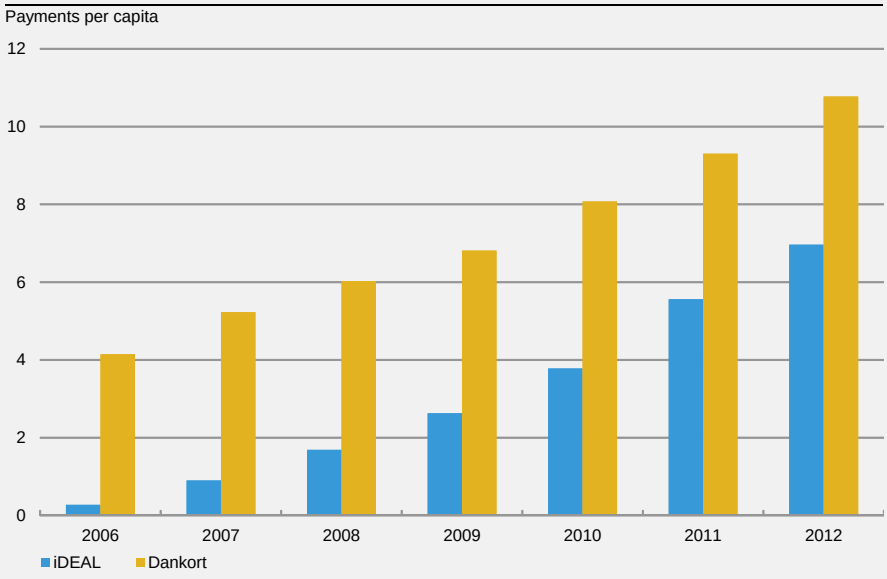
iDEAL is currently the most widely used online payment method in the Netherlands. In 2012, 117 million payments were executed via iDEAL, or more than half of all online payments made in the Netherlands. Approximately 10 million bank customers and 90,000 retailers use the solution.

The use of iDEAL has grown sharply in recent years: From 2007 to 2012, the number of payments per capita via iDEAL soared sevenfold, cf. Chart 3.2. By comparison, the number of online Dankort payments doubled during the same period.

Today, iDEAL is the preferred online payment solution among Dutch consumers. This appears from various surveys, e.g. a survey conducted by De Nederlandsche Bank, showing that 40 per cent of the consumers miss iDEAL when shopping in foreign online stores.[1]

One of the contributory factors to the success of iDEAL is probably the fact that the Dutch debit card PIN, which has now ceased to exist, could not originally be used for online shopping. To the consumers, iDEAL was therefore the only payment alternative to international cards for online shopping.

ONLINE PAYMENTS USING IDEAL AND DANKORT PER CAPITA Chart 3.2



Source: De Nederlandsche Bank and Nets.

[1] See De Nederlandsche Bank, Payment of cross-border online shopping: behaviour, perceptions and desires – Results of DNB survey among Dutch consumers, January 2011.

[1] See Eva Wix Wagner, Payments relating to online shopping, Danmarks Nationalbank, *Monetary Review*, 1st Quarter 2012.

Two banks in Denmark have launched their own online banking solutions: Danske Netbetaling and Nordea e-betaling. In order to use these solutions both the consumer and the retailer must be customers of Danske Bank or Nordea, respectively. These solutions are only used to a limited extent for online shopping compared to the Dankort.

Main type 4: Online-based accounts

Another solution for payment of online shopping is withdrawal of funds from an online account, also called an e-wallet. These are typically accounts to which the consumer transfers funds on an ongoing basis or has linked a payment card. The consumer can then use the account with retailers accepting the solution. PayPal is an example of a provider of online-based accounts, cf. Box 3.5.

In Europe, from a legal point of view, prepaid amounts in online-based accounts are considered electronic money if usable for buying goods and services from others than the issuer. This is stipulated in the E-Money Directive, which has been implemented in Danish law by the Payment Services and Electronic Money Act, cf. Chapter 2. In practice, this is server-based electronic money as opposed to card-based electronic money, cf. below.

This solution is only used to a limited extent in Denmark. According to the retailer survey in this report only around 15 per cent of all Danish retailers with online sales accept payment via PayPal. Similarly, according to data from the consumer survey, cf. Chapter 4, only around 3 per cent of payments made by Danes for online shopping are made via PayPal.

CoinClick, a Danish solution based on online accounts, was launched in 2002 but failed to meet the targeted number of users and payments and was closed down in 2004. The solution was primarily aimed at small purchases such as newspaper articles, ring tones and games for mobile phones which either ended up being free of charge or being paid via the phone bill or by Dankort.

CoinClick was established by Nets, the telecommunications company TDC and several banks and was to some extent the counterpart of a similar solution, Valus, which had been established by the Danish Media Association. However, Valus did not succeed either, and in 2009 the domain name was taken over by Ewire, which also offers online accounts and is registered with the Danish Financial Supervisory Authority as an issuer of electronic money.

A recent trend is for online-based accounts to be used for other purposes than online shopping. Deposits in these accounts are server-based funds that, in principle, can be accessed by all payment instruments or readers with Internet access. This enables payments with e.g. cards or smartphones in retail stores by withdrawing funds from the accounts, an option that PayPal, among others, is seeking to exploit through new solutions.

Being a Danish provider of online-based accounts for payments using various solutions, BigeWallet has been approved by the Danish Financial Supervisory Authority as an e-money institution. In addition to online shopping, BigeWallet's online-based accounts can be used to make payments in retail stores, etc. by means of various instruments. BigeWallet has also delivered NFC solutions to festivals in Denmark, cf. Box 3.2.

PAYPAL Box 3.5

PayPal is the best known example of a provider of online-based accounts. A consumer wishing to use this service first opens an account with PayPal and then transfers money from his or her bank account to the account or links a payment card to the account. Subsequently, the consumer makes an online purchase from retailers or private individuals who accept payments via PayPal.

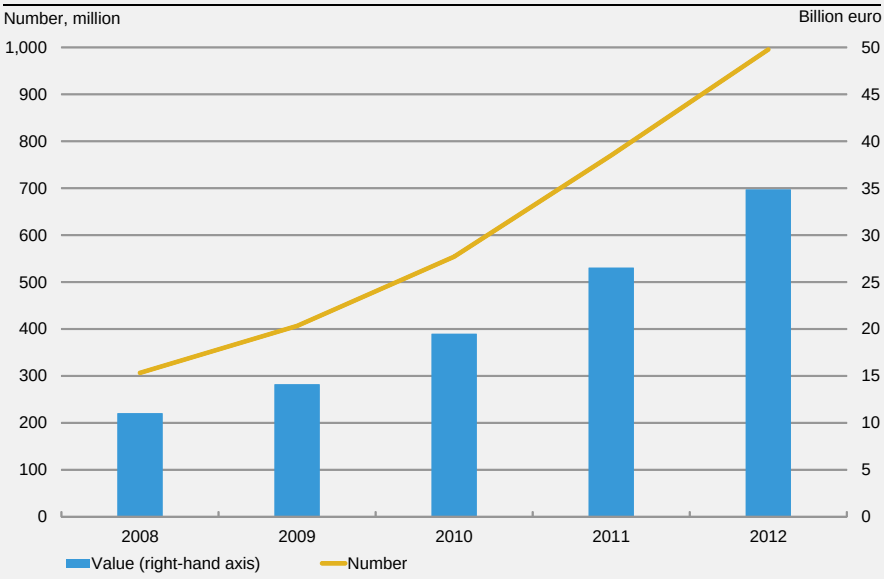
PayPal was founded in 1998, and in 2002 it was sold to US-based online trading platform eBay. Today, payments can be made via PayPal in practically all countries in the world in a total of 25 currencies, including Danish kroner. At end-2012, PayPal had 128 million active accounts and was used for more than 7 million payments daily, according to the company.

Since 2007, PayPal's European activities have been managed out of Luxembourg where the company is authorised to undertake banking activities, and this authorisation covers the whole EU area. Thus, all European customers hold their accounts with PayPal Europe S.à.r.l. Statistics on server-based electronic money in Luxembourg shows that deposits with and the use of PayPal in Europe have grown by 35-40 per cent annually in recent years, cf. Chart 3.3.

Under PayPal's business model it is primarily the payees who are charged fees. It is free of charge for consumers to open an account and use PayPal for payments except from an exchange fee for payments in foreign currency. The payee is charged a transaction fee, however, consisting of a fixed amount plus a percentage of the size of the payment.

In the past few years, PayPal has launched a series of solutions to increase the use of customer accounts for point of sale transactions, e.g. the mPOS terminal PayPal Here, a digital wallet called PayPal Wallet and a payment card co-branded with a MasterCard. In addition, PayPal offers person-to-person transfers between accounts via PC or mobile phone.

USE OF AF PAYPAL IN EUROPE Chart 3.3



Note: The chart is based on statistics on server-based electronic money in Luxembourg.
Source: European Central Bank.

Main type 5: Text message payments

As mentioned above, a mobile phone can be used as a payment instrument in several ways. For some years, text messages have offered one type of solution. The procedure is to send a text message to a specified phone number, typically a four-digit number, called a short code, that identifies the payee. The payer then receives a text message, which must be responded to in order to confirm the payment.

Payment solutions based on text messages are primarily provided by telecommunications companies. Payment is a premium-rated text message charged to the customer's telephone bill or deducted from a

prepaid amount for consumption of telecommunications services. Subsequently, the telecommunications company transfers the amount to the payee. Box 3.6 contains a description of the settlement procedure in connection with text messages via a telecommunications company.

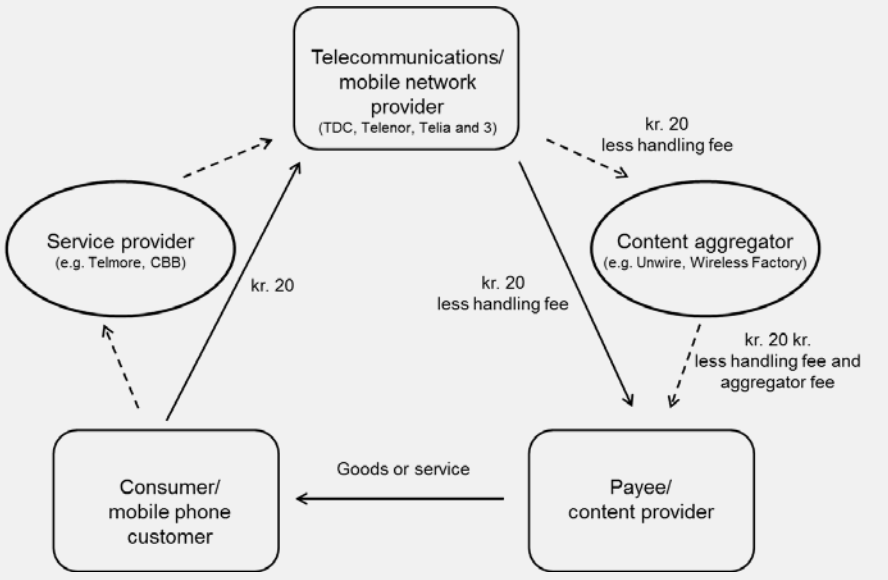
SETTLEMENT OF TEXT MESSAGE PAYMENTS — Box 3.6

A text message payment via a telecommunications company involves four, or possibly five, parties:

- The *consumer, or mobile phone customer*, i.e. the person that finalises a purchase by paying using a text message. The consumer has either prepaid an amount for the consumption of telecommunication services or agreed that payment for these services should be collected later.
- The *payee*, i.e. the party selling goods or services to the consumer. Examples of payees are providers of transport, parking services, vending machine articles and digital services such as ring tones, games, etc.
- The *telecommunications company*, which may be a mobile network operator with its own mobile network or a *service provider* which has concluded an agreement for access to a mobile operator's network. The four mobile network operators in Denmark are TDC, Telenor, Telia and 3, and examples of service providers are CBB and Telmore.
- A *content aggregator*, who has concluded an agreement with the payee and provides the interface and applications for use in connection with payment. Examples of aggregators in Denmark are Unwire, OnlineCity and Wireless Factory. In some cases the telecommunications company undertakes the role of aggregator.

Chart 3.4 shows an example of settlement of a text message payment. The telecommunications company or service provider withdraws the amount, kr. 20 in the example, from the customer's account and transfers the amount to the payee less a fee. In the event that an aggregator steps in between the telecommunications company and the payee, the telecommunications company forwards the amount to the aggregator less a handling fee. The aggregator then forwards the amount to the payee less its own fee.

EXAMPLE OF SETTLEMENT OF TEXT MESSAGE PAYMENT — Chart 3.4



Payments via text messages are primarily used in connection with remote sales such as purchases of digital services used in conjunction with the mobile phone, e.g. ring tones and games, bus and train tickets, parking charges and vending machines purchases. Settlement may also be executed via premium-rated text messages in connection with TV or radio voting or for donations in connection with fund-raising.

No statistics are available for text message payments in Denmark but other available data does not suggest that this type of payment is used extensively. It is estimated that close to 20 million payments with an aggregate value of kr. 350 million were made in 2012.[1] A major share of these payments consists of bus and train fares to DSB and other transport providers.

In 2012, Nets and the Danish banks launched a solution for text message payments called Mobilpenge. Payments using this solution are settled against bank accounts. So far, the prevalence of Mobilpenge among retailers and the use of the solution have been moderate. Box 3.7 contains a detailed description of Mobilpenge.

MOBILPENGE — Box 3.7

Mobilpenge is a mobile phone payment solution based on text messages or a smartphone app. The solution was launched by Nets and the banks in 2012. Nets owns Mobilpenge and manages the contractual relationship with the payees, i.e. Nets acts as the acquirer of payments while the banks conclude agreements with the consumers on the payment of the solution.

The consumers register for use of Mobilpenge via their online banking facility by accepting the conditions for use of the solution and stating their mobile phone number(s). Mobilpenge checks for adequate cover and can be used for payments up to kr. 1,500 a day. When signing up to the solution the consumer may fix a lower limit. The amount guaranteed for retailers is kr. also 1,500.

Payments of purchases using Mobilpenge via text message are executed by the consumer sending a text message to the payee with a specified content. The consumer then receives a text message confirming the order stating price and conditions. The consumer confirms the purchase by sending a new text message and receives a receipt via a text message which may also contain the purchased article in the case of e.g. bus or train tickets.

So far only few payees accept payment via Mobilpenge, including DSB, Movia and Tivoli, meaning that it has been difficult to muster support for the solution since it has not gained ground among the consumers who, conversely, have not been interested in the solution because of the limited usability. In consequence, only a limited number of payments are made via Mobilpenge.

Main type 6: Payments using apps

Following the increasing prevalence of smartphones in recent years, text message payments have been supplemented with app-based solutions. An app is a piece of software which is downloaded on a smartphone, and payment is made by opening the app in question and following a specific procedure. Unlike text message payments, the use of apps does not require that a short code is entered.

As defined in this report, app-based solutions are normally only used to buy goods and services from a single payee. In this kind of solution, in addition to making payments, the app is typically also used to order and confirm the purchase and in some cases receive the goods or services. In Denmark, DSB Billet (an app for paying public transport fares) is an example of such an app.

[1] Estimate from the trade association Telekommunikationsindustrien made especially for this report.

Payments via apps can be settled in several ways. A frequently used settlement method is to withdraw the amount from a payment card which the consumer has linked to the app, but payment can also be made via an online banking facility or an online-based account, cf. above. Apps can also be used to manage loyalty programmes and bonus points used for payments.

App-based solutions are mainly relevant to payees with returning customers. A frequently referred example is the US coffee company Starbucks, whose app had 7 million users in 2012.[1] In addition to making payments, Starbucks' solution can be used for purposes such as getting directions to the nearest store, pre-ordering coffee, etc.

Only few payees in Denmark have launched apps that can be used for payment. In addition to the above-mentioned Billet app, DSB offers other similar solutions, e.g. DSB Wildcard. At end-August 2013, DSB's apps for payments had been downloaded more than 700,000 times, and DSB estimates that in 2013 more than 10 per cent of all fares will be paid via text message or app.

Another example is the Mobilporto app launched by Post Danmark for purchases of postage. Initially, Post Danmark sold digital stamps via text messages but later on added an app solution to this service. According to Post Danmark, Mobilporto had been downloaded more than 400,000 times at end-October 2013, and the company expects to sell 7 million digital stamps in 2013.

A possible new trend is for several payees to develop a joint app solution based on prepaid funds or withdrawals from an online-based account. In this way they can save expenses for the card acquirer and costs for the development and operation of the app. It also enables them to offer their customers a more interesting payment solution as it can be used for several payees.

A US example of such a solution is Merchant Consumer Exchange, MCX. Some of the largest US retail chains, including 7-Eleven, Walmart, Target and Best Buy, are the initiators of MCX. The launch date of MCX has not yet been announced and no details of the solution have been furnished.

Main type 7: Digital wallets

Digital wallets resemble the previous main type. A digital wallet contains a registration of the consumer's cards or other payment solutions, e.g. an online-based account or online banking solution. When using a digital wallet the consumer needs to select a card or other solution to be used.

As opposed to the solutions outlined under the previous main type, digital wallets are not aimed at payments of purchases from an individual payee. Digital wallets are rather used in retail stores accepting the registered cards or other solutions. Therefore, this type of solution is, as a main rule, not used by payees but by firms involved in payment systems.

Digital wallets can be placed on a server and be used for online shopping. The first digital wallets that have been launched are of this type. Digital wallets can also be downloaded on smartphones. The latter type is used in retail stores and enables contactless payments, which in reality are card payments, via the mobile phone.

As already mentioned, Google is one example of a digital wallet provider. In 2011, Google introduced Google Wallet, which can only be used in the USA so far. Visa and MasterCard have also developed their own solutions – V.Me and MasterPass. The latter two solutions were introduced for use in connection with online shopping but were also intended for use at point of sale.

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[1] Cf. Starbucks' annual report 2012.

Several telecommunications companies have also launched – or have announced plans to launch – solutions similar to digital wallets. This is the case in Sweden where the telecommunications companies have developed a joint solution – WyWallet – cf. Box 3.8. In Denmark, the telecommunications companies TDC, Telia, Telenor and 3 have established 4T to handle the development and rollout of a similar solution.

Other examples are digital wallets launched by banks – some jointly with other providers. In Norway, DNB has entered into collaboration with Telenor on the solution VALYOU, which in addition to the consumer's payment card may also contain e.g. bus tickets and key cards. In Denmark, Nets has announced that they intend to offer a similar solution in collaboration with Oberthur.

WyWallet	Box 3.8

The Swedish telecommunications companies Tele2, Telenor, Telia and 3 have launched WyWallet, which is best described as a digital wallet. Payments using WyWallet involve withdrawal from an online-based account. In order to use WyWallet the consumer needs first to download an app to a smartphone and transfer funds to the account or link it to a payment card. WyWallet also enables payment on receipt of an invoice.

WyWallet is aimed at various payment situations. It is designed to replace the telecommunications companies' traditional text message payments for purchases of digital services, bus and train tickets, donations, etc., and it can be used for purchases of goods and services in retail stores and on the Internet as well as person-to-person transfers.

When joining WyWallet the consumer registers a phone number. Transfers to other users or payments to retailers are executed by opening the app and stating an amount and the phone number of the payee as it is known from the Danish banks' mobile payment services, cf. Box 3.1. Further, payment can be executed via WyWallet by sending a text message to a short code in the usual way.

In connection with online shopping payment via WyWallet is executed by clicking an icon on the website where the purchase is made. The consumer is then requested to enter his or her phone number and afterwards receives a message in the WyWallet app that needs to be confirmed by entering a PIN. A PIN is typically entered for all transfers made via the WyWallet app.

Main type 8: Prepaid cards

A prepaid card is a payment card with a preloaded monetary value, which can be used for payments. The monetary value can be stored on a chip on the card or registered in an account on a server or on the Internet. Typically, the card is a physical card but it can also be a virtual card linked to an app solution or a digital wallet, cf. above.

One type of prepaid card can only be used with the issuer and is therefore part of a closed system, e.g. electronic gift cards, prepaid phone cards, cards for purchases of transport services, etc. This type of card is usually issued with a view to boosting sales, but other factors could be that the issuer can earn a return on the prepaid funds and that, based on experience, the prepaid amount is not used up.

As opposed to the closed system, an open system involves a prepaid card issued by a provider of payment services which can be used in a wide range of retail stores. Such a card may only act as a prepaid card but can also be combined with e.g. a national debit card or an international card. In legal terms, the money stored on the card is electronic money.

Another distinction is made between cards which can be reloaded, i.e. topped up, and cards which are discarded when the stored value has been used. Cards on which the monetary value is stored in a chip are physically loaded in ATMs. When the funds have been registered in a server or on the Internet, the

card can be reloaded via a transfer to the account or via an automatic reload, i.e. by means of a linked payment card.

Prepaid cards which cannot be reloaded are characterised by being bearer certificates. If the consumer loses the card, the remaining funds are usually lost. This type of card enables anonymous payments just as no approval of the payment is usually required. These properties are similar to those of cash.

DANMØNT Box 3.9

One of the early examples of prepaid cards in Europe was Danmønt. The card was introduced on 1 September 1992 on a trial basis and the general rollout was initiated the following year. Danmønt was largely designed for small payments in payphones, automatic ticket machines, laundromats, canteens, etc., but also in retail stores although this required a separate terminal.

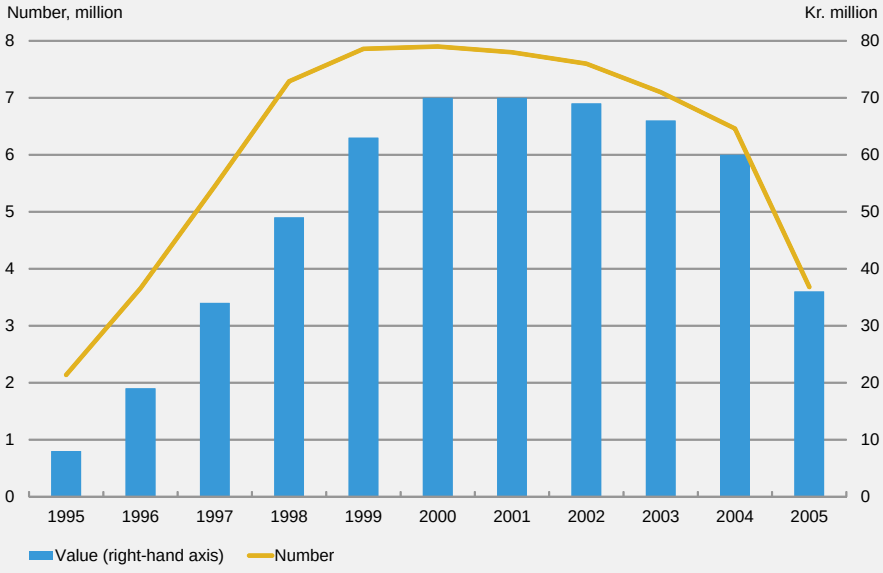
The company behind the card, Danmønt A/S, was founded in 1991 with PBS and KTAS as the shareholders. Danmønt A/S had the rights to the card and handled the settlement in respect of the payees and the specification and certification of cards and terminals. The issued cards were claims on Danmønt A/S, but were sold via banks, at bus and train stations and in kiosks.

Danmønt was launched as a non-reloadable smartcard. At the time, the smartcard was a fairly new phenomenon but the development of the Danmønt card provided PBS with considerable expertise of the underlying technology. In 1996 the non-reloadable card was supplemented with a reloadable version.

KTAS – which had become part of Tele Danmark A/S – sold its holding in Danmønt A/S to PBS in 1996, and PBS subsequently decided to close down Danmønt A/S and merge the activities with its own business activities. The use of the Danmønt card continued to rise until the end of the 1990s, cf. Chart 3.5, and then started to decrease. In 2005, PBS decided to discontinue the product.

There are several reasons why the Danmønt card did not catch on. A frequently cited reason is that the growing prevalence of mobile phones eliminated the interest in using the card for payphones. Moreover, throughout the period the Dankort constituted a popular alternative and was increasingly used for small payments, thus limiting the prevalence of the Danmønt card.

NUMBER AND VALUE OF DANMØNT PAYMENTS Chart 3.5

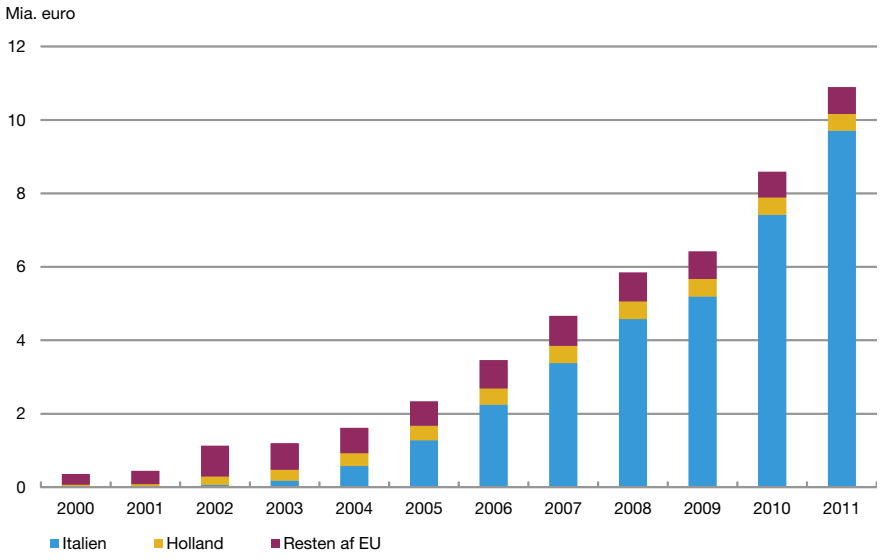


Source: European Central Bank.

The first prepaid cards which gained wide prevalence were introduced in Japan towards the end of the 1980s. One of the earliest examples in Europe was Danmønt in Denmark, which was introduced in 1992 and discontinued in 2005 after the use of the card had stagnated a few years before, cf. Box 3.9. Other early examples of prepaid cards in Europe were ChipKnip in the Netherlands and Proton in Belgium.

Prepaid cards have never really become widespread in Europe. The first E-Money Directive was adopted in 2000 without triggering a major increase in the use of the cards, cf. Chart 3.6. In 2009, the requirements for issuers of electronic money were eased with a view to boosting the prevalence of prepaid cards. However, payments using these cards still only account for less than 1 per cent of the value of total card payments.

VALUE OF PAYMENTS MADE BY PREPAID CARDS IN EUROPE — Chart 3.6



Source: European Central Bank.

Chart 3.6 shows that the use of prepaid cards is concentrated in a few countries, primarily Italy where some social benefits are paid out via prepaid cards. In Italy, the average amount per payment with these cards is relatively high. The most frequently used prepaid card in Europe is the Dutch ChipKnip, which was used for 148 million payments in 2012.

In principle, central banks can issue prepaid cards instead of or as a supplement to banknotes and coins – subject to the national legislation governing the activities of the central bank – but, in practice, no central bank has used this option. The Royal Canadian Mint, however, is planning to issue electronic money, cf. Box 3.10.

Main type 9: Overlay services

Overlay services are a relatively new payment solution aimed at online shopping, where the provider steps in between the consumer, the consumer's bank and the online retailer. Payment is executed by the user stating his or her account number and online banking login. The provider subsequently logs into the consumer's online banking facility and effects payment authorised by the consumer.

MINTCHIP Box 3.10

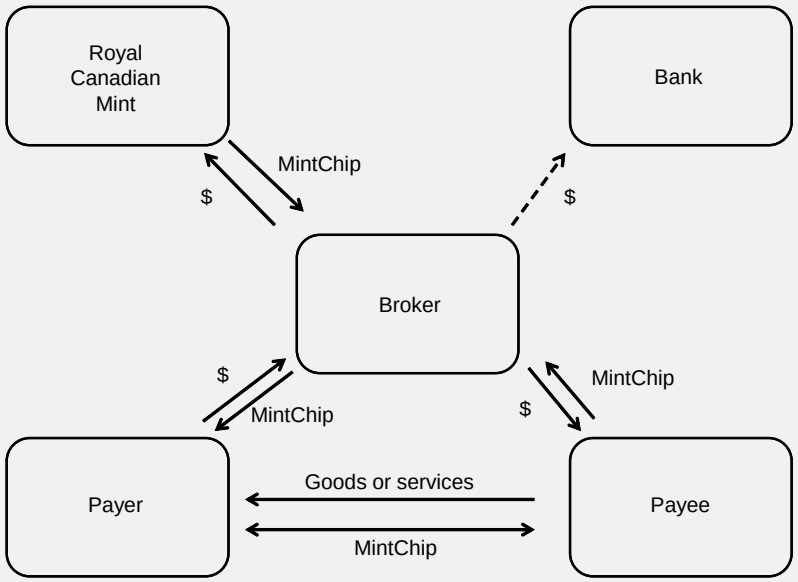
In 2012, the Royal Canadian Mint announced that it would start issuing electronic money, MintChip. According to the Royal Canadian Mint, MintChip is mainly designed for small payments in retail stores, on the Internet and between private individuals. The Royal Canadian Mint rolled out its first pilot program for the MintChip in January 2014.

Technically, the MintChip will consist of a unique encrypted code that can be fitted into a smartcard, a USB stick, a smartphone, a server or other devices enabling registration of the code. When using the MintChip for payments the code is transferred to the payee's device. Since no personal data is transferred together with the code the MintChip can be used anonymously like cash.

Chart 3.7 shows the MintChip's issue and redemption process. The Royal Canadian Mint issues MintChip via brokers by keeping their accounts with the Royal Canadian Mint and assigning them codes to issued MintChips. The brokers sell MintChip to the users and redeem them on request. On redemption of the MintChip brokers can choose to sell them back to the Royal Canadian Mint.

The technology behind MintChip enables private individuals to develop their own payment solutions. In 2012, the Royal Canadian Mint launched a challenge inviting software developers to create MintChip-based applications in several categories. Submitted ideas, including the winners, are shown on the website of the challenge (http://mintchipchallenge.com).

ISSUE AND REDEMPTION OF MINTCHIP Chart 3.7



In connection with overlay services, the provider has neither concluded an agreement with the consumer's bank nor the retailer's bank but solely with the retailer. This is a major difference between this type of solution and online banking solutions such as iDEAL and eDankort. As is the case for most providers of online banking facilities, providers of overlay services are typically not owned by banks.

In the past few years, overlay services have attracted some attention from e.g. the European Commission, central banks and national supervisory authorities. As an alternative to online banking solutions and card payments, overlay services can contribute to stimulating competition among providers of payment solutions and, hence, reduce online shopping costs for retailers and consumers.

Conversely, overlay services are based on the consumer entrusting the PIN to his or her online banking facility to a third party – the provider of the solution. In contrast to this, consumers are frequently advised to protect their PIN to payment cards, online banking facilities, etc., and it is typically incorporated in the agreement with the bank that the PIN is confidential.

Overlay services are not regulated at European level since the service is outside the scope of the Payment Services Directive. Moreover, overlay service providers cannot formally require access to the customers' bank accounts. In its proposed amendments to the Payment Services Directive the Commission suggests that this should be changed and that regulation of overlay service providers should be introduced, cf. Box 3.11.

Overlay services are still a fairly unknown phenomenon in Denmark. In Sweden, this service is provided by Trustly, which is registered as a payment institution. Trustly has activities in several other countries than Sweden and at end-October 2013 had executed around 7 million payments since 2008, according to the company. The German company Sofort is another provider of overlay services in Europe.

REGULATION OF OVERLAY SERVICES — Box 3.11

In July 2013, the European Commission published a proposal for a revised Payment Services Directive, cf. Chapter 2. The Commission envisages a definition of third-party access to payment accounts as a payment service, which implies that this type of activity will be comprised by the regulation of the directive. In consequence, third parties must seek authorisation as a payment institution and follow the rules applying to this type of institution.

In the proposal the Commission distinguishes between two types of third-party access: One is the *Account Information Service* according to which the third party provides the user with a consolidated overview of deposits and transactions on that person's payment accounts with banks, etc. The other is the *Payment Initiation Service* according to which the third party makes a payment from the user's payment account. Overlay services are an example of the latter.

These services will be covered by the general rules of the directive on duty of disclosure and rights and obligations. The proposal also contains a number of provisions that only apply to services based on third-party access. It is established that third parties have a right to access a user's account provided that the user has authorised the access. The proposal also contains provisions for a third-party obligation to take measures against abuse.

4. Consumer Views on Payment Solutions

4.1 INTRODUCTION AND SUMMARY

If new payment solutions are to gain a footing, they must meet consumer requirements and wishes to a higher degree than existing solutions. If not, consumers will continue to use the solutions they know and have become accustomed to. So it is important to map the payment solution properties appreciated by consumers, as well as the perceived shortcomings of the current solutions.

This chapter describes consumer views on existing and new payment solutions. First, the conclusions of previous studies of consumer payment habits are outlined. This is followed by a presentation of the findings of a new survey of payment habits in Denmark. The survey was conducted in collaboration with Statistics Denmark and includes a representative sample of more than 1,200 Danes aged 16-74.

The findings show that the vast majority of Danes prefer to pay by card, particularly by Dankort. This is because it is fast and convenient and they do not have to spend time withdrawing cash. As regards the Dankort, it is also seen as an advantage that it can be used in virtually all stores. In addition, some consumers appreciate the fact that card payments allow them to monitor their spending via online banking or account statements.

Slightly more than 10 per cent of Danes prefer to pay in cash. These are mainly elderly and people in the low income brackets. The reason why people with relatively low incomes often use cash is that they find it easier to manage their finances in that way. Most other consumers primarily use cash for small purchases, for which it can be a fast and easy method of payment.

Most Danes regularly shop online, and many do so at least once a month. Here, too, their preferred method of payment is by Dankort. Some consumers prefer to use international credit cards, as they find that this gives them greater security, possibly because these cards come with insurance cover. But overall, most Danes feel secure when shopping online.

As described in Chapter 3, some of the new payment solutions launched these years are aimed at mobile phones – or smartphones. Approximately one third of all adult Danes say that they are ready to use their mobile phones for paying in stores. Consumers who prefer to pay in cash are less inclined to embrace mobile solutions, while those who prefer to use cards are more likely to do so.

4.2 PREVIOUS SURVEYS

Several central banks have studied which methods of payments consumers use – and why, cf. Table 4.1. This also applies to Danmarks Nationalbank, which in 2010 conducted a survey of payment habits in Denmark.[1] The studies in the table are all based on questionnaire surveys among consumers. The results show that there are certain common denominators as regards preferred methods and reasons.

OVERVIEW OF OTHER SURVEYS — Table 4.1

	Denmark	Australia	Canada	Netherlands	Norway	UK	Sweden	Germany
Year of survey	2010	2010	2009	2010	2010	2009	2010	2011
No. of participants	1,294	1,241	9,990	7,499	2,608	2,000	1,127	2,098
Online questionnaire	Yes	No	Yes	Yes	No	Yes	No	No
Telephone survey	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Payments diary	No	Yes	Yes	Yes	No	Yes	No	Yes
No. of days	7	7	3	1	1	28	-	7

Note: The "Payments diary" row indicates whether participants were provided with a diary for recording their payments, while "No. of days" indicates the number of days for which payments were to be recorded. In the Swedish survey, participants were asked to state their most recent payment.

Source: Deutsche Bundesbank, The use of cash and cashless payment instruments: a microeconomic analysis, *Monthly Report*, October 2012; Nicole Jonker, Anneke Kosse and Lola Hernández, Cash usage in the Netherlands: how much, where, when, who and whenever one wants? De Nederlandsche Bank, *DNB Occasional Studies,* Vol. 10/No. 2, 2012; John Bagnall, Sophia Chong and Kylie Smith, Strategic review of innovation in the payments system: results of the Reserve Bank of Australia's 2010 consumer payments use study, 2011; Björn Segendorf and Thomas Jansson, The cost of consumer payments in Sweden, Sveriges Riksbank, *Working Paper No. 262*, 2012; Gustav Kaas Jacobsen and Søren Truels Nielsen, Payment habits in Denmark, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2011; UK Payment Council, *The way we pay 2010 – the UK's payment revolution*, 2010; C. Arango, K. Huynh and L. Sabetti, How do you pay? The role of incentives at the POS, Bank of Canada, *Working Paper*, 2011-23, 2011.

Size of the payable amount

Cash is primarily used for small payments, while consumers mainly use credit cards for large amounts. All studies show that the average value is lower for cash payments than for debit cards, cf. Table 4.2. However, the average values for cash and debit cards are both lower than for credit cards.

In Denmark, Sweden and Norway, consumers typically make fewer, but larger payments than in the other countries. This may reflect factors such as differences in retail structures and consumers' shopping habits. Fewer and larger payments in the Nordic countries could be one of the reasons why consumers in these countries often use cards.

Demographics

According to the studies, demographic factors have a fairly clear impact on consumers' choice of payment method. Table 4.3 presents an overview of the results. In the table, "+" indicates that, with statistical significance, the relevant characteristic has a positive impact on the individual's choice of cash or card – and "-" indicates that the impact is negative. "." indicates that no statistically significance impact was measured.

[1] See Gustav Kaas Jacobsen and Søren Truels Nielsen, Payment habits in Denmark, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2011.

NUMBER AND VALUE OF PAYMENTS IN SELECTED COUNTRIES — Table 4.2

	Denmark	Australia	Canada	Netherlands	Norway	UK	Sweden	Germany
Avg. no. of daily payments per capita								
Cash	0.5	1.4	0.9	1.0	0.2	1.1	0.3	1.1
Debit card	0.5	0.7	0.4	0.5	0.6	0.4	0.4	0.2
Credit card	0.02	…	0.4	0.01	0.1	0.2	0.1	0.02
Total	1.0	2.2	1.7	1.6	0.8	1.7	0.8	1.3
Avg. payment value								
Cash	190	63	91	91	206	87	252	145
Debit card	316	199	288	280	350	393	411	464
Credit card	530	…	422	827	595	358	513	495
Total	258	108	215	158	345	191	357	196

Note: Data from the surveys referred to in Table 4.1. In the Australian survey, no data was collected for credit card payments.
Source: See Table 4.1.

Most studies conclude that senior citizens and people with short educations are more inclined to pay in cash than others. The same applies to people with lower-than-average incomes. The studies from Denmark, Sweden and the Netherlands also show that men are more inclined than women to pay in cash, while the opposite seems to be the case in Germany.

WHO PAYS BY CARD AND IN CASH? — Table 4.3

	Denmark	Canada	Netherlands	Sweden	Germany
Who typically pays in cash?					
- Man	+	.	+	+	-
- Person aged 55+	+	+	.	.	+
- Person with short education	+	.	+	.	+
- Person with low income	+	.	+	+	+
- Person living outside the cities	.	.	+	.	.
Who typically pays by card?					
- Woman	.	.	+	+	-
- Person aged 24 to 55	+	.	+	.	+
- Person with higher education	+	+	+	.	.
- Person with high income	+	.	+	+	+
- Person living in household with more than one person	.	+	+	.	.

Source: See Table 4.1.

Important properties

Several studies indicate that certain properties of cards and cash may determine consumers' choice of these methods of payment. These properties include:

- *Cash can be used for budget management*. According to several studies, consumers use cash as a tool for limiting their spending. When people pay in cash, the transfer of funds is visible, which may dampen consumption. In addition, cash may be used as part of a budget plan. For example, a consumer may withdraw an amount at the beginning of each week or month to cover all expenses during that period.
- *Card payments are convenient*. In several studies, card payments are described as convenient since consumers do not have to worry about having enough cash. This assumes that cards are accepted more or less universally. In Danmarks Nationalbank's survey from 2010, two thirds of those who preferred to pay by Dankort emphasised its high acceptance rate, while this applied to only one third of those who preferred international debit cards.
- *Cash allows the consumer to be anonymous*. Several surveys confirm the importance to consumers of cash payments not being linked to the payer, i.e. it is not registered anywhere that they have made these purchases. For German consumers, this is an important factor when using cash.[1] In the Netherlands and Denmark, on the other hand, relatively few consumers state anonymity in connection with payments as a reason for using cash.[2]

These properties may to some extent explain the observed importance of the various demographic factors. For example, the reason why consumers with high incomes use less cash could be that they do not really need to manage their budgets. Another reason could be that spending time withdrawing cash involves higher opportunity costs for them than for other consumers.

Other surveys

Besides the above surveys, there are a number of other studies of consumers' payment habits. In Denmark, the Copenhagen Finance IT Region, CFIR, in a study examined a number of test persons' perceptions of and reactions to new methods of payment. This study is part of the project called The Future of Money, which seeks to promote knowledge about new payment instruments in Denmark. The project is described in Box 4.1.

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1 Cf. Ulf von Kalckreuth, Tobias Schmidt and Helmut Stix, Choosing and using payment instruments: evidence from German micro data, Deutsche Bundesbank, Discussion Paper, Series 1: Economic Studies, No. 36, 2009.

2 Cf. Nicole Jonker, Payment instruments as perceived by consumers – a public survey, De Nederlandsche Bank, DNB Working Paper No. 53, 2005, and Gustav Kaas Jacobsen and Søren Truels Nielsen, Payment habits in Denmark, Danmarks Nationalbank, *Monetary Review*, 3rd quarter, 2011.

CFIR PROJECT ON THE FUTURE OF MONEY – CONCLUSIONS Box 4.1

A number of user studies under the CFIR project The Future of Money have looked into consumer reactions to new methods of payment. The user studies included 30 people, who completed various scenario tests and were interviewed about their experiences. The scenarios were payments in a supermarket, at a parking ticket machine, when buying cinema tickets, at a festival and in a bar, as well as person-to-person transfers. The solutions tested included payment by text message and contactless payments via smartphones. The conclusions were as follows:

- *Users choose the solutions they know*. In the tests, many people chose to pay by text message because they were familiar with this method. Later, when they had tested contactless payments, they preferred that method.
- *A PIN provides security but is not necessary for small payments*. Most test persons saw PINs as reassuring, but around one third were ready to skip them for small payments – in some cases even up to kr. 1,500.
- *New solutions are expected to offer something extra*. It was emphasised that new payment solutions must offer something extra compared with existing solutions if they are to gain a footing. This could be saved time or new features.
- *New solutions should be simple and easy to grasp*. If a user interface was not intuitive, the payment solution in question was deselected. The same applied to solutions requiring too many clicks or steps in order to finalise payment.
- *The payment situation is decisive*. The test persons did not prefer the same solution in all scenarios. In some situations, speed was of the essence, while other factors were more important in other scenarios.
- *For some purposes, cash is difficult to replace.* It was pointed out that in some cases cash is more suitable than new payment solutions, e.g. when giving a pecuniary present or making small payments.

Source: Copenhagen Finance IT Region.

4.3 DESCRIPTION OF THE CONSUMER SURVEY

In collaboration with Statistics Denmark, a survey has been conducted of consumers' payment habits. The survey includes a representative sample of Danes aged 16-74. Participants were asked to record their payments during a 24-hour period. In addition, they were asked questions about their payment cards, preferred methods of payment in stores and experience with and views on online and mobile payments.

The survey was conducted by sending letters to 2,400 selected persons. The letters included paper-based payments diaries, in which participants were to record information about their payments on a specific date, including amounts, method of payment and type of recipient. To adjust for any fluctuations in payment patterns over the month, letters were sent to 85 people every day in the period from 25 February to 24 March 2013, i.e. a total of 28 days.

Besides the payments diary, the letters contained a link to an online questionnaire. If the participants had not responded within two days, they were contacted by telephone. Statistics Denmark conducted telephone interviews every day until approximately 40 responses had been received. All in all, responses were collected from 1,261 citizens, giving a response rate of 53 per cent. The survey is described in more detail in Appendix 2.

4.4 PAYMENTS AT POINT OF SALE

In the survey, participants were asked how often they pay in cash and by card, respectively, at points of sale. The results are shown in Table 4.4, which shows how often consumers use cash (rows) and cards (columns). For example, 26 per cent of consumers use both cards and cash at points of sale at least once a week.

CONSUMERS' PAYMENT HABITS — Table 4.4

Cash: \ Card:	Daily	At least once a week	2-3 times a month	Once a month or less frequently
Daily	2 per cent	3 per cent	1 per cent	3 per cent
At least once a week	13 per cent	26 per cent	4 per cent	4 per cent
2-3 times a month	11 per cent	13 per cent	1 per cent	1 per cent
Once a month or less frequently	7 per cent	8 per cent	1 per cent	

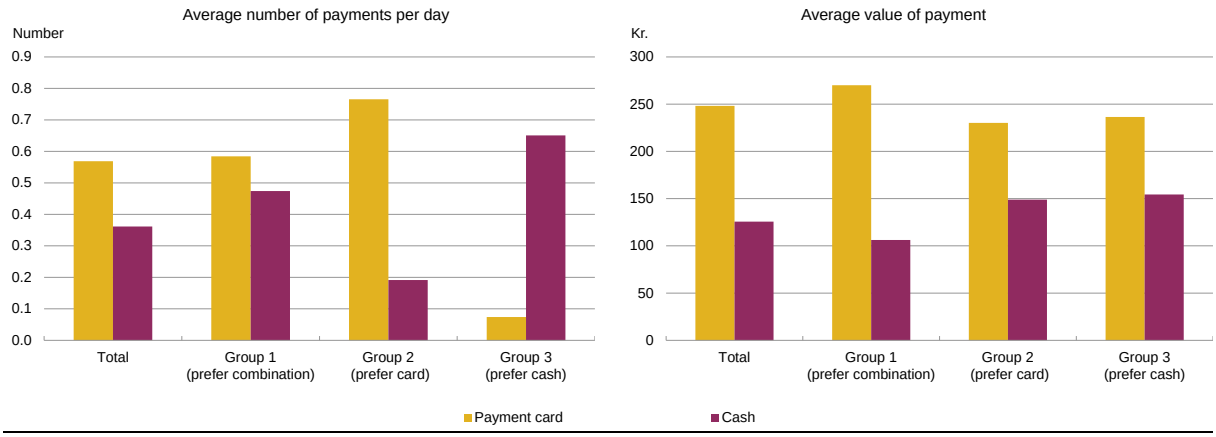
Note: The table shows how often respondents pay in cash or by card. Each cell indicates the percentage of respondents paying with the frequency stated. Due to rounding, the percentages do not add up to 100.
Source: Danmarks Nationalbank's consumer survey, 2013.

On the basis of the responses, consumers can be divided into three groups, reflecting their payment habits:

- *Group 1* includes people who use both cash and cards every week. 44 per cent of consumers belong to this group, which is framed in blue in the table.
- *Group 2* includes people who mainly use payment cards and who use cash no more than 2-3 times a month. 39 per cent of consumers belong to this group, which is framed in yellow.
- *Group 3* includes people who primarily pay in cash and who use cards no more than 2-3 times a month. 12 per cent of consumers belong to this group, which is framed in red.

In Chart 4.1 the payment habits stated by consumers have been compared with their actual payments as recorded in the diary. The chart confirms that the two sets of information match. It also shows that consumers in group 1 have a higher tendency to use cash for small payments and cards for large payments compared with the other two groups.

ACTUAL PAYMENTS AND PAYMENT HABITS — Chart 4.1



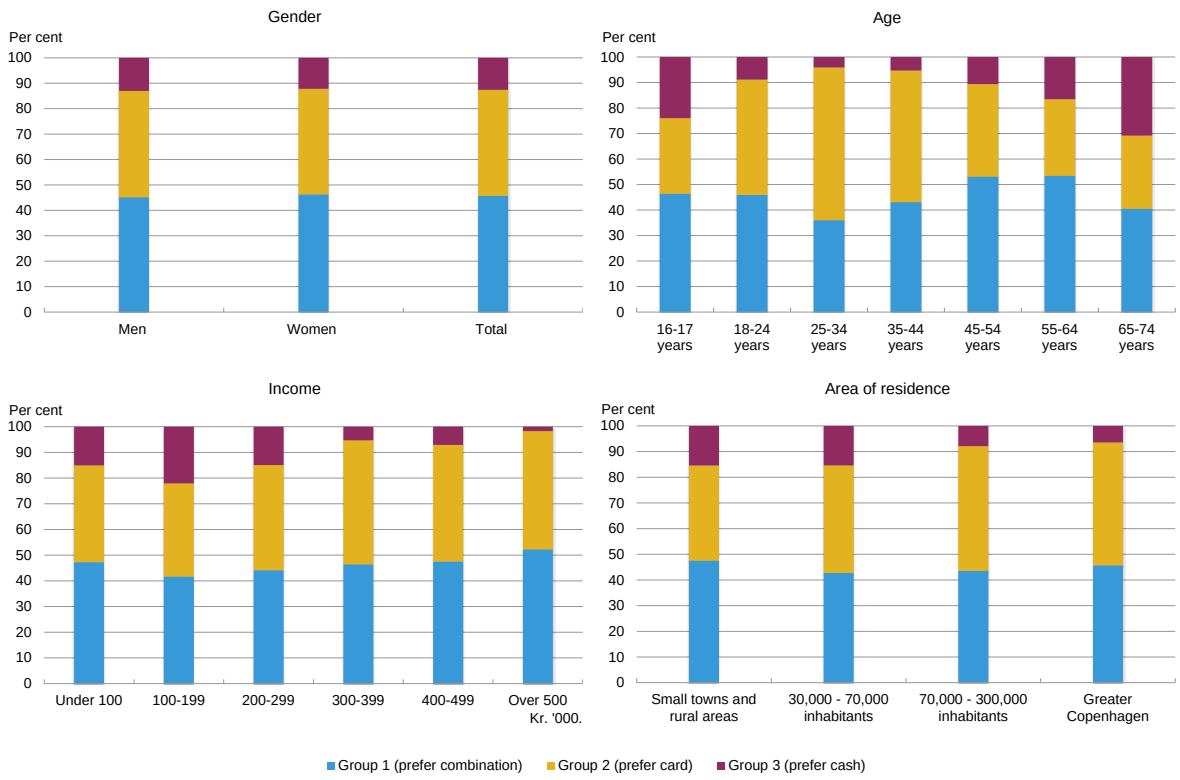
Note: The chart shows the average numbers and values of payments recorded by survey respondents in their payments diaries, compared with the payment habits stated.
Source: Danmarks Nationalbank's consumer survey, 2013.

Demographic factors

The groups can be used to examine whether personal characteristics such as gender, age, income and place of residence affect consumers' payment habits. This is done in Chart 4.2, which shows a breakdown by payment habits for each of these characteristics.

Overall, the results match previous findings. For example, the share of consumers who prefer to pay in cash is larger among senior citizens and people with relatively low incomes. On the other hand, there does not seem to be any difference in men's and women's payment habits, so it is not confirmed that men are more likely to pay in cash than women, cf. above.

IMPACT OF DEMOGRAPHICS ON PAYMENT HABITS — Chart 4.2



Source: Danmarks Nationalbank's consumer survey, 2013.

Chart 4.2 also shows that consumers in cities use cards more and cash less than people in the rest of Denmark. This is attributable to factors such as a lower average age and higher incomes among those living in cities. Cash is used more in small towns and rural areas despite the fact that there is further distance between ATMs and bank branches, which makes it more time-consuming to withdraw cash.

Why cash?

Participants in the survey were asked to assess various reasons for using cash on a scale from 0 (not important at all) to 3 (very important). Not surprisingly, those who prefer cash consistently rate the various reasons higher than other respondents, cf. Chart 4.3. However, the ranking of the reasons is more or less the same among all respondents.

According to the respondents, the major reason for paying in cash is the amount payable. For small, perhaps also round amounts they find it faster and easier to pay in cash. Moreover, most people do not

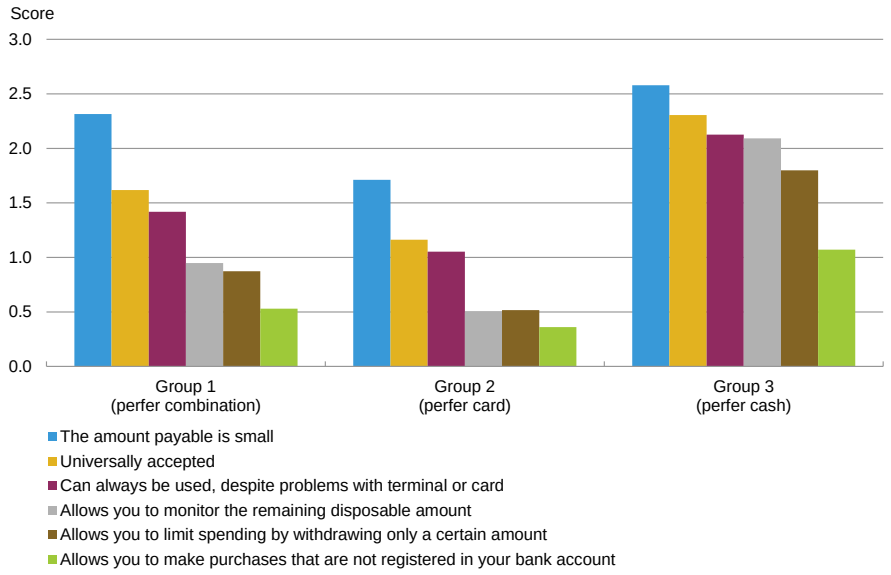
like to carry too much cash. If they have received cash, e.g. as a present, they often wish to spend it before using their cards.

Another important reason is that cash is always an option. Retailers have no obligation to accept a given payment card, but the law states that retailers with staffed checkouts are obliged to accept payment by cash, cf. Chapter 2. With cash, the consumer also avoids the risk of not being able to pay because of system failure or problems with the terminal or card.

In general, the respondents do not attach much weight to cash as a budget management tool, whether for monitoring the disposable amount during a given period or for keeping spending within certain limits. All the same, this does seem to be a relatively important factor for consumers who prefer to pay in cash.

It is also seen that the possibility of remaining anonymous when using cash is of minor importance to consumers. This also applies to those who mainly pay in cash. This confirms the results of the 2010 survey of the Danes' payment habits, which also showed that anonymity is not a major reason for paying in cash, cf. above.

REASONS FOR PAYING IN CASH — Chart 4.3



Note: Participants in the survey were asked to rate various statements about reasons for paying in cash using the following scale: 3 = Agree strongly, 2 = Agree somewhat, 1 = Disagree somewhat and 0 = Disagree strongly. The chart shows the average score for each statement for each of the three groups.
Source: Danmarks Nationalbank's consumer survey, 2013.

Why payment cards?

In the same way, participants in the survey were asked to assess various reasons for using a card. The most important reason for using a given payment card is that it is widely accepted, cf. Chart 4.4. This to a large extent explains why surveys show that the Dankort is the most popular payment instrument in Denmark, as it can be used in practically all stores, cf. Chapter 2.[1]

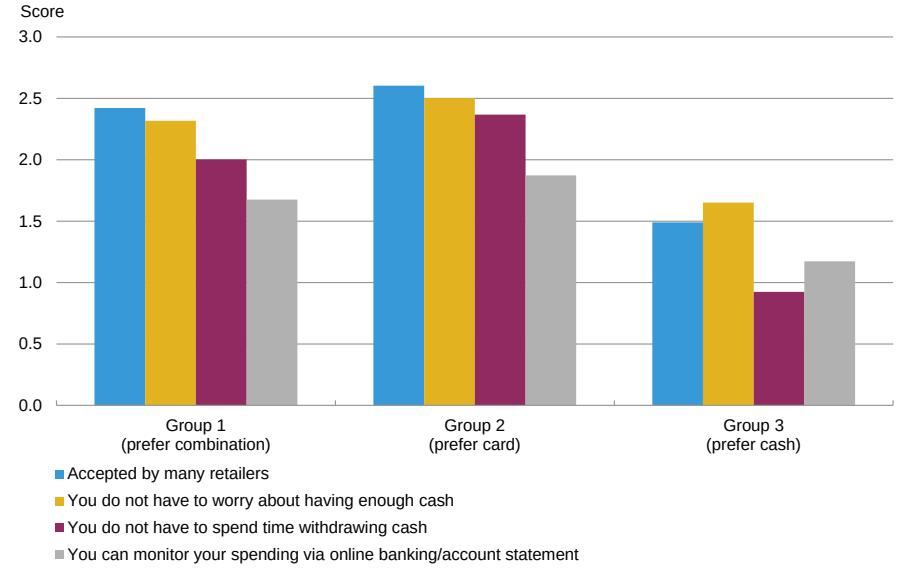
Another reason why consumers like to use cards is that they do not have to worry about having enough cash or spend time withdrawing cash. This is in accordance with the fact that for many consumers the

[1] See e.g. Gustav Kaas Jacobsen and Søren Truels Nielsen, Payment habits in Denmark, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2011.

costs of payments are the time spent withdrawing cash, including transport time and queuing at ATMs or in bank branches.[1]

Yet another reason for using cards is that it allows consumers to keep an eye on their spending as the payments are shown on the account statement. In the survey, this reason is rated lower than other explanations. However, this does not apply to consumers who mainly pay in cash, possibly because more people in this group have to plan their consumption and follow up their budgets.

REASONS FOR PAYING BY CARD — Chart 4.4



Note: Participants in the survey were asked to rate various statements about reasons for paying by card using the following scale: 3 = Agree strongly, 2 = Agree somewhat, 1 = Disagree somewhat and 0 = Disagree strongly. The chart shows the average score for each statement for each of the three groups.
Source: Danmarks Nationalbank's consumer survey, 2013.

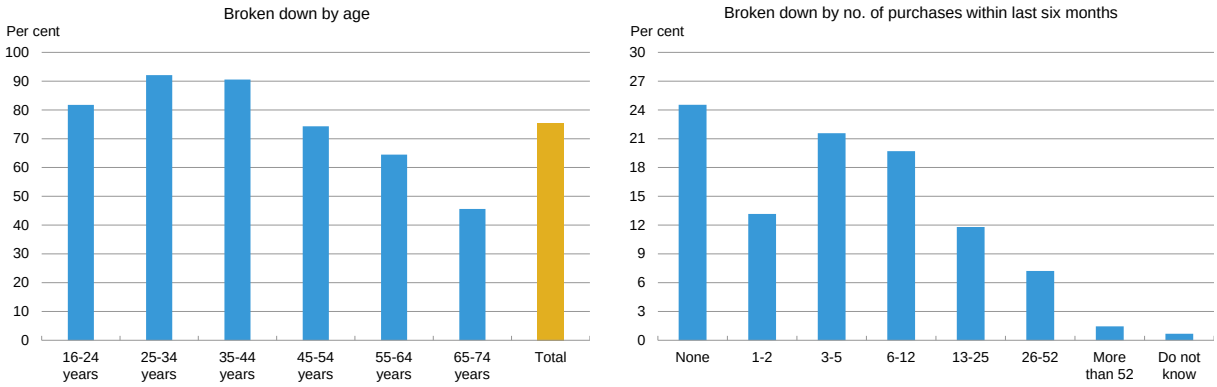
4.5 ONLINE PAYMENTS

Most Danes regularly shop online. Three out of four state that they have bought goods or services online within the last six months, cf. Chart 4.5 (left). The percentage is lowest among senior citizens, but nevertheless almost half of all Danes aged 65 or more shop online. Chart 4.5 (right) shows that more than 40 per cent have purchased goods and services at least six times within the last six months, i.e. at least once a month on average.

[1] Cf. Danmarks Nationalbank, *Costs of payments in Denmark*, 2012.

PERCENTAGE THAT HAVE SHOPPED ONLINE WITHIN THE LAST SIX MONTHS

Chart 4.5



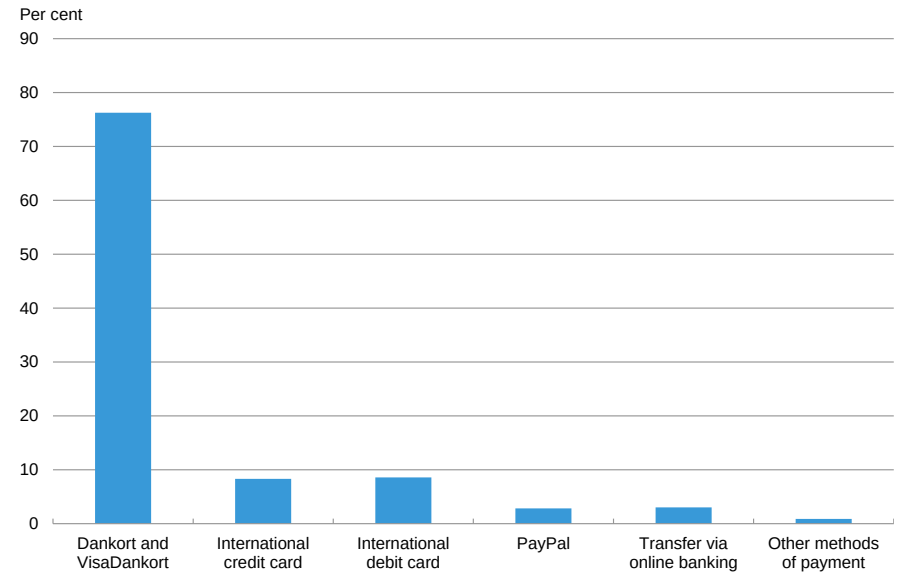
Note: The chart shows the percentage of respondents that have shopped online within the last six months, broken down by age and number of purchases.
Source: Danmarks Nationalbank's consumer survey, 2013.

Choice of method of payment

In the survey, participants were asked how they paid for their most recent online purchase. Approximately 75 per cent had used a Dankort, and just under 20 per cent an international card, cf. Chart 4.6. Only few participants stated that they had used another method, e.g. PayPal or an online bank transfer, typically after having received an invoice and an inpayment form.

METHOD OF PAYMENT FOR MOST RECENT ONLINE PURCHASE

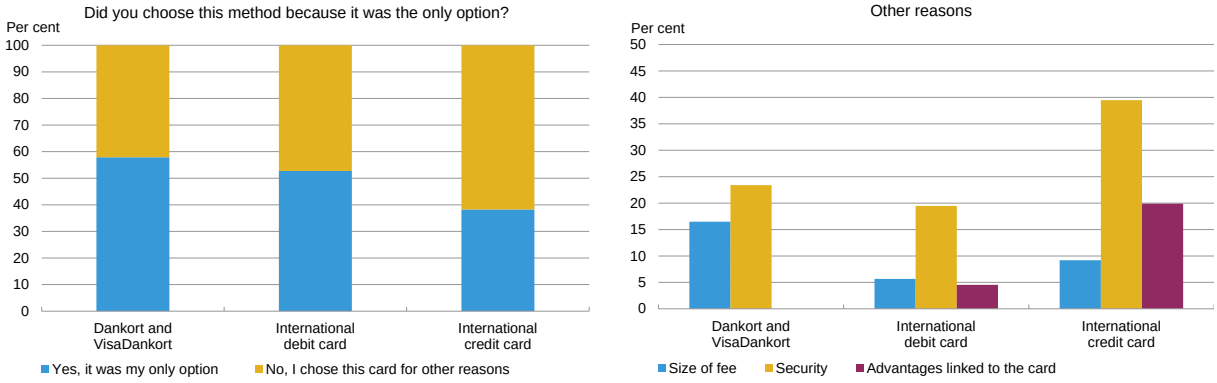
Chart 4.6



Note: The chart shows the percentage of respondents who used the relevant method of payment for their most recent online purchase.
Source: Danmarks Nationalbank's consumer survey, 2013.

The participants were also asked why they chose this method of payment. Among those paying by Dankort, the primary explanation was that they had no other option, cf. Chart 4.7 (left). This could be because they did not have access to any of the other methods accepted by the online store, or because the Dankort was the only method accepted by the store.

REASONS FOR CHOICE OF MOST RECENT ONLINE PAYMENT METHOD — Chart 4.7



Note: The left-hand chart shows the percentage of respondents who paid for their most recent online purchases using the card in question because this was the only option or for other reasons. The right-hand chart shows a breakdown of other reasons for using that card. Note that it was possible to state several reasons for choosing that card.
Source: Danmarks Nationalbank's consumer survey, 2013.

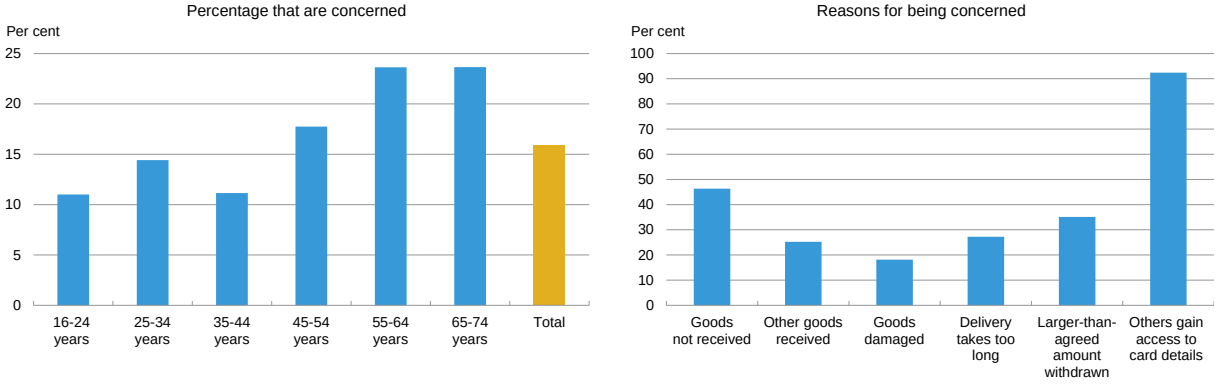
Lack of other options was also the primary explanation among those using international debit cards. This reflects how these cards are to a large extent substitutes for the Dankort, i.e. consumers typically have one or the other, cf. Chapter 2. It is also relatively unusual for a consumer with an international debit card also to have an international credit card.

Among participants using international credit cards, the primary reason was that this was seen as the most secure solution for online payments, cf. Chart 4.7 (right). The reason might be that these cards often come with insurance cover. In addition, some consumers may find it reassuring that the money is not withdrawn from their accounts immediately in credit card transactions.

Barriers to online shopping

Participants in the survey were also asked whether they feel secure when shopping online. Most of them did, in that only 16 per cent of those who had shopped online had had concerns about it, cf. Chart 4.8 (left). Broken down by age groups, senior citizens were most concerned about buying goods and services online, while younger consumers were less concerned.

PERCENTAGE THAT IS CONCERNED ABOUT SHOPPING ONLINE AND THE REASONS FOR THIS — Chart 4.8



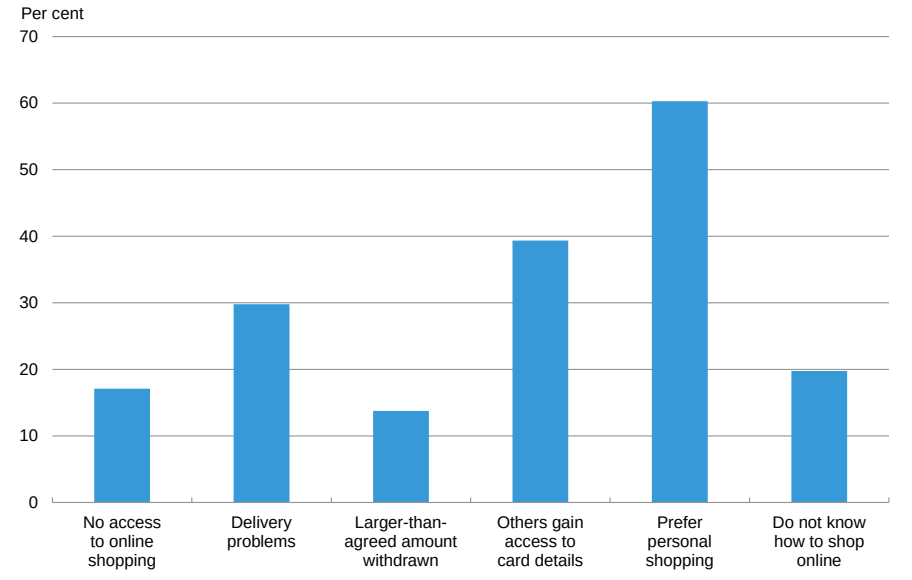
Note: The left-hand chart shows the percentage of respondents who have shopped online during the last six months, but have not felt secure doing so. The right-hand chart shows the same respondents, broken down by the reasons for their concerns. It was possible to state several reasons.
Source: Danmarks Nationalbank's consumer survey, 2013.

Those who were concerned about shopping online were asked to elaborate on the reasons. In most cases, the concerns related to the risk that others would gain access to their card details and use them fraudulently, cf. Chart 4.8 (right). In addition, some were concerned that the amounts withdrawn might be larger than agreed or that there might be problems with the goods delivered.

Finally, those who had not shopped online at all within the preceding six months were asked why. In many cases, this was because they prefer shopping at points of sale, cf. Chart 4.9. However, these respondents also expressed concerns that others could get their card details and use them fraudulently and that larger-than-agreed amounts would be withdrawn.

Danish legislation includes provisions protecting consumers against such risks. For example, the charge-back rule ensures that consumers may demand that the transfer be reversed if goods are not delivered or are damaged on delivery, cf. Chapter 2. This is also the case if card details are used fraudulently in online transactions. The consumers' concerns might then to some extent reflect lack of awareness of these rules.

REASONS FOR NOT SHOPPING ONLINE — Chart 4.9



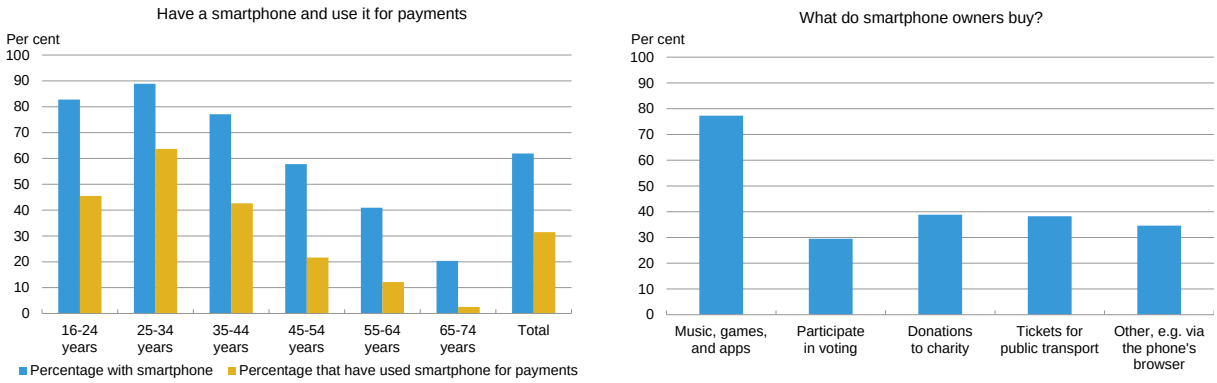
Note: The chart shows the respondents who have not shopped online within the last six months, broken down by the reasons for not doing so. It was possible to state several reasons.
Source: Danmarks Nationalbank's consumer survey, 2013.

4.6 MOBILE PAYMENTS

According to the survey, approximately 60 per cent of the respondents have a smartphone, cf. Chart 4.10 (left). Half of those with a smartphone had used it to make payments. The percentage of smartphone owners who use it for payments is highest in the young age groups.

Just under 80 per cent of those who have made smartphone payments have used their phones to buy music, games or apps, cf. Chart 4.10 (right), e.g. by linking a payment card to a supplier of digital services, such as iTunes or Google Play. Besides that, consumers have to a lesser extent used their smartphones for other payments, e.g. for purchasing public transport fares and for donations.

SMARTPHONES – PREVALENCE AND USE FOR PAYMENTS — Chart 4.10

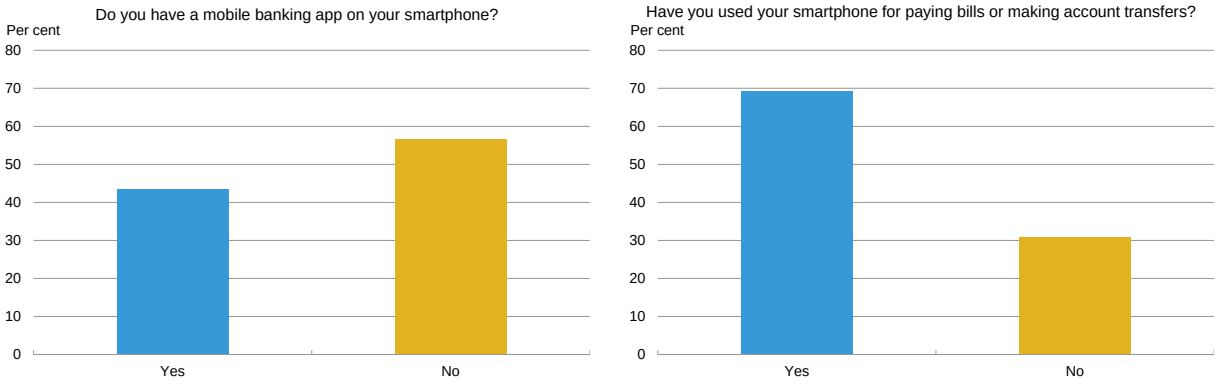


Note: The left-hand chart shows the percentage of respondents who have a smartphone and have used it for payments. The right-hand chart shows the percentage of all smartphone owners who have used it for buying various types of goods and services.
Source: Danmarks Nationalbank's consumer survey, 2013.

In addition to using smartphones for payments, consumers may also use them for more bank-related tasks if they download their banks' mobile banking solutions. A mobile banking solution is an app enabling consumers to monitor account transactions, pay bills and transfer funds via smartphones. In Denmark, virtually all banks offer their customers such solutions.

The prevalence of mobile banking gives an indication of the share of consumers who are ready to pay by smartphone. According to the survey, just under half of all consumers with smartphones have downloaded mobile banking apps, cf. Chart 4.11 (left). Within this group, some 70 per cent have used mobile banking to pay bills or make transfers, cf. Chart 4.11 (right).

MOBILE BANKING – PREVALENCE AND USE FOR PAYMENTS — Chart 4.11

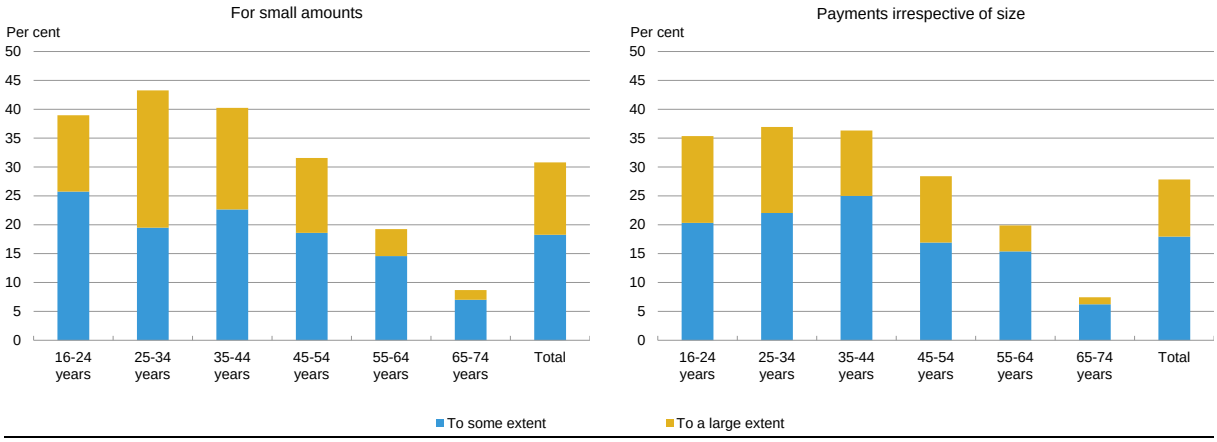


Note: The left-hand chart shows the percentage of respondents with smartphones who have downloaded a mobile banking app. The right-hand chart shows the percentage of respondents with mobile banking who have used it to pay bills or make transfers.
Source: Danmarks Nationalbank's consumer survey, 2013.

Views on mobile payments

Participants were asked about their views on paying by mobile phone in retail stores. The answers indicate that almost one third of the respondents would pay by mobile phone if they could, both when making small purchases, where coins are the alternative, and when making larger purchases, where cards or banknotes are normally used, cf. Chart 4.12.

PERCENTAGE THAT IS READY TO PAY BY MOBILE PHONE — Chart 4.12



Note: The chart shows the percentage of respondents that would use their mobile phones for payments if they could.
Source: Danmarks Nationalbank's consumer survey, 2013.

Experience shows that responses to such questions should be interpreted with caution as consumers typically find it difficult to assess whether they can benefit from new solutions before they have seen them used in practice. That was also evident from the test persons' responses in the CFIR project The Future of Money, cf. Box 4.1.

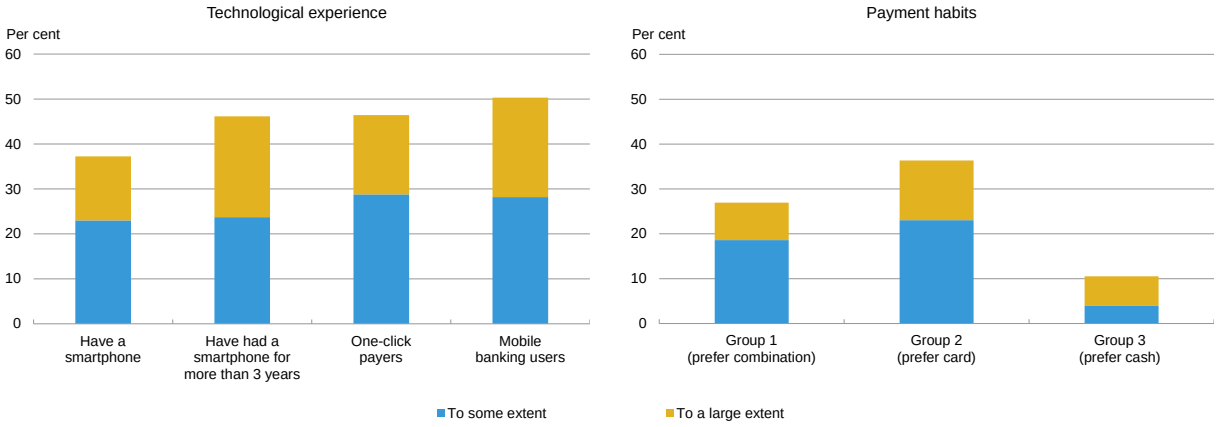
Whether consumers are ready to use mobile payments depends on various personal characteristics. For example, young consumers are more likely to use their mobile phones for payments than older consumers are. Basically, this reflects the generation gap in relation to new technology that is also seen in other areas.

In addition, consumers with extensive experience of new technology seem to be more open to mobile payments than others. Among consumers who have had smartphones for several years there is a relatively high percentage who are ready to pay by mobile phone, cf. Chart 4.13 (left). The same applies to consumers who frequently shop with suppliers of digital services or who have downloaded and actively use mobile banking apps.

Moreover, there is a clear tendency for consumers who prefer cards to be ready to switch to mobile phones, cf. Chart 4.13 (right). By comparison, only around 10 per cent of consumers preferring cash would be ready to use a mobile phone if this was possible. The responses do not show whether consumers would replace cash or card payments with mobile payments.

PERCENTAGE THAT IS READY TO PAY BY MOBILE PHONE – SIGNIFICANCE OF TECHNOLOGICAL EXPERIENCE AND PAYMENT HABITS

Chart 4.13

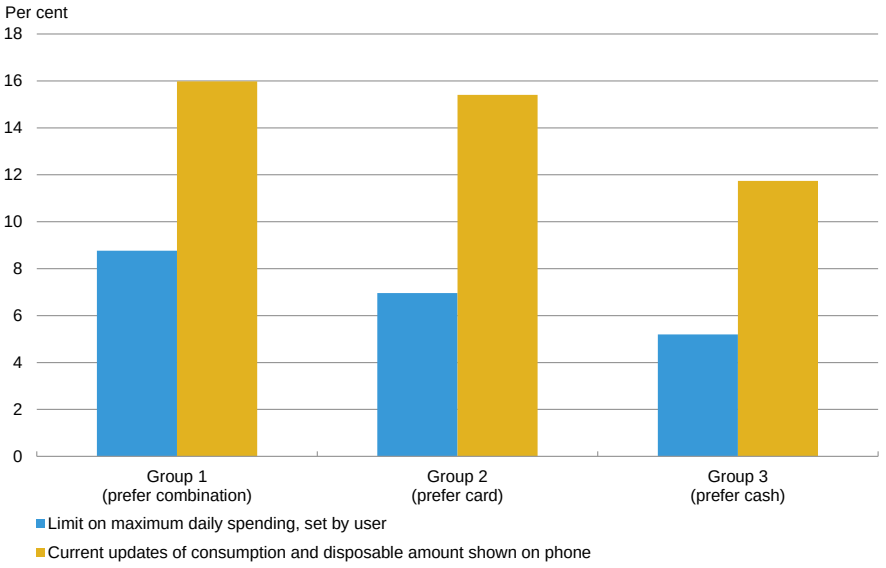


Note: The chart shows the percentage of respondents, who would pay by mobile phone if they could, broken down by technological experience and payment habits. "One-click payers" are people who have linked a payment card to a supplier of digital services or an online store, so that they can pay by simply clicking once and entering a PIN to verify. Respondent groups 1, 2 and 3 refer to the breakdown in Table 4.4.
Source: Danmarks Nationalbank's consumer survey, 2013.

Finally, the participants were asked about the functionalities that might make them change their views on mobile payments. Some consumers would be more willing to use mobile payments if they were kept informed of their account balances via their mobile phones, cf. Chart 4.14. A small share would also take a more positive view of mobile payments if they could set a daily maximum on their spending.

FUNCTIONALITIES THAT MIGHT CHANGE CONSUMERS' VIEWS ON MOBILE PAYMENTS

Chart 4.14



Note: The chart shows the percentage of respondents, who would change their views on mobile payments if the functionalities in question were introduced. Respondent groups 1, 2 and 3 refer to the breakdown in Table 4.4.
Source: Danmarks Nationalbank's consumer survey, 2013.

5. Retailers' Views on Payment Solutions

5.1 INTRODUCTION AND SUMMARY

If innovative payment solutions are to become prevalent, they need to win the support not only of consumers, but also of retailers. Accordingly, knowledge of retailers' wishes in terms of new solutions is important. But in practice, these wishes may be difficult to identify since relatively few retailers have reflected on this issue, and those who have are primarily the larger ones.

This chapter describes Danish retailers' views on existing and new payment solutions. The chapter builds on a survey conducted as part of the work on this report. The survey is based on an electronic questionnaire distributed to a large number of retailers and contains responses from 1,000 payees from different industries.

Of traditional payment solutions, most retailers receiving payments at point of sale prefer payments by Dankort, especially large payees and retailers in the Supermarkets industry, comprising various types of grocery stores. After payments by Dankort, retailers prefer payments by cash over international cards.

As a benefit of cash payments, retailers point to lower costs payable to card acquirers. This is particularly true in comparisons with international cards for which retailers are charged a fee for each payment. Another benefit mentioned is greater certainty of receiving payment for goods or services sold. A relatively large number of retailers indicate that they see no benefits of cash payments.

As a benefit of card payments, retailers highlight that these payments reduce the risk of loss and robbery. Just over one third of retailers have introduced anti-robbery measures, which come at a cost. In addition to the cost, the implications for the staff affected should also be counted. Furthermore, large retailers, in particular, point to cash handling savings.

Online retailers' preferred method of payment is also Dankort. This is despite the fact that payments by Dankort may involve greater risks for them because the amounts guaranteed by the acquirer (Nets) are lower than those guaranteed on other methods of payment. One reason why retailers accept this greater risk may be that the scope of fraudulent use of the Dankort for online payments has been relatively modest.

When asked about their wishes for new payment solutions, retailers specify that these solutions should, first and foremost, help to reduce payment service provider costs. Another wish is for new solutions to contribute to quicker settlement and increased payment security. The ongoing modernisation of the Danish payments infrastructure will bring improvements in both areas.

One aspect for retailers when considering a new payment solution is whether the solution can be expected to increase turnover. Other key factors are payment security and payment service provider costs. To small retailers, in particular, investment costs also play a significant role.

Looking at a 3-5 year time frame, retailers' greatest expectations in terms of new payment solutions is related to mobile phones. The solution highlighted by most retailers – with some variation among industries – is contactless payments via smartphone. Retailers also have some expectations in terms of mPOS-terminals and app-based solutions.

Despite their expectations of contactless payments, only a small percentage of retailers have specific plans for launching this method of payment. But retailers' position on contactless technology must be assumed to depend on its prevalence among consumers. In case of widespread issuance of e.g. contactless cards, retailer preparations can be expected to be stepped up.

5.2 DESCRIPTION OF THE RETAILER SURVEY

In cooperation with Wilke , a survey was conducted of Danish retailers' views on existing and new payment solutions. A total of 1,000 retailers were surveyed, cf. Table 5.1. These retailers can be broken down into seven general industries, described in detail in Box 5.1.

COMPOSITION OF THE SAMPLE — Table 5.1

	Number of participants	Percentage of turnover (per cent)	Average turnover (kr. million)
Supermarkets	66	50	1,815
Specialist food stores	80	1	35
Shoe and clothing stores	128	15	272
Other retail stores, non-food	389	5	31
Hotels and restaurants	156	7	113
Services	65	1	51
Other	116	21	434
Total	1,000	100	241

Source: Danmarks Nationalbank's retailer survey, 2013.

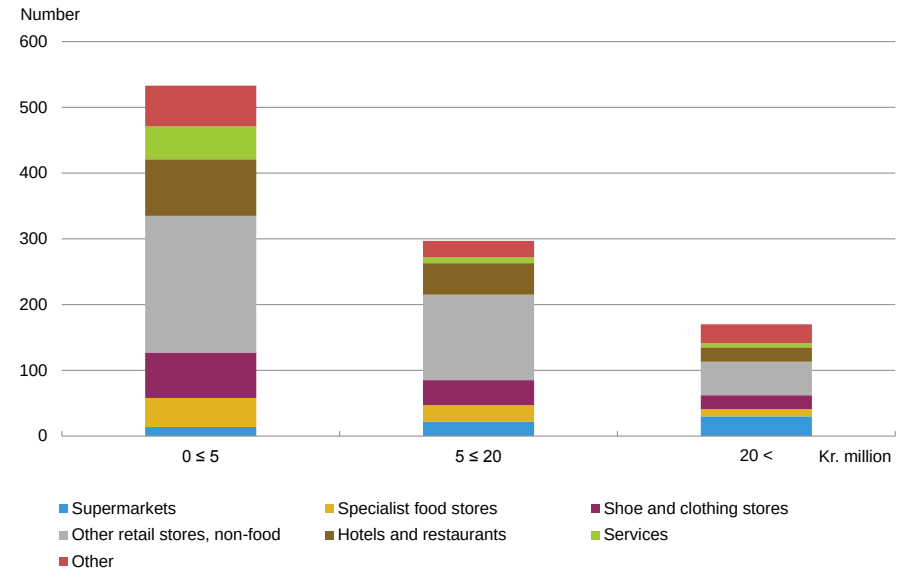
INDUSTRIES IN THE RETAILER SURVEY — Box 5.1

Respondents in the retailer survey may be broken down into seven main industries:

- *Supermarkets*, comprising supermarkets, convenience stores, grocers, discount stores, department stores and variety stores.
- *Specialist food stores*, comprising bakers, greengrocers, fishmongers, butchers, tobacconists, etc.
- *Shoe and clothing stores,* comprising, in addition to shoe and clothing stores, stores selling leather goods, dress fabrics and baby equipment.
- *Other retail stores, non-food,* comprising, inter alia, opticians, photo stores, florists, pharmacies, bicycle stores, book stores, toy stores, DIY centres and stores selling computers, televisions and radios.
- *Hotels and restaurants,* comprising, in addition to hotels and restaurants, cafés, bars, pubs, pizzerias, takeaway and fastfood outlets, etc.
- *Services*, comprising hairdressers and beauty parlours, cleaners, shoe repairers, photography and printing stores, film rental stores, etc.
- *Other,* comprising, inter alia, service stations, cinemas, telecommunications companies, ticket agencies, game providers, taxi companies, transport companies, travel agents, magazine publishers and car rental companies.

More than half of the respondents in the survey are small retailers with an annual turnover of less than kr. 5 million, cf. Chart 5.1. Below, the survey results are presented, based on the number of retailers, i.e. small and large payees are included with the same weight. Appendix 3 provides a more detailed review of the survey.

RETAILERS IN THE SURVEY, BROKEN DOWN BY TURNOVER — Chart 5.1



Source: Danmarks Nationalbank's retailer survey, 2013.

5.3 TRADITIONAL PAYMENT SOLUTIONS

As described in Chapter 2, practically all retailers accept payment by Dankort. Moreover, two thirds accept payment by cheque and international cards. For online shopping, the acceptance of payment cards is slightly less prevalent. As mentioned earlier, the reason is that a number of online retailers, primarily small ones, accept payments by bank transfer only.

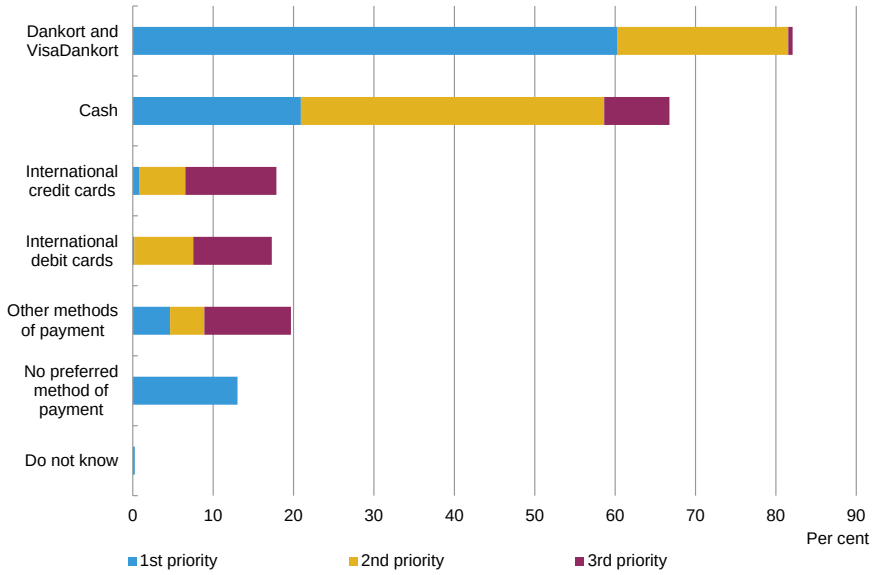
Point of sale, staffed checkout

Most of the responding retailers have staffed checkout at points of sale and thus payments which are termed physical trade in a legal context. Among these retailers, 60 per cent prefer customers to pay by Dankort, cf. Chart 5.2, while about one fifth prefer cash payments, and overall retailers tend to prefer payments by cash over payments by international cards. A small number of retailers prefer other methods of payment, such as bank transfers and use of store payment cards. Just under 15 per cent of the retailers respond that they have no preferred method of payment.

Retailers' preference for Dankort payments complies with their costs of accepting the various methods of payment. Thus estimations show that retailers' costs of an additional payment by Dankort, i.e. marginal costs, are lower than those of both cash and international cards.[1] This applies even if considering the fact that retailers may surcharge payments by international credit cards.

[1] Cf. Gustav Kaas Jacobsen, Faste og variable omkostninger ved betalinger i Danmark (Fixed and variable costs of payments in Denmark – in Danish only), Danmarks Nationalbank, *Working Paper No. 79*, 2012.

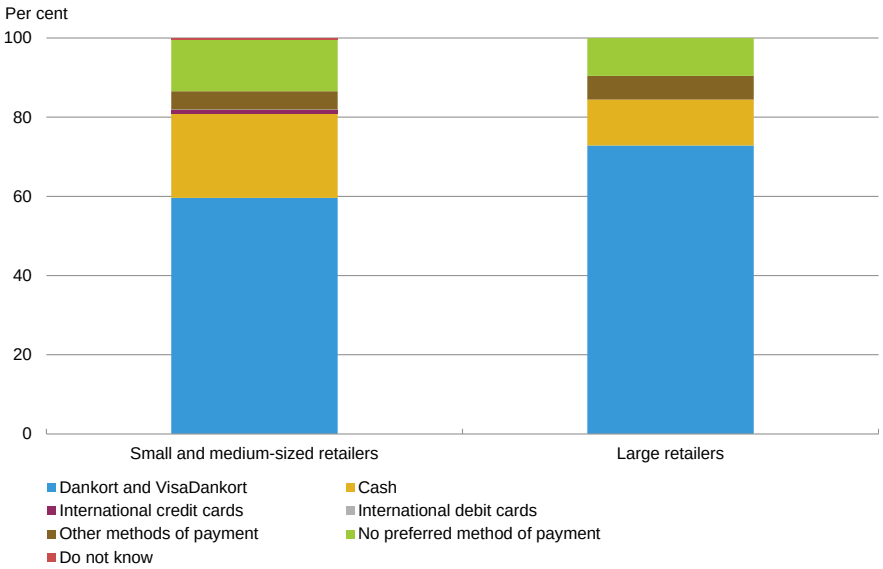
RETAILERS' PREFERRED METHOD OF PAYMENT, POINT OF SALE — Chart 5.2



Note: In the survey, retailers were asked to prioritise up to three methods of payment. Other methods of payment are, inter alia, cheques, own payment cards and bank transfers.
Source: Danmarks Nationalbank's retailer survey, 2013.

A breakdown of retailers by size shows that large payees tend to prefer payments by Dankort to a greater extent than small and medium-sized retailers, cf. Chart 5.3. Moreover, among large payees, less than one in 10 retailers prefer consumers to pay in cash. Furthermore, fewer large than small and medium-sized retailers have no preferred method of payment.

RETAILERS' PREFERRED METHOD OF PAYMENT, POINT OF SALE, BROKEN DOWN BY RETAILER SIZE — Chart 5.3



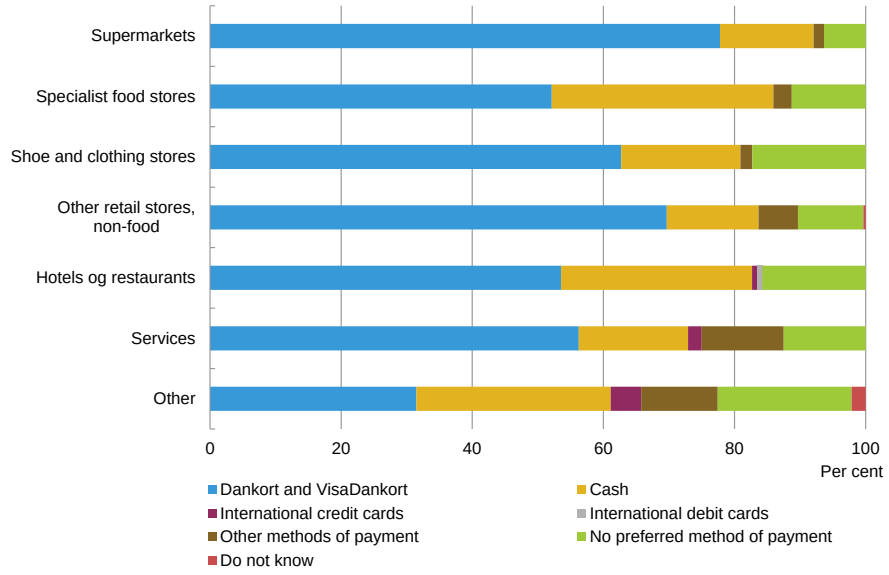
Note: The chart shows only retailers' 1st priority. Other methods of payment are, inter alia, use of cheques, own payment cards and bank transfers. Large retailers are payees with an annual turnover exceeding kr. 150 million.
Source: Danmarks Nationalbank's retailer survey, 2013.

One reason for the more common preference for cash payments by small retailers could be that they do not assign the costs of these payments the same weight as large payees. Costs of cash are mainly the time spent closing the cash register, picking up change and depositing the day's sales in a night safe.[1] Sole proprietors are likely to focus less on this time consumption than on invoiced costs, e.g. acquirer fees.

Broken down by industry, a slightly larger share of the payees in Supermarkets prefers payments by Dankort than other types of retailers, cf. Chart 5.4. This to a large extent reflects differences in views on the various methods of payment between small and large payees. For example, large retail chains are probably well aware of the costs of cash in the form of employee time consumption and fees to cash-in-transit companies.

In the industries Specialist food stores and Hotels and restaurants, a large percentage of the payees prefer cash payments. However, also in these industries, payments by Dankort are the most frequently preferred method of payment. Finally, the industry Other stands out from other industries in that this industry covers very different types of payees, cf. Box 5.1.

RETAILERS' PREFERRED METHOD OF PAYMENT, POINT OF SALE TRANSACTIONS, BROKEN DOWN BY INDUSTRY — Chart 5.4



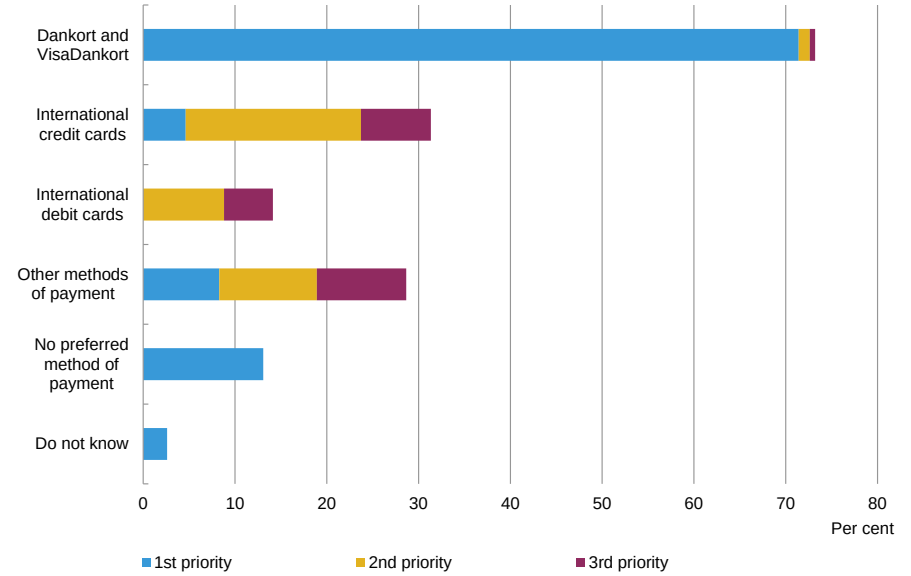
Note: The chart shows only retailers' 1st priority. Other methods of payment are, inter alia, use of cheques, own payment cards and bank transfers. The breakdown of retailers by industry is described in Box 5.1.
Source: Danmarks Nationalbank's retailer survey, 2013.

Online sales

For online sales, payments by Dankort are also retailers' preferred method of payment, cf. Chart 5.5, although these payments involve greater risk than other methods of payment. No PIN is used for online Dankort payments, and retailers are liable for losses on fraudulent use for amounts exceeding kr. 1,000. The reasons why retailers accept the greater risk could be that they mainly sell products for amounts below the payment guarantee and that the extent of fraudulent use has been relatively moderate so far.

[1] Cf. Danmarks Nationalbank, *Costs of payments in Danmark*, 2012.

RETAILERS' PREFERRED METHOD OF PAYMENT, ONLINE SALES — Chart 5.5



Note: In the survey, retailers were asked to prioritise up to three methods of payment. Other methods of payment are payments by eDankort, Paypal and COD, i.e. the product is sent with an invoice and subsequently paid for by inpayment form or bank transfer.
Source: Danmarks Nationalbank's retailer survey, 2013.

Other online payment solutions are payments by eDankort, PayPal or inpayment forms after the product has been sent with an invoice. According to the retailer survey, some 30 per cent of the respondent retailers accept payments bank transfers or inpayment forms. This method of payment involves a significant risk for the retailer and is used primarily for the sale of products that consumers want to assess before paying for them.

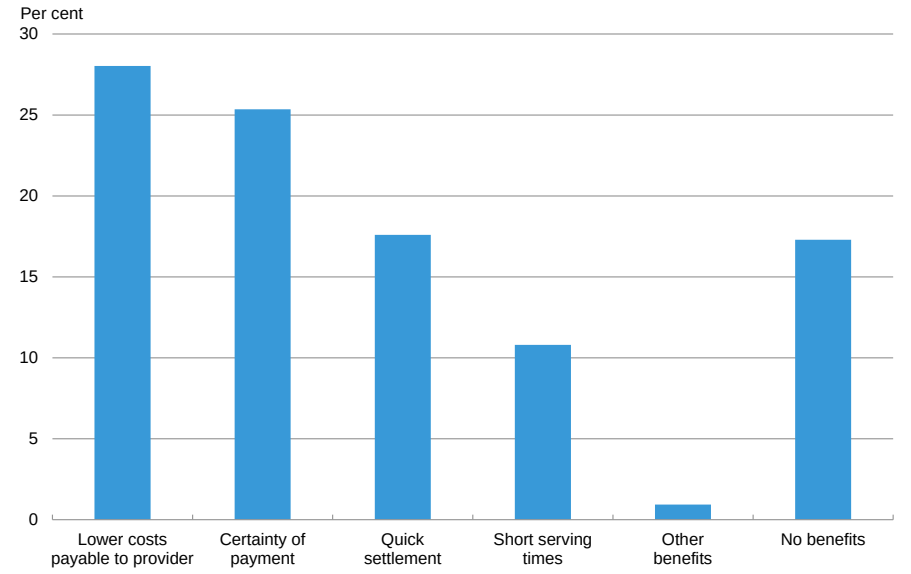
Payments by PayPal and eDankort are accepted by about 15 per cent and 10 per cent, respectively, of retailers, but few of them prefer these methods of payment. As the risk of fraudulent use is limited, eDankort is a method of payment giving retailers a high degree of certainty that they will receive payment for the sale. As mentioned earlier, there may be several reasons why eDankort is not more popular among retailers, including lack of knowledge of this solution, cf. Chapter 3.

Benefits of cash payments

In the survey, retailers were asked to assess a number of benefits of cash payments over card payments at points of sale. The key benefit highlighted by retailers is lower costs payable to card acquirers, cf. Chart 5.6. This is a benefit only in relation to international cards for which retailers are charged a fee on each payment – not in relation to Dankort where fixed subscription fee applies, cf. Box 2.3.

Another benefit of cash payments pointed out by a large number of retailers is that they provide certainty of receiving the payment. Retailers are guaranteed an amount of up to kr. 4,000 for Dankort payments, when PIN and chip is used. For larger purchases, the retailer bears the risk of loss of the share of the payable amount exceeding the payment guarantee and may possibly suffer a loss in case of insufficient funds in the consumer's account if the product cannot subsequently be recovered.

BENEFITS OF CASH PAYMENTS OVER CARD PAYMENTS — Chart 5.6



Note: The chart shows the percentage of retailers pointing to the respective benefit as the most important one when a customer pays by cash rather than paying by card. Only retailers with staffed checkouts at points of sale are included in the chart.
Source: Danmarks Nationalbank's retailer survey, 2013.

Slightly more than one in six retailers mention quick settlement, i.e. how quickly they receive the funds in their account, as the primary benefit of cash payments. This is also exclusively a benefit in comparisons with international cards. Depending on the agreement with the acquirer, it usually takes a few days for international card payments to be credited to the retailer's account, while Dankort payments are typically credited to the account the following day, cf. Chapter 2.

Furthermore, about one in 10 retailers mention short serving times as the key benefit of cash payments. Timing shows that the average serving time is about the same for cash and card payments.[1] However, for some retailers, cash payments may be quicker. This applies e.g. to retailers predominantly receiving small, round amounts. Retailers that may be receiving a large number of payments in one day and, therefore, attach importance to short serving times.

Finally, about one sixth of retailers respond that they see no benefit of cash payments over card payments. A breakdown of retailers by size shows that this view is especially prevalent among large payees. This tallies with the fact that these retailers focus more than others on the costs of handling cash and may possibly be able to negotiate the most advantageous terms with acquirers of card payments.

Benefits of card payments

Retailers were also asked to assess various benefits of card payments over cash payments. According to the respondents, the key benefit of card payments is that they reduce the risk of loss and robbery, cf. Chart 5.8. Besides reducing retailers' direct losses, card payments may also help to reduce the costs of anti-robbery measures. Slightly more than one third of small and medium-sized retailers have introduced anti-robbery measures, for the larger retailers with an annual turnover exceeding kr. 150 million, it is more than half, cf. Box 5.2. Costs are but one side, the effects of robberies on the affected staff are another which should also be considered.

[1] See Danmarks Nationalbank, *Costs of payments in Denmark*, 2012.

ANTI-ROBBERY MEASURES

Box 5.2

The participants in the retailer survey were asked whether they have introduced anti-robbery measures and, if so, which ones. Among small and medium-sized retailers, 35 per cent have introduced measures, while, for large retailers with an annual turnover exceeding kr. 150 million, slightly more than half have introduced such measures, cf. Table 5.2.

The most widely used type of anti-robbery measure is CCTV in the stores. Furthermore, just under one fourth of large retailers have opted to outsource their cash handling, while 16 per cent have security guards in selected stores. Only a small percentage of retailers have introduced closed cash handling systems.

When asked, close to 30 per cent of retailers respond that they are still concerned about robberies, despite any measures they have put in place, cf. Chart 5.7. Of these respondents, a small percentage would consider refusing cash payments, possibly only during some opening hours, if the current ban on refusing these payments was lifted, cf. Chapter 2.

ANTI-ROBBERY MEASURES

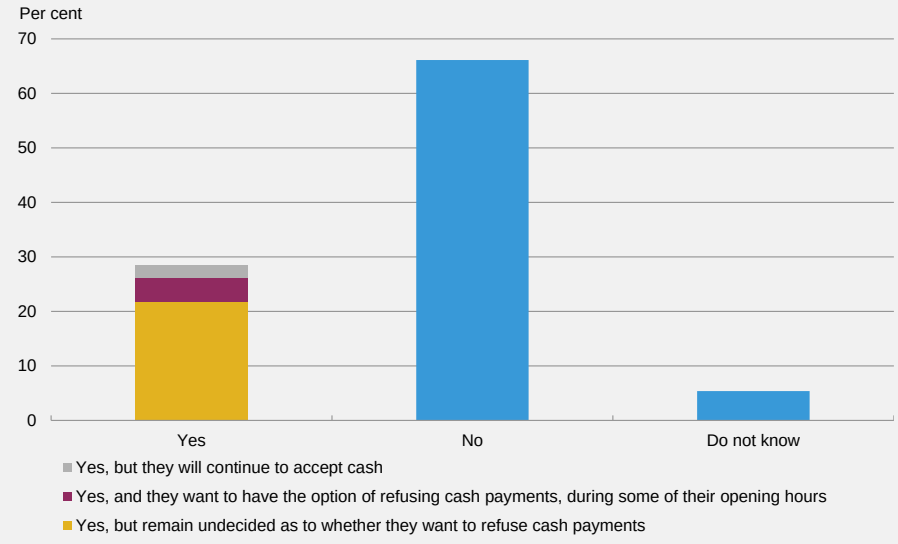
Table 5.2

Per cent	Small and medium-sized retailers	Large retailers
No measures	60	40
Measures	35	51
CCTV, video surveillance	26	46
Outsourcing of cash handling services	1	24
Closed cash handling systems	2	6
Security guards in selected stores	1	16
Other measures	11	11
Do not know	4	9
Total	100	100

Note: In the survey, a retailer may have specified several anti-robbery measures; therefore, the sum of individual measures does not equal the sum of total measures. Examples of other measures are staff attack alarms near the checkout register, time delays and dye packs.
Source: Danmarks Nationalbank's retailer survey, 2013.

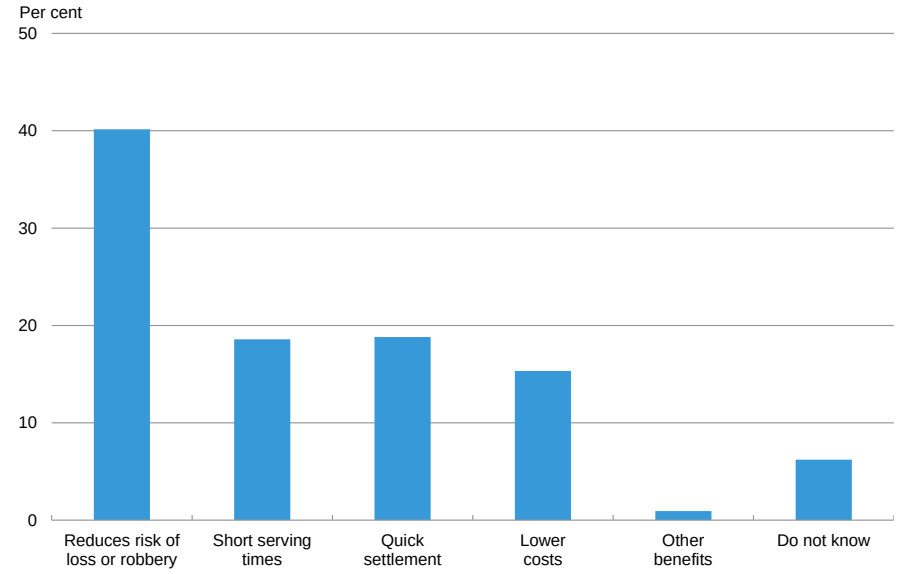
IS THE RETAILER CONCERNED ABOUT ROBBERIES?

Chart 5.7



Source: Danmarks Nationalbank's retailer survey, 2013.

BENEFITS OF CARDS PAYMENT OVER CASH PAYMENTS Chart 5.8



Note: The chart shows the percentage of retailers pointing to the respective benefit as the most important one when a customer pays by card rather than paying cash. Only retailers with staffed checkouts at points of sale are included in the chart.
Source: Danmarks Nationalbank's retailer survey, 2013.

5.4 NEW PAYMENT SOLUTIONS

In addition to the part of the survey related to traditional methods of payment, retailers were also asked a number of questions about their wishes and expectations of new solutions. In general, few retailers have reflected on this issue, and those who have are predominantly the largest ones. Accordingly, the following review of retailer responses should be interpreted with some caution.

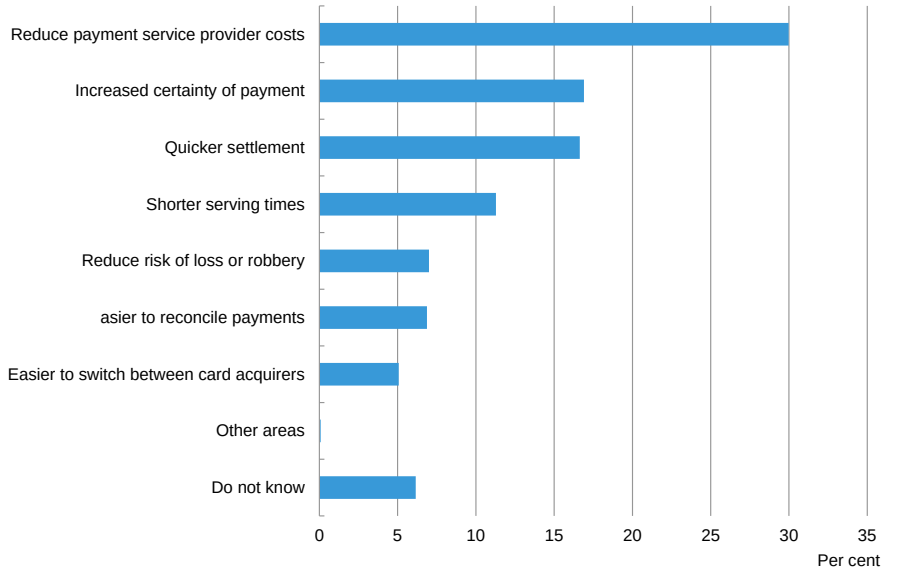
Wishes for improvements

Firstly retailers were asked about their wishes for new payment solutions. Specifically, they were asked to indicate the respects in which they prefer new solutions to bring improvements. Just under one third of the retailers responded that the most important factor was for new payment solutions to help reduce their payment service provider costs, cf. Chart 5.9. An industry breakdown shows that this is the primary demand across all industries, cf. Chart 5.10.

About one in six retailers also indicate that new payment solutions should contribute to quicker settlement. This is mainly a wish among small and medium-sized retailers. The ongoing modernisation of the Danish payments infrastructure will enable solutions with settlement times shorter than the current ones. Especially when immediate transfers on a 24/7 basis become possible from the end of 2014.

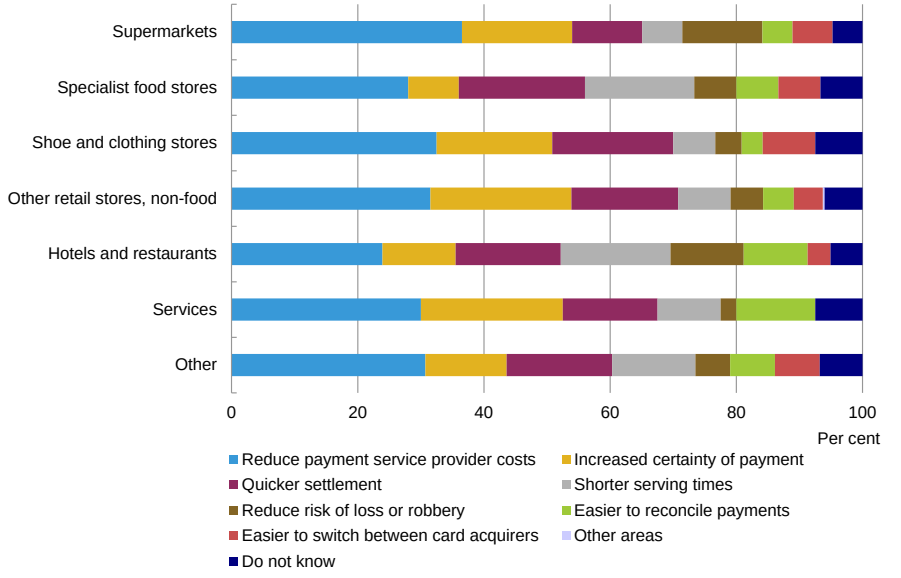
The same percentage of retailers also specify increased certainty of payments as their main wish for improvement. According to another survey question, retailers consider certainty of receiving payments for sales as the key feature of a payment solution. When immediate transfers become possible, retailers will achieve this certainty by seeing the funds credited to their account before a product is released to the customer.

IMPROVEMENTS WHEN USING NEW PAYMENT SOLUTIONS — Chart 5.9



Note: The chart shows the percentage of retailers pointing to the respective improvement as the most important one of a new payment solution.
Source: Danmarks Nationalbank's retailer survey, 2013.

IMPROVEMENTS WHEN USING NEW PAYMENT SOLUTIONS, BROKEN DOWN BY INDUSTRY — Chart 5.10



Note: The chart shows the percentage of retailers pointing to the respective improvement as the most important one of a new payment solution. The breakdown of retailers by industry is described in Box 5.1.
Source: Danmarks Nationalbank's retailer survey, 2013.

Slightly more than 10 per cent of the respondent retailers state that they prefer new payment solutions to lead to shorter serving times. This wish is especially pronounced among Specialist food retailers, who primarily receive small payments and serve a large number of customers every day. This is also ranked as the most important potential improvement among a relatively large number of payees in the Hotels and restaurants industry, primarily cafés, bars, etc.

Other potential improvements of existing payment solutions are deemed to be less important by retailers, including a wish to make it easier to switch between acquirers of payment instruments, e.g. cards. In general, payees, especially small retailers, seem to have limited focus on the choice of acquirer. This appears from retailer responses on what the key factor in their choice of acquirer is, cf. Box 5.3.

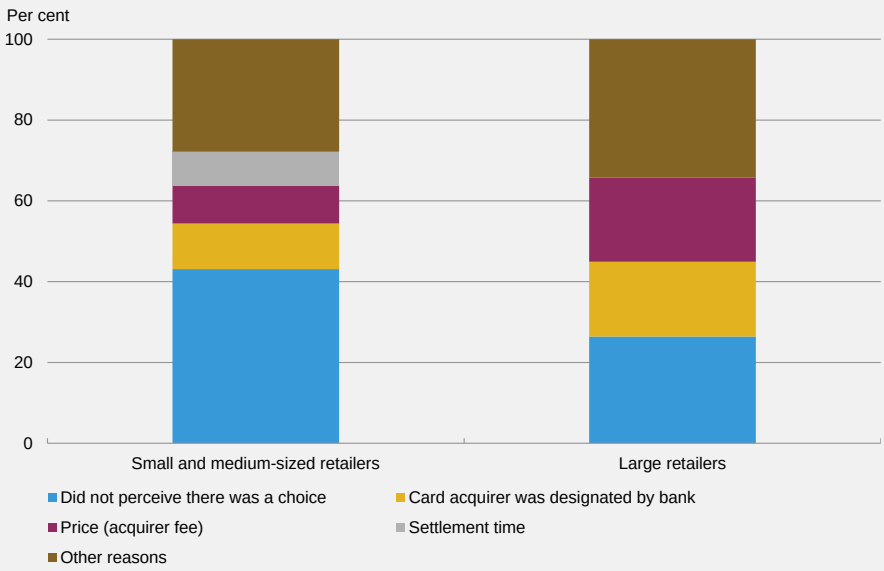
RETAILERS' CHOICE OF CARD ACQUIRER — Box 5.3

The participants in the retailer survey were asked about their reason for choice of card acquirer. Nets is the only Dankort acquirer, while retailers accepting payments by international cards have a choice between various card acquirers, e.g. Nets' subsidiary Teller as well as Swedbank, Handelsbanken, Nordea and Valitor.

When asked about the key factor in their choice of international card acquirer, a large percentage of retailers responded that they did not perceive there was a choice, cf. Chart 5.11. This was particularly the case for small and medium-sized retailers. Most of these have chosen Teller, the largest acquirer of international cards in Denmark.

The largest retailers tend to include the size of the acquirer fee as a factor when deciding on a card acquirer to a greater extent than small and medium-sized retailers. Small and medium-sized retailers, for their part, look at the payment settlement time. The reason why large retailers do not specify the payment settlement time as a key factor in their choice of card acquirer could be that several card acquirers offer them short settlement times already.

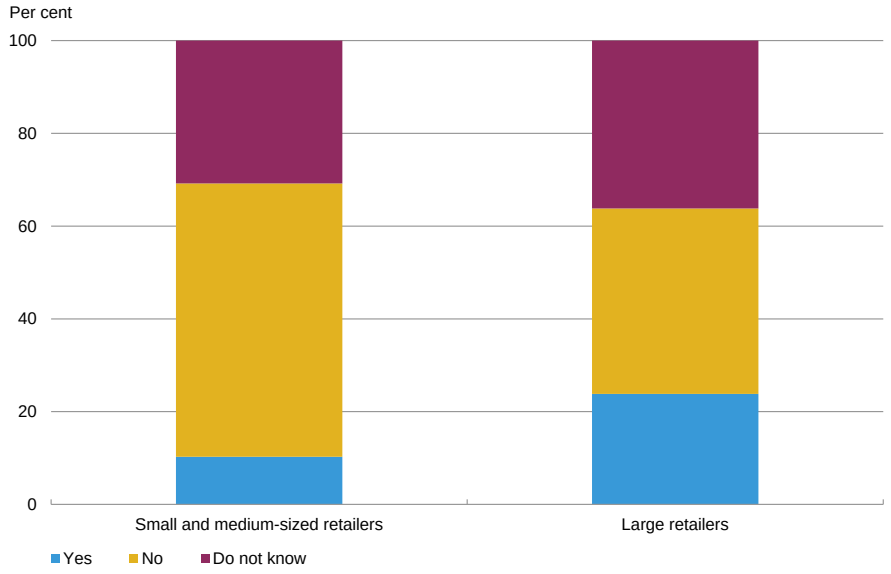
KEY FACTOR IN CHOICE OF CARD ACQUIRER — Chart 5.11



Note: Other reasons include retailers' expectations of card acquirers' operational reliability and cash system, which could be an industry solution with a predetermined acquirer. Large retailers are payees with an annual turover exceeding kr. 150 million. Only retailers with staffed checkouts at points of sale are included in the chart.
Source: Danmarks Nationalbank's retailer survey, 2013.

As a measure of the importance of achieving these improvements, retailers were also asked whether they would contribute to the financing of new payment solutions, given that otherwise these would not be launched. Most of the retailers responded that they did not wish to participate in covering the costs of new solutions, cf. Chart 5.12. This especially applies to small and medium-sized retailers, while a larger percentage of large payees are positive towards the idea of co-financing new solutions.

DO RETAILERS WANT TO CONTRIBUTE TO THE FINANCING OF NEW PAYMENT SOLUTIONS? Chart 5.12

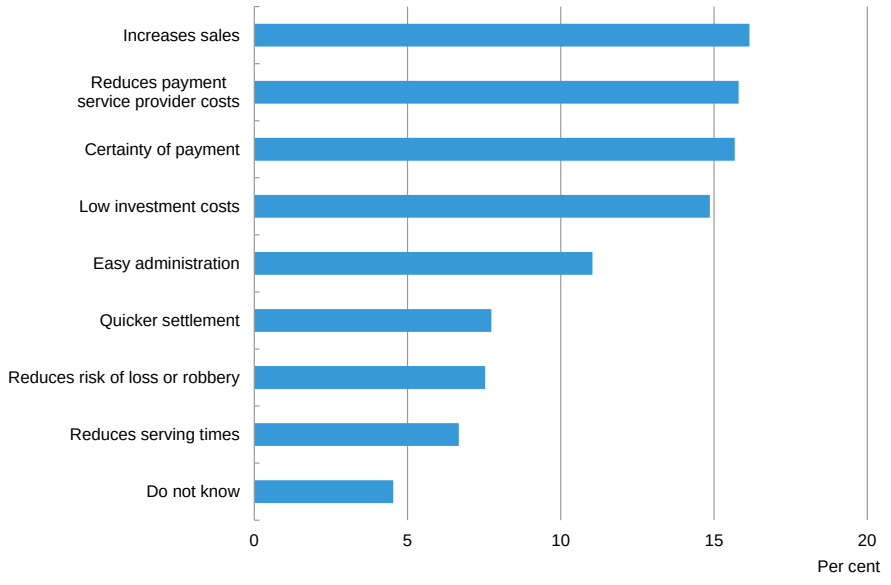


Note: The chart shows the distribution of retailer responses to the question of whether they are willing to contribute to the financing of new payment solutions resulting in their requested improvements, given that these solutions will otherwise not be introduced. Large retailers are payees with an annual turover exceeding kr. 150 million. Only retailers with staffed checkouts at points of sale are included in the chart.
Source: Danmarks Nationalbank's retailer survey, 2013.

Key factors in terms of new solutions

Secondly retailers were asked about key factors when they are considering new payment solutions. Assessed on the basis of retailer responses, no one factor stands out above others, cf. Chart 5.13. Quite a few retailers indicate that a new payment solution should contribute to increased sales. In order for this to be fulfilled, the solution should be prevalent and popular among consumers. If competitors are already offering the solution in question, this may provide a further incentive for retailers to launch a new payment solution.

KEY FACTOR WHEN RETAILERS ARE CONSIDERING A NEW PAYMENT SOLUTION Chart 5.13



Note: The chart shows the percentage of retailers pointing to the factor in question as the most important one when considering a new payment solution.
Source: Danmarks Nationalbank's retailer survey, 2013.

A number of retailers also state that their main concerns are payment service provider costs and certainty of receiving payment. If a new solution involves higher costs for acquirers or increases the risk of payment, retailers will be hesitant to embrace the solution. This ties in with retailer responses to other survey questions that are not presented here.

Finally, according to the same percentage of retailers, it is decisive that investment costs are low. If a new payment solution is expensive to roll out, these retailers will tend to reject it. A breakdown of retailers by size shows that this is primarily a key factor among small and medium-sized retailers, while such costs are of less importance to large retailers.

Expectations of new solutions

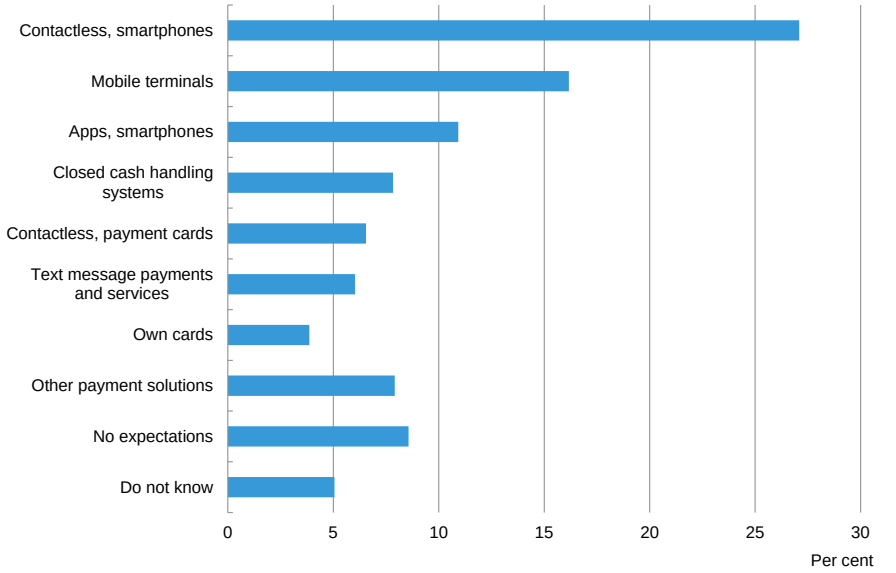
Thirdly the retailer respondents were asked to specify the new payment solutions that account for their highest expectations within a span of 3-5 years. Retailers were offered a number of new solutions, described in Box 5.4.

POTENTIAL NEW PAYMENT SOLUTIONS — Box 5.4

- *Contactless payments via a payment card*. Payments by a smartcard that is swiped by a reader, such as the Oyster card in London or the Danish Rejsekortet.
- *Contactless payments via a smartphone*. Payments by smartphone with an embedded or attached chip used as a contactless card.
- *Closed cash handling systems*. Cash systems that do not allow sales assistants access to banknotes or to dispense change.
- *Self-service checkouts and vending machines*. Unstaffed checkout stands where customers scan their purchases themselves or choose them in a vending machine.
- *MPOS terminals*. A device connected to a smartphone or tablet, enabling these to function as a card terminal.
- *Text message payments and services*. Payments via text message, settled over the telephone bill or the customer's bank account.
- *Smartphone apps*. An app downloaded to a smartphone, where the user links one or more cards. Subsequently the app can be used for purchase of goods and services from a single payee.
- *Own payment cards*. Payment cards issued by a retailer or other payee, such as fuel cards, store cards and loyalty cards.
- *Prepaid cards and gift vouchers*. Card that may be used in one or several stores, issued for a prepaid amount.
- *Coupons*. Electronic discount coupons received via mobile phone and presented or scanned along with the purchase.

Contactless payments via smartphone top the list of retailer expectations, cf. Chart 5.14. In general, retailers highlight solutions involving smartphones, including mobile terminals and app-based solutions. Expectations of the latter are particularly high in the industry of Other, cf. Chart 5.15, comprising various types of payees selling tickets or other services to regular customers.

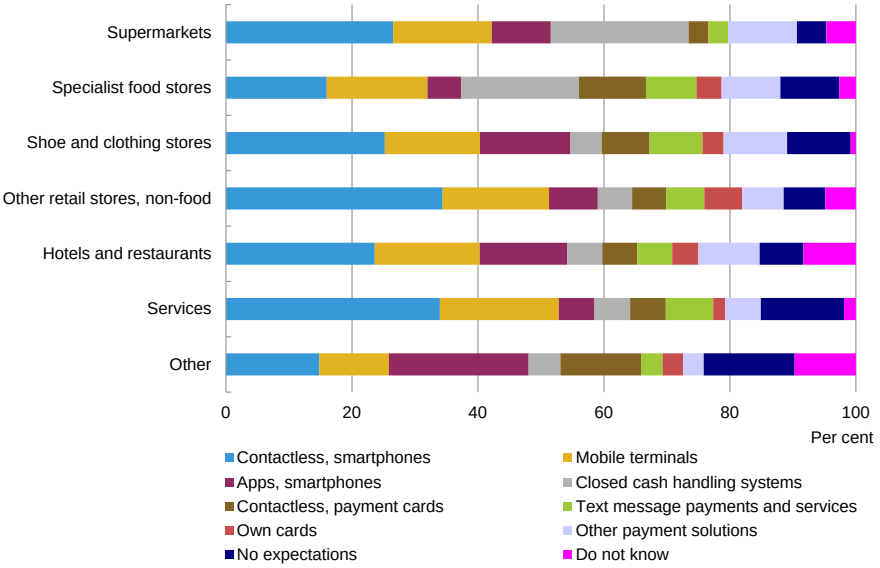
NEW PAYMENT SOLUTIONS FOR WHICH RETAILERS HAVE THE HIGHEST EXPECTATIONS — Chart 5.14



Note: The chart shows the percentage of retailers pointing to the solution in question as the solution for which they have the highest expectations within 3-5 years. Other payment solutions are self-service checkouts and vending machine, prepaid cards and gift vouchers and coupons.
Source: Danmarks Nationalbank's retailer survey, 2013.

Quite a few retailers also point to closed cash handling systems as the payment solution for which they have the highest expectations, especially retailers in the Supermarkets and Specialist food industries. As described in Box 5.2, relatively few retailers, mainly large ones, have introduced these systems. In other industries, fairly few payees highlight closed cash handling systems.

NEW PAYMENT SOLUTIONS ACCOUNTING FOR THE HIGHEST RETAILER EXPECTATIONS, BROKEN DOWN BY INDUSTRY — Chart 5.15



Note: The chart shows the percentage of retailers pointing to the solution in question as the solution of which they have the highest expectations within 3-5 years. The breakdown of retailer by industry is described in Box 5.1. Other payment solutions are self-service checkouts and vending machines, prepaid cards and gift vouchers and coupons.
Source: Danmarks Nationalbank's retailer survey, 2013.

Contactless payments

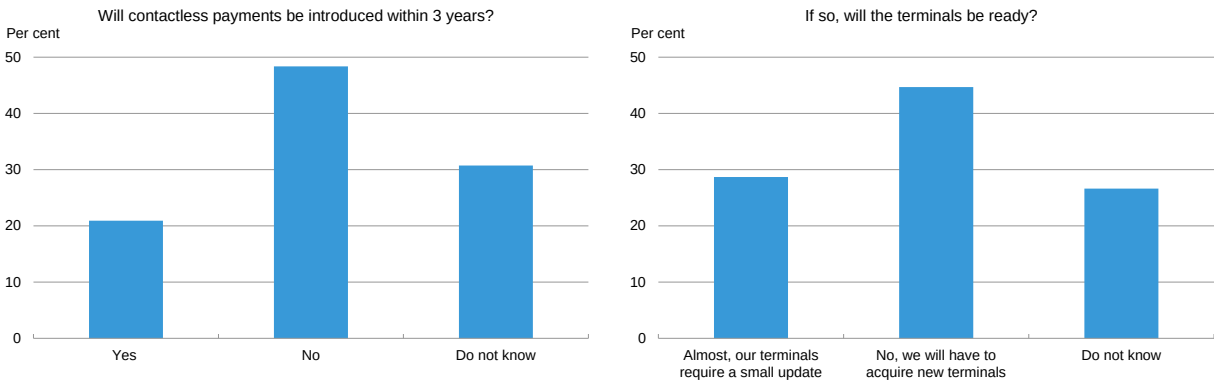
Finally, retailers with staffed checkouts at points of sale were asked a number of questions about payments using contactless technology. Among other things, they were asked if their existing card terminals could already handle contactless payments, including whether this would require only minor software updates. Retailers who are not ready for contactless technology were also asked if they were planning to introduce this technology within the next three years.

Although retailers have the highest expectations of contactless payments, only about 20 per cent seem to be planning to accept this type of payments within the coming years, cf. Chart 5.16 (left). Of this percentage, about half predict that they will have to acquire new terminals, cf. Chart 5.16 (right). Broken down by industry, the percentage of retailers that are planning to introduce contactless payments is highest among Supermarkets.

In general, retailer responses to these questions should be interpreted with caution. In practice, retailers' views of contactless payments must be assumed to depend on whether or not consumers have access to payment which supports use of this technology. If, at some point, large-scale roll-out of contactless chip payment cards for widespread use is launched, this will probably speed up retailer preparations for accepting this type of payments.

Moreover, Danish retailers are currently replacing terminals in order to meet international security standards. In this process, retailers will typically be offered terminals that – with relatively modest updates – will be able to handle contactless payments. According to estimates, about one third of all card terminals will be ready for contactless technology at the turn of the year, possibly after a remote terminal update.

ARE RETAILERS PLANNING TO INTRODUCE CONTACTLESS PAYMENTS WITHIN 3 YEARS? IF SO, CAN THEIR EXISTING TERMINALS BE USED? Chart 5.16



Note: The left-hand chart shows the percentage of retailers planning to introduce contactless payments within 3 years. The right-hand chart shows the extent to which the terminals of the retailers planning to do so are ready for contactless payments.
Source: Danmarks Nationalbank's retailer survey, 2013.

6. Assessment of New Payment Solutions

6.1 INTRODUCTION AND SUMMARY

As far as possible, a country's payment solutions should have low costs, be safe and reliable, facilitate quick and timely payments and offer payment methods that are widely available. Moreover, they should meet other consumer requirements and wishes, taking into account the added value of these requirements and wishes and the profitability of providers.

This chapter assesses the main types of new payment solutions described in Chapter 3. The primary focus is on the pros and cons to consumers and retailers relative to traditional methods of payment. It should be emphasised that the objective is not to rank the individual solutions.

Most of the new payment solutions designed for payments at point-of-sale can be expected to reduce the use of cash. This will lower the social costs of payments, since cash payments are typically associated with higher resource consumption for all parties involved, compared with electronic payments.

On the other hand, these solutions might also bring new types of risk of fraudulent use and operational disruptions. These risks are not analysed in detail in this chapter, but they are important in terms of an overall assessment of new solutions. In some cases, payment innovations may also contribute to reducing risks.

Several of the new solutions may help to reduce serving times or otherwise provide time savings to consumers and retailers. However, few new solutions aim to improve security and those that do typically result in a more cumbersome payment process.

Moreover, individual payment solutions have different pros and cons, basically reflecting that the solutions do not target the same payment situations and user segments and, at the same time, explaining why ranking of the solutions serves no purpose.

6.2 CRITERIA

In order to assess a country's payment solutions, criteria need to be defined for assessing the solutions. Appendix 4 describes the criteria considered significant by the Payments Council. These criteria are:

- *Costs*. The payment solutions used should have low social costs. These costs are the overall resource consumption of all parties involved, i.e. payment service providers, consumers and payees. The resource consumption comprises the parties' time consumption, computer-time consumption, depreciation of relevant equipment, etc.

- *Security and reliability*. As far as possible, a country's payment solutions should be secure from fraudulent use and limit the risk of loss for the parties involved. Moreover, frequent operational disruptions should not occur, e.g. due to defective terminals or payment instruments. Finally, confidence in providers' booking of payments is fundamental.
- *Speed and timeliness*. Far from all payments are time-critical, and all payment instruments need not enable quick settlement of the parties' outstanding accounts. But the payer and the payee should have access to an efficient method of payment which can be used for immediate exchange of funds when required, e.g. when larger amounts are paid.
- *Availability*. Just as all payment instruments need not offer quick settlement, they should not necessarily be available to all consumers. However, all consumers should have access to a method of payment that can be used under reasonable conditions. This also entails that the consumer knows how to use the method of payment in a safe and secure manner.
- *Other consumer requirements and wishes*. Finally, users, i.e. consumers and payees, may have other requirements and wishes in relation to payment solutions that should possibly be met. In an assessment of these requirements and wishes, the profitability of these solutions for providers should also be considered.

6.3 ASSESSMENT

The following sections describe a number of pros and cons of the main types of new solutions reviewed in Chapter 3. The primary focus is on the implications for consumers and retailers. As already mentioned, the solutions are not ranked, either among themselves or in relation to existing methods of payment.

A common aspect of the solutions designed for payments at points of sale is that they may reduce the volume of cash payments, thereby lowering the costs of cash handling, which in Denmark have been calculated at an annual costs of just under kr. 6 billion.[1] Initially, this will affect only the variable costs of cash handling.

Solutions based on new technologies for payments may introduce new types of risk of fraudulent use and operational disruptions – especially because the instruments used, e.g. smartphones, are typically designed for purposes other than payments and therefore do not have the same security features as other payment-related equipment.

On the other hand, new technologies also facilitate the introduction of other types of protection against these risks, such as new methods of payer verification. The following review does not present a detailed analysis of the risks of new solutions, since such analysis is beyond the mandate of this report. However, basically, these risks should be included in an overall assessment.

Furthermore, it is also important to establish who will bear the loss of fraudulent use of new payment solutions. This is governed by the liability provisions of the Payments Services Act, depending, inter alia, on whether a PIN is used. Moreover, the charge-back provisions of the Act for online purchases also apply to the new solutions described in Chapter 3.

Still, uncertainty may linger as to the implementation of and compliance with liability and charge-back provisions when it comes to new solutions. Two reasons are the limited use of these solutions so far and

[1] See Danmarks Nationalbank, *Costs of payments in Denmark*, 2011.

the limited jurisprudence established in this regard. If the solutions become more prevalent, it will become increasingly decisive to clarify the provisions where clarification might be lacking.

Main type 1: Contactless technology

A benefit of contactless technology is that it may reduce the serving time, especially if use of this technology does not require a PIN or receipt. Contactless technology without a PIN is typically used for small payments, while a PIN is required for larger amounts.

The payment time is a resource cost – for both consumers and retailers. As far as consumers are concerned, it is a cost not just for the payer, but also for the people waiting in line to pay. Contactless technology is particularly well-suited when retailers want to serve consumers quickly to limit the waiting time.

The potential benefits of contactless technology – e.g. in the form of shorter payment times – should be seen in the context of the costs of roll-out. These costs primarily comprise costs of issuance of instruments, such as cards to be used for contactless payments, and terminals to receive this type of payment.

As described in Chapter 3, Danish retailers are replacing their card terminals. According to providers, several of the new terminals require only a minor software update to be ready for contactless payments. At the same time, the terminals installed have also helped to reduce serving times for conventional card payments.

Providers also point out that contactless technology is likely to reduce the wear and tear of terminals and that lower maintenance and terminal cleaning costs can be expected. Moreover, contactless technology without the use of a PIN may be hygienically beneficial as consumers do not touch terminals.

CONTACTLESS TECHNOLOGY – POSSIBLE PROS AND CONS	Box 6.1

Pros:

- Serving times may be reduced.
- Less wear and tear of card terminals.
- With no PIN for small amounts, the risk of having the PIN compromised is reduced.
- No touch of the terminal improves hygiene.

Cons:

- Issuance of instruments based on contactless technology entails costs.
- Replacement or updating of terminals is associated with costs.
- Fraudulent use is made easier when no PIN is required.

Experience from other countries shows that contactless technology without the use of a PIN does not necessarily increase the risk of fraud. The main reason is that this type of fraudulent use is not sufficiently tempting, as only small amounts are involved. Moreover, there will be fewer situations in which the PIN can be fraudulently discovered.

However, contactless technology may entail the risk of new types of fraudulent use that are as yet unknown or seen only to a limited extent, e.g. use of fake scanners. As stated above, this Chapter does not present a detailed analysis of these risks.

Main type 2: mPOS terminals

So far, mPOS terminals have been marketed primarily to small retailers looking to accept card payments. For these payees, mPOS terminals may bring savings, since sign on fees are typically moderate, while the fee for each payment is relatively high.

Moreover, concluding an agreement with a mPOS terminal provider is described as a relatively simple process. The retailer need not have a separate agreement with a card acquirer and the volume of information to be provided and the number of documents and agreements to be read and approved are relatively limited.

MPOS terminals may also be well-suited for retailers that frequently change their points of sale. But this is not a particular mPOS terminal feature, since several of the card terminals offered today are movable. However, due to their size, mPOS terminals are easy for retailers to bring along.

Moreover, mPOS terminal solutions are typically equipped with supplementary features that are useful to the retailer. Examples include displays of the products sold, preparation of reports on sales, management of discounts and receipts as well as systems for inventory management and bookkeeping.

There are no known studies of the impact of mPOS terminals on payment times. But in large stores in which mPOS terminals may gain increasing prevalence, they may help to reduce serving times, for instance if they are used to process payment on the shop floor, i.e. away from the checkout.

MPOS TERMINALS – POSSIBLE PROS AND CONS	Box 6.2

Pros:

- Entering into an agreement with a mPOS terminal provider is simple.
- The solution is well-suited for retailers with changing points of sale.
- MPOS terminals may be equipped with supplementary features in addition to receiving payments.
- Serving times may be reduced by serving customers away from the checkout.
- Private individuals may receive card payments.

Cons:

- The level of security and operational reliability may be lower than for conventional card terminals.

As opposed to traditional acquirers, mPOS terminal providers typically do not require payees to be registered businesses. For example, iZettle in Denmark does not require the payee to have a CVR (business registration) number. This enables private individuals to accept card payments via a mPOS terminal.

Transactions on the first mPOS terminal versions were carried out by swiping the magnetic strip of the card, authorised by the cardholder's signature on the display of the smartphone or tablet, resulting in a lower security level than by use of a chip and PIN solution. Since then, mPOS terminals have been launched that comply with the same security standards as conventional card terminals.

Other than that, mPOS terminals are subject to the same basic risks as other smartphone-based solutions, see above. For example, smartphones may be infiltrated by downloads of unauthorised

software. Moreover, in order for the solution to work, the smartphone needs a network connection and power.

Main type 3: Online banking solutions

Online banking solutions are often considered to be a secure solution for online payments. The reason is that this type of solution is based on strong customer verification, with a new code for each payment as in the Danish NemID setup. Strong customer verification is in compliance with international recommendations for secure online payments.[1]

Measures such as strong customer verification tend to slow down payment times. For online purchases, this is a resource cost only for consumers. Online retailers, for their part, achieve greater security, although typically at the expense of increased risk that the consumer will give up on the purchase, since payment is cumbersome.

Online banking solutions may also reduce the retailer risk through automatic balance check. When paying via online banking facilities, consumers usually cannot spend more that the balance in their account plus any undrawn part of a potential overdraft facility. This is different from payments by Dankort where balance check is not performed.

Moreover, when online banking solutions are used, consumers avoid entering their card details for online purchases. As described in Chapter 4, concern that these details may be used fraudulently is the main reason why some consumers refrain from online shopping. To these consumers, the possibility of payment via online banking facilities may provide the security they need.

A drawback to existing online banking solutions is that they do not facilitate cross-border payments, because they are national solutions that do not involve banks in other countries. For this type of payment, consumers instead need to resort to other methods of payment such as international cards or online-based accounts, see below.

ONLINE BANKING SOLUTIONS – PROS AND CONS	Box 6.3
Pros: • Strong customer verification reduces the risk of fraudulent use. • Consumers' ability to pay is certain. • Consumers avoid entering their card details for online purchases. Cons: • Measures related to online banking solutions may slow down payment times. • Current solutions do not facilitate cross-border payments.	

Main type 4: Online-based accounts

Online-based account solutions are usually three-party systems. Unlike online banking solutions, these solutions may be used for cross-border payments. One example is PayPal, which may be used in practically all countries.

[1] See European Central Bank, *Recommendations for the security of internet payments*, January 2013.

Another benefit of online accounts is that – like for online banking solutions – consumers avoid entering their card details for online purchases. Moreover, online-based accounts may be used for purchases that, for some reason or other, consumers do not want to appear on their account statement from the bank.

Some see online accounts as a more simple method of payment than other solutions. When connecting to PayPal, for example, the consumer needs to provide a number of details and attach a payment card. Subsequently, payment is made by entering an email address and a code, which does not have to be changed with each payment.

On the other hand, consumers may tend to forget their code, possibly because they do not use the solution in question very often. Moreover, they potentially have to spend time transferring funds to the account and those who have lost or replaced their payment card must attach the new card to their account with the provider.

Online-based accounts may also be used for transfers between private individuals. For instance, PayPal offers a service for transferring funds between accounts by entering the payee's email address. The transfer can be made via a smartphone, tablet or computer allowing access to PayPal and is completed immediately.

ONLINE ACCOUNTS – PROS AND CONS	Box 6.4

Pros:

- Some consumers see online-based accounts as a simple method of payment.
- Some online-based account providers offer cross-border payments.
- Consumers avoid entering their card details for online purchases.
- Online-based accounts may be used for transfers between private individuals.

Cons:

- Online-based accounts are typically not based on strong customer authentication.
- Transfering funds to the online account may be time-consuming.

Main type 5: Text message payments

Often, text message payments can save both payers and payees time. Payees need not offer point of sale transactions and, therefore, save payroll costs. If ticket sales are involved and the alternative is ticket vending machines, payees may also save on machine operating and maintenance costs.

Payers, for their part, save time because they need not be in a specific location to make the payment. A typical example is payment for public transport fares. The consumer can make this payment while waiting for the bus or train or at some other time that is convenient to him or her.

Usually text message payments are protected only by the telephone PIN. This PIN is regarded as relatively weak, i.e. easy to break, and, moreover, it may be deactivated. However, text message payments are typically used for small amounts only, and the agreement with the provider may specify a daily limit.

Furthermore, text message payments enable persons without payment cards to make electronic payments. This is relevant mainly to children and adolescents, since only a modest percentage of Danish adults do not have at least one payment card, cf. Chapter 2.

TEXT MESSAGE PAYMENTS – PROS AND CONS	Box 6.5

Pros:

- Often, text message payments save payers time.
- Payees have fewer costs than for point of sale transactions.
- Payees may save on machine operating and maintenance costs.
- Text message payments enable children and adolescents to make electronic payments.

Cons:

- A telephone PIN, if any, is the primary protection against fraudulent use.
- The mobile phone needs power and a network connection.

Main type 6: Payments using apps

A number of the pros and cons of text message payments also apply to app-based payments. Moreover, apps are better suited than text message solutions for the purchase of a specific product or service. For instance, DSB Billet App (ticket app) enables consumers to search for their journey, select the type of seat and number of tickets they want and reserve seats.

The payment situation typically determines whether a consumer finds it more convenient to use an app or a text message. For frequent purchases, it may be quicker to enter a short code and send a text message. In other cases, consumers may prefer to pay by opening an app and completing the steps indicated.

From the payee's point of view, apps offer different opportunities than text message solutions when it comes to increasing sales. For instance app-based solutions may be used to manage loyalty programmes, accept orders, notify consumers of the nearest point of sale, provide special offers, etc.

For app-based payments, the telephone PIN is often the only security measure in place, resulting in risk of fraudulent use. But this risk is no greater than for online payments using the Dankort for which there is no requirement of a PIN. If the app enables the purchase of expensive items, a PIN may be added.

If a payment card is linked to an app, consumers should be aware that they need to block the card if they lose their smartphone. This also applies if the card is registered to a digital wallet, see below. To many people, this is undoubtedly a new measure that they need to be made aware of.

PAYMENTS USING APPS – PROS AND CONS — Box 6.6

Pros:

- Often, app-based payments save consumers time.
- Payees have fewer costs than for point of sale transactions.
- Payees may save on machine operating and maintenance costs.
- Apps are well-suited for the purchase of a specific product or service.
- Apps may be used for managing loyalty programmes, etc.

Cons:

- The security level may be lower than for other payment solutions.
- The smartphone needs power and a network connection.
- Linked cards must be blocked if the smartphone is lost.

Main type 7: Digital wallets

A digital wallet enables consumers to store multiple payment cards in one place and have them registered online or on their smartphones. This is a convenient solution for consumers who, in theory, need not bring their physical wallets when going shopping or have their payment cards available when shopping online.

With an online digital wallet, consumers need only to log in and approve the payment. To that end, they typically enter an email address and a PIN. Digital wallets may also come with a feature that automatically loads consumers' delivery details.

Using this type of solution, as opposed to conventional card payments, consumers need not enter their card details for online payments. These details are registered by the digital wallet provider and they are not disclosed to any third parties in connection with the payment.

In retail stores, digital wallets will enable payment via smartphone and contactless technology. This means that it will be possible to realise some of the benefits specified above, such as shorter payment times, less wear and tear of terminals, improved hygiene, etc. Moreover, providers can save on payment card production costs.

DIGITAL WALLETS – PROS AND CONS — Box 6.7

Pros:

- Consumers may have all their cards registered electronically in one place.
- Consumers avoid entering their card details for online purchases.
- This solution enables payments via mobile phone and contactless technology.

Cons:

- The security level may be lower than for other payment solutions.
- The smartphone needs power and a network connection.
- Registered cards must be blocked if the smartphone is lost.

Digital wallets on smartphones often have to be opened using a PIN, and a PIN may be required to make the actual payment. This reduces the risk of fraudulent use and, in principle, facilitates the introduction of a PIN that does not need to be entered into a terminal for contactless payments.

Main type 8: Prepaid cards

Prepaid cards come in different varieties. For instance, some cards are bearer cards, while others are personal and can be reloaded i.e. topped up when the funds are depleted. The pros and cons of the different varieties depend on the type of card.

Prepaid cards often have shorter payment times than other types of card, especially prepaid cards based on contactless technology and used without a PIN. At the same time, as already mentioned, payment times for conventional card terminals have been reduced with the introduction of new terminals.

Moreover, according e.g. to a study conducted by the Dutch central bank, these cards may have lower provider costs than, say, debit cards.[1] This reason is that prepaid card payments are usually handled offline, entailing that the card is not validated by a central server and that payments are not recorded individually.

On the other hand, prepaid cards may also have a number of drawbacks. Firstly, consumers have to spend time acquiring cards or transferring funds to reload the cards. If the specific card type is not reloadable, card production costs also have to be included.

If bearer prepaid cards are involved, consumers also run the risk of losing their cards. This is similar to the risk of losing a banknote. However, prepaid cards tend to be issued for relatively small amounts. Like cash, this type of card may be used for purchases that consumers do not want to appear on their account statement from the bank.

PREPAID CARDS – PROS AND CONS	Box 6.8

Pros:

- Certain prepaid cards are associated with low payment times.
- Providers have lower variable costs than for other types of cards.

Cons:

- Consumers need to spend time acquiring cards or transferring funds to the card.
- The residual value of lost prepaid cards may be lost.
- If the card cannot be recharged, the card production costs are higher.

Main type 9: Overlay services

Overlay services can be seen as a variation of online banking solutions and, accordingly, have many of the same pros and cons. For instance, if this is required to log into the consumer's online banking facility, overlay services support strong customer verification. Moreover, an overlay service may be designed to facilitate cross-border payments.

When using overlay services, just as for online banking solutions, consumers also avoid entering their card details for online purchases. On the other hand, consumers need to disclose their online banking

[1] See Hans Brits and Carlo Winder, Payments are no free lunch, De Nederlandsche Bank, *Occasional Studies*, Vol. 3, No. 2, 2005.

login to a third party, the provider of the overlay service in question, and some people may not feel safe doing that.

In general, this type of solution places high requirements on the measures taken by the third party to prevent fraudulent use. This emphasises the need to regulate overlay service providers as proposed by the European Commission, cf. Box 3.11. Moreover, clear rules are required, inter alia, for liability in the event of fraudulent use and objections.

Moreover, since this solution is based on the disclosure of the online banking login to a third party outside of the usual online banking environment, overlay services may dissuade consumers from being careful when handling this login. Ultimately, this could mean that consumers also become less careful when handling other personal codes, causing the extent of fraudulent use to rise.

OVERLAY SERVICES – PROS AND CONS	Box 6.9

Pros:

- Strong customer verification reduces the risk of fraudulent use.
- Consumers' ability to pay is certain.
- Consumers avoid entering their card details for online purchases.
- Depending on the design of the solution, it may possibly facilitate cross-border payments.

Cons:

- Consumers may not feel safe disclosing their online banking login to a third party.
- Overlay services place high requirements on provider security measures.
- Consumers may become less careful when handling personal codes.

7. Barriers to New Payment Solutions

7.1 INTRODUCTION AND SUMMARY

The preceding chapters have described and assessed various new types of payment solutions. A number of barriers may stand in the way of these solutions. If the barriers in question prevent efficient solutions from becoming generally accepted, this may increase the costs of payments. In many cases, however, the barriers reflect other considerations, such as protecting consumers or maintaining confidence in a country's payment systems.

This chapter presents some of the potential barriers to new solutions identified in the process of preparing the report. It should be emphasised that the list is not exhaustive. Moreover, no analysis is performed of the underlying reasons. A broader assessment of whether to seek to remove a given barrier should obviously include such an analysis.

Distinctions can be made between various types of barriers. Market-related barriers are factors that limit consumers' and retailers' incentives to start using a new payment solution. For example, it is difficult to persuade retailers to introduce a new solution before consumers have embraced it – and vice versa. Typically, both parties must accept the solution simultaneously.

Market-related barriers could also be factors reducing providers' incentives to develop new solutions. For providers, it is essential that new solutions are likely to be profitable, which often means that they must take market shares from existing solutions. This may be more difficult in Denmark than elsewhere due to the immense popularity of the Dankort with consumers and retailers alike.

Another type of barrier relates to the payments infrastructure, elements of which may limit business opportunities, e.g. by preventing access to parts of the infrastructure or allowing access on unfavourable terms only. Such limitations may be well-founded, but if they impede the activities of innovative providers, they may constitute a barrier to new solutions.

A third form of barrier could be statutory provisions supporting the use of existing solutions or making it more difficult to reap the benefits of new solutions. There may also be legislation that imposes relatively strict requirements on providers of new solutions, either in connection with their approval or when they subsequently provide payment services.

7.2 CHARACTERISTICS OF THE MARKET FOR PAYMENT SERVICES

A number of factors in the market for payment services affect the framework conditions for new payment solutions. These factors are:

- *Network effects*. Demand for a given payment solution, such as a particular instrument, is characterised by network effects. This means that the more stores that accept the instrument, the more attractive it becomes for consumers to have it – and vice versa. These effects typically have a

self-reinforcing impact on the prevalence of a payment solution once it has passed a certain level. Examples of Danish products that have been supported by strong network effects are the Dankort and Betalingsservice (direct debit).

- *Large overheads*. Developing and operating payment solutions involves considerable overheads, so a large number of transactions are required for the solution to be profitable. Combined with the network effects, this cost structure means that for a given payment segment, e.g. card payments at points of sale or online payments, the number of existing solutions is often small, from which it can be difficult for new solutions to capture market shares.
- *Need for cooperation.* Typically, providers of payment services need to cooperate in a number of areas. This is particularly true in four-party systems, where providers need to agree on formats for the exchange of payment messages and to lay down rules for shared products in relation to liability for payment obligations, mutual fees and reversal of payments, etc. An example is the cooperation between banks on the core infrastructure in Denmark.
- *Different reactions to fees*. Experience shows that consumers and retailers are not equally willing to accept fees for payment services. While consumers typically react to even small fees by switching to another method of payment or provider, retailers may be less reluctant to accept fees if they are matched by expectations of increased sales or savings in other areas. This is why business models for payment solutions are often based on contributions from retailers only.
- *Legal hierarchy of providers*. The market for payment services is also characterised by a breakdown by different types of providers. This is to ensure that the rights granted to providers match the requirements imposed on them. First in the legal hierarchy are the credit institutions, e.g. banks, which must meet the tightest requirements and are subject to supervision, but may, on the other hand, accept deposits. Other types of providers are subject to less stringent requirements and consequently do not enjoy the same business opportunities as credit institutions.
- *An underlying need for consumer protection*. For ordinary consumers, it is difficult to understand the risks linked to the various payment solutions and take the necessary steps to prevent fraudulent use. So there is a need for legislation to protect consumers against large losses, unless they have displayed gross negligence or acted fraudulently. Businesses are often better at assessing risks and taking precautions, and for them the terms applying in the event of fraudulent use may to a larger extent be governed by the law of contract.

These factors make a case for supervision or regulation. This applies to network effects and cost structures, which may give a specific solution or its provider a high market share. In addition, the authorities must monitor that cooperation between providers does not limit competition. And finally, legislation must be in place that to some extent protects consumers, while also ensuring that the parties involved – providers, consumers and payment recipients – take precautions to prevent fraudulent use.

At the same time, it is also important to acknowledge the importance of the market forces in a modern, well-functioning payment system. If providers are to have incentives to develop new payment solutions, they must have expectations that such solutions will be profitable. Regulation that prevents providers from making profits will dampen interest in investing in new solutions. So regulation is normally restricted to situations where it is necessary, all things considered.

7.3 MARKET-RELATED BARRIERS

Market-related barriers are factors that reduce consumers' and retailers' incentives to use new payment solutions or providers' incentives to develop new solutions. Many such barriers can be identified, and most of them exist not only in Denmark, but also in comparable countries. Typically they reflect basic characteristics of the market for payment services, as described above.

Network effects

If a new payment solution is to gain a footing, it basically requires that it is accepted by all parties. It is a "chicken-and-egg" situation, in that network effects are typically only seen once the solution has reached a certain level of popularity with consumers and retailers alike. Until then, both parties will be hesitant to embrace it. So when launching new payment solutions, providers often target consumers and retailers simultaneously.

Several providers of new payment solutions have found it difficult to overcome this problem. A Danish example is Mobilpenge, which was introduced in 2012 by Nets and the banks jointly, cf. Box 3.7. According to data from Nets, the use of Mobilpenge is still very limited. This is because it takes time to change consumer payment habits, but also because it has been difficult to get consumers and retailers, respectively, to use the solution when the other party does not use it much.

Consumers

Consumers' readiness to embrace new payment solutions depends on other factors than merely retailer acceptance, including their views on existing solutions. In Denmark, most payments, in both retail and online stores, are made by Dankort, cf. Chapter 2. Among the reasons why consumers prefer the Dankort are that no fees are charged in retail stores and that it can be used virtually everywhere. However, the immense popularity of Dankort with consumers makes it more difficult for new solutions to gain ground.

In addition, convenience is a key factor for consumers when choosing a method of payment, cf. Chapter 4. So it is important that consumers do not perceive a new solution as more cumbersome than existing methods of payment. Moreover, experience shows that fees can make consumers deselect a given solution. In this context it should be remembered that consumers do not normally pay any fees for withdrawing cash. Finally, some consumers may have rooted payment habits that can be difficult to change.

Retailers

In the same way, consumer acceptance is not the only factor determining whether retailers will embrace a new payment solution. As described in Chapter 5, one consideration for retailers is whether the solution can be expected to boost sales. To a large extent, this depends on the other solutions available. When a payment solution such as the Dankort is in widespread use and preferred by a large share of the population, a new payment solution is not likely to increase sales much.

It is also important to retailers that they are sure of receiving their payment when selling goods, cf. Chapter 5. In practice this means that it will be difficult for a new payment solution that does not offer retailers a sufficient degree of payment certainty to enter the market. Finally, retailers attach importance

to whether the solution contributes to reducing the fees payable to providers and is inexpensive to introduce. This is particularly relevant for small retailers, cf. the results of the retailer survey.

Providers

For providers, the incentive to develop new payment solutions primarily depends on whether the solution is expected to be profitable. This does not necessarily mean that each individual payment solution must yield a profit, as some providers may have strategic reasons for offering a given solution. For banks, it may e.g. be a question of attracting customers and thereby deposits that contribute to earnings via the interest margin, i.e. the spread between lending and deposit rates.

As regards the Dankort, the financing model may have been a separate barrier to development of the card. Previously, the model entailed that Nets and the banks could claim only half of the Dankort-related costs – including development costs – from retailers, cf. Box 2.3. With the new agreement between Nets and the Danish Chamber of Commerce, retailers are gradually to pay a larger share of the costs and all by 2018, so that the future framework for financing and development of the Dankort is now in place.

The cost structure and the size of the country's population may also be barriers to new payment solutions. As previously stated, large development costs mean that a certain volume of payments is required before the solution becomes profitable. In this respect, providers in Denmark may be faced with the problem that, due to the population size, the upper limit on the volume of payments is lower than in many comparable countries. A larger number of payments can be achieved by also offering the solution in other countries, but that may also involve a number of challenges.

7.4 INFRASTRUCTURE BARRIERS

Providers may also come up against barriers in the payments infrastructure. These may include restrictions on access to various parts of the infrastructure or terms and conditions for participation that have implications for competition. There may be weighty reasons for having these obstacles, such as a wish for secure and stable payment systems, but if they impede the activities of innovative providers, they may constitute a barrier to new solutions.

Limited access to key payment systems is an example of an infrastructure barrier. These systems have typically been designated under the Settlement Finality Directive[1], which protects the settlement of payments in the event of a participant's default. In practice, the Directive allows only banks to participate in such systems. Consequently, e-money and payment institutions, etc. must settle their payments via banks. In Denmark, Danmarks Nationalbank's payment system, Kronos, and the Sumclearing, which is owned by the Danish Bankers Association, are designated under the Directive.

Another example could be that customers are prevented from giving third parties access to their payment accounts, typically bank accounts. Not only overlay service providers, but also e.g. telecom companies and non-bank card issuers might find such access useful. Like companies offering overlay services, these providers may have a wish to initiate payments from or reserve funds in customer bank accounts. As described in Box 3.11, the European Commission has presented a proposal to regulate third-party access to bank accounts.

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[1] Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and securities settlement systems.

A third example is restrictions on access to card terminals. Card terminals must meet the security requirements determined by the card companies. The international card companies have common requirements for card terminals, and in Denmark terminals must also be certified by Nets if they are to be used for Dankort payments. This means that recertification is required if retailers wish to accept a new payment solution via the existing terminals. This could be a barrier since providers of new solutions typically do not have the option of installing their own terminals.

Furthermore, the terms of competition resulting from Nets' key role in Danish payment systems and its relations with Danish banks could also constitute an infrastructure barrier. According to other providers, this gives Nets a number of advantages, thereby making it more difficult for competitors to gain a foothold in the Danish market. The problems for other providers are amplified by network effects and the cost structure, i.e. the considerable overheads linked to providing payment services, cf. above.

One area in which other providers find it difficult to compete with Nets is the market for acquiring card payments. Nets is the only acquirer of Dankort payments, and its subsidiary Teller is the largest acquirer of payments by international cards in Denmark, cf. Chapter 2. Other acquirers point out that various factors impede their competition with Teller, cf. Box 7.1. Competition in this area may support the rollout of new solutions in several ways.

POTENTIAL BARRIERS TO COMPETITION IN RELATION TO ACQUIRING CARD PAYMENTS — Box 7.1

Only a handful of actors acquire card payments in Denmark. These are first and foremost Nets, which acquires Dankort payments, and Teller, which acquires the majority of payments by international cards. Besides these, a few other acquirers are seeking to gain market shares, but various factors impede their competition with Teller, especially in connection with point of sale transactions.

One challenge for other acquirers is linked to the collection of payments. Most of the terminals for Dankort payments are equipped with a security chip developed by Nets, which, by default, sends all payments to Nets. This also applies if the acquirer is not Teller. In the latter case, Nets forwards the payments to the relevant acquirer against an agreed fee per payment.

For payments by international cards, it is also possible to circumvent Nets and send the payments to another acquirer than Teller. This can be done by installing terminals that do not contain the Nets security chip, but have been certified by Nets for Dankort payments. Such terminals exist, but are not in widespread use. Another option is to develop an equivalent chip that enables circumvention of Nets, but this involves considerable costs.

Furthermore, some retailers are not aware that there are several acquirers of international cards. That is confirmed by the results of the retailer survey in this report, cf. Box 5.3. Some of these retailers may perceive their acquiring agreements for the Dankort and international cards as a single agreement, without realising that they could choose another acquirer than Teller.

7.5. LEGISLATIVE BARRIERS

Legislative barriers to new payment solutions may take various forms. Some provisions may prevent consumers and retailers from reaping the benefits offered by such solutions, or make the solutions less attractive. Others may support existing solutions. Finally, the requirements imposed on providers of new solutions may be relatively tight, or providers of existing solutions may be offered easier conditions. The following describes some of the potential legislative barriers.

The most important Danish act in this area is the Payment Services and Electronic Money Act, cf. Chapter 2. In accordance with the Payment Services Directive, it includes special provisions for payment instruments that can be used for small payments only, i.e. micro-payment instruments. From a provider perspective this means that some of the Act's general provisions on disclosure requirements, liability rules, etc. have been eased. In general, the rules on micro-payment instruments are assessed to meet the purpose of supporting new solutions.

Prohibition against refusal of cash payments

In Denmark, retailers with staffed checkouts must accept payment in cash, cf. section 56 of the Payments Services Act. This is a Danish provision, i.e. it is not an implementation of the Payment Services Directive. The provision does not apply to certain purchases exceeding kr. 50,000, which may not be paid for in cash, cf. the Anti-Money Laundering Act, or to remote sales, e.g. online sales, or in unstaffed self-service environments. Box 7.2 outlines the historical background to this provision.

The ban on refusing cash payments aims to ensure that consumers who wish to pay in cash, or who have no other option, may use this method. However, it is claimed that this provision is a barrier to new payment solutions. The underlying assumption is that, without this provision, some retailers would refuse to receive cash. This might support a market for new solutions for small payments, which are often made in cash, cf. Chapter 4.

SECTION 56 OF THE PAYMENT SERVICES ACT — Box 7.2

According to section 56 of the Payment Services and Electronic Money Act, retailers with staffed checkouts have an obligation to receive cash payment. This is a separate Danish provision, i.e. it is not an implementation of the Payment Services Directive. The provision is a re-enactment of section 10 of the Act on Certain Means of Payment with no intended amendment to its content.

The ban on refusal of cash payments stems from the Payment Card Act, which entered into force in 1984 and was a response to the banks' rollout of Dankort, cf. Box 2.5. It was to ensure that cash could still be used in all stores in future, despite the expected boom in card payments, including payment by the new Dankort.

One of the underlying reasons is that cash has a special status as legal tender. And unlike payment cards, cash does not require an agreement with a payment service provider or entail costs for e.g. terminals, which may explain why the same rules do not apply to card payments.

When the rule was introduced in 1984, the ban on refusal of cash payments applied within normal opening hours only. With the Act on Certain Means of Payment from 2000, it was expanded to cover all opening hours. On the other hand, it was stipulated that retailers did not have any obligation to receive cash payment for remote sales or in unstaffed self-service environments.

In 2006, a minor amendment was made in the form of a provision in section 2 of the Anti-Money Laundering Act saying that dealers in objects and organisers of auctions were not allowed to receive cash payments of kr. 100,000 or more. A legislative amendment in 2013 has reduced this threshold to kr. 50,000 and increased its scope to include other retailers.

There has also been focus on the implications of this provision for employee safety in retail stores that might be exposed to attempted robbery. Some, but by no means all, retailers have taken steps to reduce the risk of robbery, e.g. by using CCTV, cash-in-transit companies, closed cash systems and guards, cf. Box 5.2. However, the retailer survey shows that only a small percentage of the retailers that are concerned about robberies would actually refuse to accept cash if this was an option.

Rules on fees and surcharging

The Danish rules on surcharging are also laid down in the Payment Services Act and are presented in Box 2.5. As described in Chapter 2, the introduction of the "split model" for physical trade – which prohibits surcharging on debit cards, but not on credit cards – has been followed by a slowdown in the use of credit cards, while use of debit cards has increased. This indicates that the new rules have had the assumed limiting effect on the volume of credit card payments in Denmark.

The fact that retailers may surcharge payments by credit cards could, in principle, constitute a barrier to innovation in the Danish card market. That would be the case if the derived effects on the use of credit cards mean that card companies or issuers decide not to develop their cards, or that they choose to launch new solutions in other countries. If so, this must be assumed primarily to affect new features or services aimed at credit cards, since the split model would seem to support the use of debit cards.

Another key element of the Danish fee and surcharging rules is the distinction between "physical" and "non-physical" trade. The decisive factor is whether the buyer and seller are both present at the point of sale at the same time. In other words, self-service checkouts and vending machines are defined as "non-physical" trade, and for Dankort payments a higher acquiring fee is charged in these situations than when sales are at staffed checkouts. Viewed in isolation, this distinction in the rules reduces the incentive for retailers to install self-service checkouts and vending machines.

As mentioned in Chapter 2, the European Commission has presented a proposal to regulate interbank fees for card payments, which includes a ban on surcharging. The overall impact of such legislation on issuers' and card companies' interest in developing their cards remains to be seen. On the one hand, retailers will no longer be able to surcharge the use of credit cards, which may stimulate the use of such cards. On the other hand, the acquiring fee on credit cards, and hence issuers' earnings per payment, will be lower than at present.

Payment surrogates

The Payment Services Act also regulates "payment surrogates", e.g. electronic 10-clip cards. Such instruments were also comprised by earlier Danish legislation, but are not regulated by the Payment Services Directive. According to providers, the definition of payment surrogates is subject to some uncertainty. As a result, potential issuers spend resources clarifying their legal position, and there is a risk that some of them abandon their projects.

Moreover, some provisions relating to payment surrogates may impede their rollout. One example is the statutory obligation to redeem such instruments, cf. section 39s of the Payment Services Act. This section stipulates that the holder of an electronic claim in the form of a payment surrogate or electronic money is entitled to have the remaining amount redeemed by the issuer, provided that this is done within a year of a given expiry date. No corresponding rule applies to paper-based claims.

The redemption obligation reflects a wish to ensure that consumers can redeem their prepaid funds within a reasonable period of time. But a consequence of the different rules for electronically registered and paper-based claims for goods and services could be that companies choose to issue such claims on paper. In addition, this obligation also applies in cases where issuers, typically for marketing purposes, give consumers a right to goods or services without consideration, and this right has been transferred electronically, e.g. via a smartphone app.

Other acts

Besides the Payment Services Act, other acts may also contain provisions that constitute barriers to new solutions. Examples include the Financial Business Act, which regulates the disclosure of customer information and the consent required, the Act on Processing of Personal Data and the Marketing Act, cf. Box 7.3. Typically, the relevant provisions of these acts are aimed at protecting consumers against various nuisances and misuse, but in some cases they prevent the use of new, enhanced solutions or make it more cumbersome to adopt them.

The Anti-Money Laundering Act is also said to contain provisions that impede the rollout of new payment solutions. This Act, which primarily implements an EU directive, seeks to prevent money laundering and financing of terrorism and imposes a number of administrative requirements on financial enterprises, etc., including payment service providers. Some of these requirements may be particularly burdensome for providers of new solutions. For example, separate acquirer agreements must be concluded for each payment solution that a retailer wishes to offer customers.

OTHER ACTS — Box 7.3

Other acts than the Payment Services Act may also include provisions that constitute barriers to new solutions. This applies to e.g. the Financial Business Act and the rules in the Act on Processing of Personal Data on the use of personal data, cf. sections 117-123 and sections 3 and 5-7, respectively, of the two acts. Overall, these provisions mean that financial enterprises may not disclose information about their customers without consent unless they have "due cause" to do so, a term that is interpreted relatively narrowly.

These limitations on disclosure of personal data may constitute an obstacle to the launch of new payment solutions. That may be the case if there is a wish to add a feature whereby a solution cannot be used for certain purchases on the basis of information about the customer, such as age. If that feature requires consent from the customer, because it requires the use and disclosure of personal data, this could make it more difficult to roll out the solution.

A case in point was when Nets and the banks prepared the launch of Mobilpenge. Retailers had expressed a wish to use the solution to prevent sales of alcohol to under-18s. To do that, Nets would have to validate payment for such purchases against the customer's age. However, the authorities assessed that this would require the customer's consent, and with customer acceptance in mind the feature was left out.

A similar barrier to new solutions could be the customer consent requirements in connection with the disclosure of personal data. Section 123 of the Financial Business Act states that consent must be given in writing or digitally and must be voluntary, specific and informed – and it must be revocable. According to providers, these requirements may in some cases impede the rollout of new solutions.

In addition, there may be provisions in the Marketing Act that stand in the way of new solutions. For example, the Act does not allow advertising material to be sent electronically, unless consent has been given by the recipient. This prevents banks from informing customers of ingoing payments via solutions that they have not signed up for. In addition to reassuring the remitter of the payment, this could also contribute to making more customers sign up.

Glossary

Acquirer fee
A fee payable by the retailer to the *card acquirer* per payment. The fee may be a fixed amount per payment, a percentage of the payment value, or a combination of the two. The retailer may also pay a fixed annual subscription fee to the acquirer, illustrated by the *Dankort*.

App
An application, i.e. a piece of software stored on a *smartphone* or *tablet*. Some apps can be used for payment of goods and services bought from one or more payees. The consumer pays by opening the app and executing a number of steps.

Card acquirer
A provider of payment services, which concludes agreements with retailers on receipt of card payments. An example is Nets, which acquires Dankort payments.

Card scheme owner
A company owning the rights to the card scheme, e.g. Nets, MasterCard or Visa. The company determines the rules for issuing, acquiring and use of the card.

Card issuer
A provider of payment services, e.g. a bank or a retailer, e.g. a retail chain, which issues payment cards for card holders.

Charge-back
Charge-back of an amount withdrawn from a payer's account. In connection with online shopping, consumers have the right to have the payment charged back if the goods are not delivered or are defective, under special Danish provisions laid down in the Payment Services and Electronic Money Act.

Contactless technology
Technology that e.g. enables registration of a payment without any contact between the *payment instrument* and the reader. An example of this technology is Near Field Communication, NFC, which requires the instrument to be swiped close to the reader.

Credit card

A payment card that can be used for buying goods and services and possibly for cash withdrawals on the basis of an approved credit line. For payments by credit card, the money is not withdrawn from the card holder's account until sometime after the payment, typically once a month.

Dankort

The national Danish *debit card*, issued by banks in Denmark. The scheme owner and acquirer is Nets.

Debit card

A payment card that can be used for withdrawing cash and buying goods and services by direct drawing on the card holder's deposit in a bank. The *Dankort* is an example of a debit card.

Digital wallet

A digital wallet contains electronic registration of the consumer's cards or other payment solutions, e.g. *online accounts*. It can be server-based or downloaded as an *app* on a *smartphone* and used in various payment situations.

Electronic money

A monetary value which is stored electronically or magnetically, e.g. on the chip of a payment card or on a server. It is issued against prepayment and can be used as payment for goods and services from payees others than the issuer. Electronic money is often called e-money.

E-money institution

A provider of payment services subject to the Payment Services and Electronic Money Act. E-money institutions may issue *electronic money* and provide *payment services*, but they may not receive deposits.

Four-party system

The set of agreements between the parties of a card system or similar in which the payer and payee do not necessarily have agreements with the same provider of payment services.

Interbank fee

A fee payable by the *card acquirer* to the *card issuer* per payment. The interbank fee may be a fixed amount per payment, a percentage of the payment value, or a combination of the two.

International card

A payment card issued under licence from a foreign card company, e.g. Visa or MasterCard. An international card can be used for cash withdrawals and purchases of goods and services both in Denmark and abroad.

Mobile bank

A mobile bank is an *app* enabling consumers to monitor account transactions, pay bills and transfer funds via a *smartphone* or *tablet*.

MPOS terminal

A device that enables the receipt of card payments by use of a *smartphone* or *tablet*. It may consist of e.g. an accessory, or dongle, which is connected to the smartphone or tablet.

NemID

Common Danish secure online login, which can be used for logging onto private and public self-service solutions, such as online banking.

Non-physical trade

A payment situation where either the payer or the payee is not physically present, cf. the definition of *physical trade*. Examples are online shopping and purchases from vending machines.

Online account

An account used for payment of purchases, e.g. online purchases, and which is based on prepaid funds, possibly via drawings on an attached payment card.

Online banking solution

A payment solution for online shopping, which leads the consumer to his or her online bank for approval of the payment after the usual login, that is by means of *NemID*.

Overlay service

A payment solution for online shopping based on the consumer providing his or her account number and online bank login to a third party, which will then log into the consumer's online bank and execute the payment.

Payment institution

A provider of payment services subject to the Payment Services and Electronic Money Act. Payment institutions may provide *payment services* as defined in the Act, but they are not allowed to receive deposits or issue *electronic money*.

Payment instrument

An instrument used for initiating a payment, e.g. a card or mobile phone. A payment instrument is typically linked to an account with a provider of payment services.

Payment service

The service provider transfers money from a payer to a payee to perform the payment service. The activities that are considered to be payment services in legal terms are defined in an annex to the Payment Services and Electronic Money Act.

Physical trade

A payment situation defined in the Payment Services and Electronic Money Act as transactions for which both the payer and the payee are physically present. Physical trade is also called point of sale transactions.

Prepaid card

A payment card containing a prepaid monetary value, which can be used for payments. The prepaid funds may be stored e.g. in the card chip or registered to a server-based account.

SEPA

The Single Euro Payments Area, SEPA, covers payments in euro by citizens and firms. From 1 February 2014, all credit transfers in the euro area and direct debit in euro must be executed according to the SEPA standards.

Smartphone

An advanced mobile telephone, which enables the user to use features known from a PC, e.g. online access and sending and receiving emails.

Tablet

A small laptop, which, like a *smartphone*, can be used for receiving payments using a mPOS terminal. Like smartphones, tablets normally have a touch screen and may contain apps.

Text message payment

A payment solution where the consumer pays by sending a text message via his or her mobile phone to a number – typically a four-digit short code – identifying the payee. The consumer then receives a text message, which must be replied to in order to confirm the payment.

Three-party system

The set of agreements between the parties of a card system or similar in which the payer and payee have agreements with the same provider of payment services.

Appendix 1 – Mandate of the Working Group on New Payment Solutions

Under the auspices of the Danish Payments Council, a working group is established, tasked with performing an analysis of new payment solutions on the basis of data on consumer purchases of goods and services in retail stores, online and from vending machines, etc.

New payment solutions cover innovations that enable payment by other means than cash or traditional payment instruments such as cards and cheques. In addition, the solutions may be innovations that enable consumers to pay using traditional instruments in new ways. The analysis is not to comprise payment solutions for collection purposes, but solely solutions in which a payment execution order is submitted simultaneously with or immediately after the purchase. Moreover, it is not to include payments in virtual currencies or payment surrogates as defined in the Danish Payment Services Act.

The analysis should be viewed in conjunction with the banks' ongoing efforts to modernise the Danish payments infrastructure. This will reduce the time need for settlement of payments in Denmark, thereby supporting new payment solutions that are conditional on fast execution, along the lines of electronic messaging services such as text messages and emails.

The objectives of the analysis are

(i) To identify trends in the development and rollout of new payment solutions in Denmark and comparable countries. On the basis of a breakdown of payment methods into categories, the mandate is to describe existing new payment solutions in Denmark and comparable countries and other solutions that may be expected to gain ground in the coming years.

The focus should be on payment solutions that are estimated to have the potential to replace traditional methods of payment wholly or partially, as instruments to be used widely or for specific purposes. In addition, the description should cover mainly new solutions that, in the assessment of the working group, are or may be relevant in Denmark.

This part of the analysis should also contain a summary of experience from previous and existing attempts to launch new payment solutions. Examples should include both payment solutions that have seemed to catch on and solutions that have not caught on, and the successes and failures should be explained.

(ii) To assess the pros and cons of new payment solutions in a socio-economic perspective. The mandate is to provide an analysis of the costs and benefits of the new payment solutions described under (i) versus existing solutions in relation to factors such as social costs, security, availability and user requirements and needs.

Danmarks Nationalbank's survey of Costs of Payments in Denmark from April 2012 will be an important starting point for this analysis. It showed that the existing payment solutions have substantial social costs, so considerable savings can potentially be achieved from introducing more efficient solutions.

User requirements and wishes can be assessed by pooling and analysing the knowledge of the working group members acquired through surveys and experience of new payment solutions. Moreover, the working group may choose to conduct its own survey of user requirements for and reactions to new payment solutions.

(iii) To identify any barriers to rolling out new payment solutions. The mandate is to examine whether there are any current barriers to rolling out new payment solutions in Denmark. Any such barriers should be described, and suggestions should be made for removing or reducing the individual barriers.

Barriers to new payment solutions may be market-related obstacles reflecting that banks and other service providers, retailers and consumers need incentives to provide, accept and use, respectively, a given solution. Other examples may be factors related to the Danish payments infrastructure and legal constraints.

Similarly to (ii), this part of the analysis may be based on the members' knowledge and experience, possibly supplemented with consultation of stakeholders outside the working group. Moreover, the working group under the Payments Council that is concurrently reviewing the Danish Payments Services Act may also provide input.

The working group's analysis is to result in a report to the Payments Council. The report may contain recommendations for measures that the working group finds relevant, e.g. concerning removal of barriers to new payment solutions.

Appendix 2 – Survey of Consumer Views on Payment Solutions

INTRODUCTION

In collaboration with Statistics Denmark, Danmarks Nationalbank has conducted a survey of Danish consumers' views on payment solutions. The survey consisted of two parts: first, participants were asked to record their payments in retail stores and online during a 24-hour period. After that they were asked various questions about their payment habits and views on payment solutions.

The purpose of the survey was to map consumers' actual payments, views on existing payment solutions and readiness to embrace new solutions. Register information makes it possible to break down the results by e.g. age, income, area of residence and experience with new technology such as smartphones and mobile banking solutions.

This appendix outlines the design and content of the survey and describes how the results have been scaled up to a national level.

DESIGN OF THE SURVEY

Danmarks Nationalbank prepared the survey in collaboration with Statistics Denmark and discussed it with the working group that has prepared this report. As part of the preparations, a pilot survey was carried out in the period 30 January to 6 February 2013. During this period, the design and contents of the survey were tested on some 20 persons. The final survey design was adjusted in accordance with the experience from the pilot survey.

Statistics Denmark then picked a representative sample of Danes from the national CPR register. The sample comprised a total of 2,376 persons aged 16-74, who received letters inviting them to participate in the survey. The letter included a paper-based payments diary in which they were asked to record information about their payments during a specified 24-hour period. To adjust for any fluctuations in payment patterns over the month, letters were sent to 85 people every day in the period from 25 February to 24 March 2013, i.e. a total of 28 days.

Besides the payments diary, the letters contained a link to an online questionnaire. Here, participants were asked to enter data from the diary and answer various questions about their payment habits. If the participants had not responded within two days, they were contacted by telephone. Statistics Denmark conducted telephone interviews every day until at least 40 responses had been received. Overall, responses were obtained from 1,261 people. This means that the level of uncertainty is ±3 percentage points when the survey responses are scaled up to the national level.

Scaling-up

Table B2.1 presents an overview of survey participants broken down by age, income and area of residence. It is seen that the responses received do not precisely reflect the actual age and income structures of the population; for example, there is an overweight of senior citizens and people with high incomes. To adjust for this, sample weights have been applied so that responses from people in the "overrepresented" groups are given a lower weight, and vice versa, when scaling up the survey results to the national level.

SURVEY PARTICIPANTS — Table B2.1

	Number of people			Percentage			
	Responses	Sample	Population (thousands)	Responses	Sample	Population	Weight
Age:							
16-17 years	43	88	143	3	4	3	1.0
18-24 years	134	305	506	11	13	12	1.2
25-34 years	121	328	650	10	14	16	1.6
35-44 years	211	378	759	17	16	18	1.1
45-54 years	278	493	802	22	21	19	0.9
55-64 years	242	412	695	19	17	17	0.9
65-74 years	232	372	598	18	16	14	0.8
Disposable income:							
No income	58	170	266	5	7	6	1.2
Under kr. 100,000	199	409	727	16	17	18	1.1
Kr. 100,000-200,000	357	771	1,365	28	32	33	1.2
Kr. 200,000-300,000	398	663	1,202	32	28	29	0.9
Kr. 300,000-400,000	180	251	395	14	11	10	0.7
Over kr. 400,000	69	112	198	6	5	5	0.9
Area of residence:							
North Denmark Region	140	263	429	11	11	10	0.9
Central Denmark Region	267	513	940	21	22	23	1.1
Region of Southern Denmark	308	539	882	24	23	21	0.9
Capital Region of Denmark	366	743	1,300	29	31	31	1.1
Region Zealand	180	318	603	14	13	15	1.0
Total	1,261	2,376	4,153	100	100	100	1.0

Note: The population is all Danes aged 16-74. The weights have been calculated as population/responses so that they indicate whether a specific age or income group is overrepresented (weight < 1) or underrepresented (weight >1) in the sample. In connection with the scaling-up of the results, weights calculated on the basis of cross-tabulated age and income groups have been applied so that the sample weights in the table are identical to those used for scaling-up.
Source: Statistics Denmark and own calculations.

CONTENT OF THE SURVEY

As previously stated, there were two main elements of the survey – a payments diary and a questionnaire.

Payments diary

Respondents provided the following information about all payments made during a 24-hour period: payment value, method of payment, type of store and where the payment was made, e.g. at the checkout in a retail store or via a computer, tablet or mobile phone.

The decision to ask participants to keep a payments diary limited to a24-hour period was based on experience with the use of payments diaries in other countries. This experience shows that a short period gives the most precise diary entries, cf. Box 2.1.

Questionnaire

There were four main categories of questions:

1. With a view to mapping the prevalence of payment cards in Denmark, participants were asked to state which and how many payment cards they have access to and whether they use these cards.
2. Then they were asked about their preferred methods of payment in retail stores, e.g. cash, payment card or both. They were also asked to state why they prefer these methods of payment.
3. The third category related to online payments. Participants were asked whether they had shopped online within the last six months and if so, how they had paid. They were also asked whether they generally feel secure when shopping online. Those who had not shopped online or who had concerns about doing so were asked to elaborate on the reasons.
4. The final category related to mobile payments. Here, participants were asked whether they have ever paid by mobile phone and if so, which types of purchases they had paid for. They were also asked to which extent they would be ready to use mobile phone for payments instead of – or as a supplement to – cash and cards in the future.

In addition, respondents provided various background details, including their experience with new technology such as mobile banking, streaming services and downloading of electronic journals to computers or tablets. Information about gender, age and income was sourced from register data.

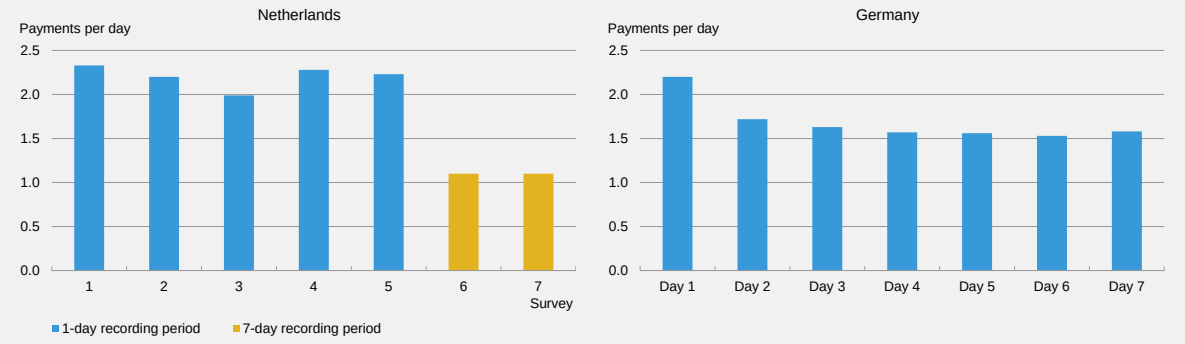
EXPERIENCE WITH DIARY SURVEYS — Box B2.1

Other central banks have studied consumers' payment habits. Several of them have used payments diaries, in which consumers were asked to record their payments during a given future period.[1] The purpose has been to ensure that all payments are recorded, even small amounts. This gives more correct data than in surveys where participants are asked to list their payments during a given period in the past, based on their memories. But the quality of the data also depends on the length of the recording period. This is because people have a tendency to be more careful to record all payments at the beginning of the survey than they are towards the end. This is known as "diary fatigue", a phenomenon that is also seen in other types of data collection, e.g. in diary-based medical studies.

The Dutch and German central banks have studied the optimum length of the diary period.[2] The Dutch study was based on seven different surveys; in five of these, payments diaries were kept for just one day, while the period was seven days in the remaining two surveys. The German study is based on a single survey with a seven-day diary period. In both studies, statistical tests are performed to see whether the length of the diary period has an impact on the average number of payments recorded per day. In the Dutch study, this is done by comparing the one-day surveys with the seven-day surveys. In the German study, the average numbers of payments recorded on each of the days are compared, i.e. the average number of payments on day 1, 2, ..., 7.

Both studies show that the length of the diary period is significant, in that the average number of payments recorded falls when the number of days increases, cf. Chart B2.1. According to the German study, this effect is observed as early as on the second day, cf. the right-hand chart. In the Dutch study, the number of payments recorded is substantially lower in the seven-day surveys, cf. the left-hand chart.

IMPACT OF LENGTH OF DIARY PERIOD – NUMBER OF PAYMENTS RECORDED PER DAY — Chart B2.1



[1] See Table 4.1 for an overview of the countries that have used payments diaries.

[2] See Nicole Jonker and Anekke Kosse, The impact of survey design on research outcomes: a case of seven pilots measuring cash usage in the Netherlands, De Nederlandsche Bank, *Working Paper* No. 221, 2009, and Tobias Schmidt (2011), Fatigue in payment diaries – empirical evidence from Germany, Deutsche Bundesbank, *Discussion Paper* No. 11.

Appendix 3 – Survey of Retailers' Views on Existing and New Payment Solutions

INTRODUCTION

In early 2013, in partnership with Wilke, Danmarks Nationalbank conducted a survey of retailers' views on existing and new payment solutions. As part of the preparations for the survey, a number of pilot interviews were carried out with retailers and other payees to adapt questions, etc. Moreover, the survey was discussed in the working group preparing this report.

Wilke was in charge of selecting retailers and distributing and collecting questionnaires. In general, the survey was designed to make it as easy as possible for retailers to participate. They received links to the online-based questionnaire by email, and retailers were presented only with questions relevant to their specific type of business. As a case in point, online retailers were not asked to answer questions regarding cash payments.

The survey contains responses from a total of 1,000 payees, large and small, from various industries. Between them, they are deemed to be a representative sample of Danish retailers covering sales in retail stores, online shops and vending machines including self-service petrol pumps and checkouts.

CONTENTS OF THE SURVEY

The questionnaire survey was divided into three overall parts. The first part, which all respondent retailers were asked to complete, contained general questions about their stores. For example, they were asked about the methods of payment they accept and the sales channels they use.

The second part of the survey focused on existing methods of payment. Among other questions, retailers were asked about their preferred method of payment in a purchase situation and the reason for this preference. They were also asked to elaborate on individual methods of payment.

The third part of the survey focused on retailers' views on new payment solutions. For example, they were asked to specify the new method of payment that accounts for their highest expectations and aspects that are included when they consider accepting a new payment solution as a means of payment.

In the report, results were calculated based on the number of retailers, i.e. small and large retailers within the same industry are included with the same weight. In the calculation of overall results, an adjusted weighting of industries was applied to allow for over- or underrepresentation of industries in the sample.

Appendix 4 – Criteria in the Assessment of a Country's Payment Solutions

INTRODUCTION

A socio-economic assessment of a country's payment solutions should include various criteria, including (i) resource costs, (ii) security and reliability, (iii) facilitation of quick and timely payments, (iv) user availability and (v) other potential user requirements and wishes.

It should be emphasised that these criteria can be used mainly to obtain an overall assessment of the pros and cons of a country's payment solutions – not to rank solutions. The reason is that, in addition to measurement problems, individual solutions may have different benefits for users. Moreover, the criteria applied would have to be weighted if solutions were to be ranked.

It should also be noted that, despite these criteria, a country's payment solutions should not be perceived as static. On the contrary, it is important that these solutions are continuously improved to match technological advances. These advances depend on framework conditions, including providers' and users' incentive to develop and use new solutions.

CRITERIA

Each criterion is outlined below.

Costs

In general, the social costs of a country's payment solutions should be as low as possible. Social costs are the overall resource consumption of all parties involved, i.e. both parties that contribute to facilitating payments, e.g. banks, and payer and payee.

The resource consumption related to payments primarily comprises the time consumption of the parties involved. The resource consumption also includes, inter alia, computer time consumption and depreciation of relevant equipment, such as ATMs, card terminals and cash registers. The resource consumption of the most common methods of payment in Denmark was calculated in a survey conducted by Danmarks Nationalbank, published in 2012.

Security and reliability

Moreover, a country's payment solutions should protect users from fraud and fraudulent use and be reliable when it comes to booking of payments. If these requirements are not met, entailing that users do not trust one or more payment solutions, they may choose other less efficient solutions or refrain from making their purchase or sale.

Therefore, it is also significant that the systems executing payments via a country's payment solutions are reliable and not affected by operational disruptions. When such disruptions occur, it is also essential, as far as possible, that alternative methods of payment are available to users for executing their transactions.

Speed and timeliness

All payments are not time-critical, but a country's payment solutions should include some solutions that facilitate immediate transfers in an easy and efficient manner when required. For example, for the purchase of expensive items where the seller is guaranteed payment up to a certain amount only and consequently will not hand over the item before he or she has received payment in full.

The assessment of this criterion typically depends on systems for clearing and settlement of payments, since they usually determine the speed of payments. In Denmark, the ongoing modernisation of the payments infrastructure will enable providers to offer solutions that facilitate immediate transfers.

Availability

In general, a country's payment solutions should not prevent certain segments of the population from making specific types of purchases. Therefore, for each purchase payment solutions should exist that are, as far as possible, available to all consumers, irrespective of technical knowledge, income, physical disability, etc.

According to this criterion, users should be able not only to use the solutions available to make their payments. They should also be able to use the payment solutions in a safe and secure manner and understand the implications and risks involved in using the solutions in question.

Other user requirements and wishes

Finally, users may have other requirements and wishes for features that should also be met by a country's payment solutions. In the assessment of whether such requirements and wishes should be accommodated, provider costs in relation to benefits to users of these features should be considered.