

Critical Comparison of Charges for NFC Payment, instead of paying with Cash

**Which identical or different costs incur when paying via NFC
compared with the payment in cash?**

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Wien, Dezember 2021

Im Rahmen der SBWL Betriebliche Informationssysteme

Seminar aus BIS 0095

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Semester: WS 2021

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1 Introduction

1.1 Motivation

Transactions, whether with cash or with NFC (Near Field Communication), are an indispensable part of the everyday life of every person. They occur, for example, when shopping for food, when shopping in the mall, driving with an Uber or for different leisure-time activities. Transactions arise whenever a service is obtained for a corresponding fee, regardless whether it concerns a material or an immaterial good. This fee can either be paid in cash or with the aid of NFC.

All over the world a wide variety of transactions are carried out and an extensive variety of costs are charged which many people are often not even aware of. This coursework should give in particular information about such costs.

The trend of the cashless payment via NFC based technology always seems to spread further because of the fact that transactions can be processed faster and easier for many people. Due to this paying with NFC is increasingly promoted within the society. This is also why nearly every shop around the world offers both of the above stated payment methods. Transactions with cash increasingly loses even its appreciation because it is often more time-consuming to either pay in cash or even to withdraw the money from the various banks and their different ATM`s in order to subsequently pay with it. Why make something difficult, when it can also be easy. But is the payment via NFC really as advantageous as most of the people perceive?

In the course of this work a particular focus should be given to the costs incurred through transactions with cash and transactions with NFC. What costs incur when

paying abroad will also be dealt with. Furthermore, the advantages and disadvantages of the different payment techniques will also be taken into consideration and will be explained in greater detail.

The current pandemic, triggered through Covid-19 and the increased safety measures within society, have changed the attitude towards various payment types, not only in Europe but worldwide. There was a much higher proportion of online shopping because most of the shops were closed during the lockdowns. In order to improve the hygiene standards, more and more emphasis was placed on cashless payment methods. A wide variety of different NFC payment techniques were and still are used. These will also be described within this work in greater detail.

This well-structured coursework will outline and discuss the above-mentioned topics. Scientific journals, working papers and monographs will serve in particular as scientific basis for this work. The aim is to „reveal“ the different costs that incur while paying with cash and NFC based devices.

1.2 Research Question

A part of this term paper will be targeted on the different types of payment techniques and the associated costs that occur, as well as the resulting advantages and disadvantages. The research question „Which identical or different costs are incurred when paying via NFC compared with the payment in cash?“ will serve as a guideline. Above all, there will be a great focus on pointing out the different costs of the two payment types.

The research question came up because many people are often not aware of the costs that accumulate while paying with cash or with the aid of NFC based devices. Not only within the home country, but also abroad in foreign countries.

Additionally, various “sub questions” will serve as a support when answering the main research question. Like for example which costs are charged abroad?, Which costs are charged in the home country? Which advantages or disadvantages does paying with cash have? What are the advantages and disadvantages of paying with NFC? Which devices are able to have NFC technology integrated?

2 NFC Transactions

These days cash payments mostly get replaced by so called NFC-Transactions. NFC stands for Near Field Communication, which more precisely describes the process of a contactless data exchange between NFC-based devices within short distances, which also transfers this data as fast as possible. It represents a form of contactless payment. Moreover, in order to ensure a smooth transmission of the collected data the distance between the NFC-devices should be as small as possible, meaning only a few centimetres away from the device. Cashless transactions with NFC technology occur directly at the point of sale (POS).

Examples for transactions with NFC are the contactless payments with debit cards, credit cards or electronic devices. These cards contain a so-called NFC-chip through which the contactless payment is made possible, and which is small enough to be integrated into the NFC-devices. The information stored in this chip is transmitted to a reader which triggers the payment. As soon as a strong customer authentication is needed for example when paying higher amounts of money, a Pin-Code will be required.

But also, the payments at the point of sale with a smart phone or a smart watch count as a NFC transactions. Here, however one must distinguish between the different technical configurations where different authentication options can be applied. The most popular ones, are as already mentioned, on the one hand entering a Pin-Code and on the other unlocking the own smartphone or smartwatches, but also a signature is one possible way of authentication (Hoffmann& Rastegar, 2021a).

Transactions without cash will become increasingly more popular because of the fact that the transaction process can be handled much faster and easier than as it would be the case

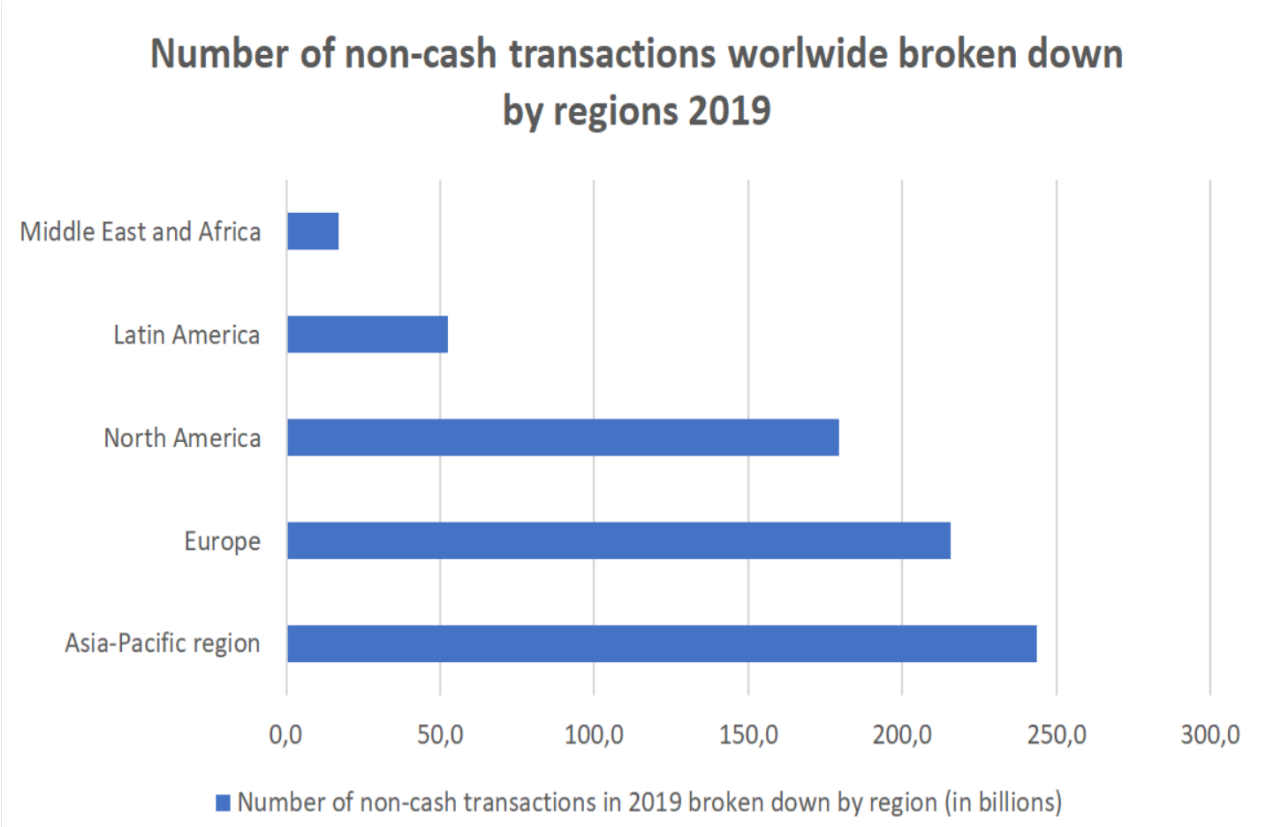
in the form of a cash payment. Especially when it comes to smaller payments the NFC-transactions are more suitable.

The volume of the cashless payments worldwide is expected to increase between 2020 and 2025 by more than 80%, from a total of 1 trillion to 1,9 trillion. The number will have tripled by 2030. The influence of Covid-19 and the resulting increase in online costumers play a key role within this circumstance (Kolerus, 2021).

More and more people appreciate the contactless paying technology. They are quick, reliable and uncomplicated for most people. NFC transactions are not merely a completely new way of payment for different customers but also adds value to the costumers trough different aspects. However, when paying contactless this service is not only about costumer convenience also merchants benefit from this payment procedure because the payment process in store are optimized. Furthermore, one can not only pay with a wide variety of giro cards, but it is also possible to pay with a smartphone. Since nowadays smartphones are an integral part of everyday life the likelihood to pay with a smartphone will increase in the future (Oesau, 2019).

The graphic below shows the number, in billions, of cashless transactions in 2019 according to the different regions worldwide. One can see that the fewest cashless transactions were executed within Africa and the Middle East. This can be pinned down due to a variety of different reasons. For example the increasing demand for electronical devices like a smartphone or a laptop. Europe is on the second place with, around 215,8 billion transactions. With 243,6 billion cashless transaction the Asia-Pacific region has the highest amount and is therefore in a leading position.

FIGURE 1



(Capgemini, 2019)

1.1 Advantages and Disadvantages

As payment methods have their advantages and disadvantages the same applies for NFC transactions as. These should be explained and discussed in greater detail within this section.

NFC based technologies are widespread in today`s society. More and more people are switching from cash payments to non-cash payments. One advantage of NFC based transactions is their ease of use. The devices with which such transactions work are easy to use, though their technical complexity is rather high. On top of that nowadays a vast majority of society are familiar with such payment methods (Dutot, 2015).

What is more, the payment process is a lot faster if you pay cashless using Near Field Communication. For example, people who pay in cash have to search and take out their money first, and that have to count whether it is enough and the right amount of money. With the aid of NFC transactions the time spent on the payment process itself can be minimized and therefore more payments can be ensured.

Furthermore, the consumers receive a precise overview on what they have spent and how much money they have available and do not need to collect the paper receipts in order to keep track of their expenditures. This makes the whole process on the on hand much easier for the costumer and on the other even save time.(Burkard & Duchmann, 2012).

Another major advantage is the to receive a wrong amount of change or even encounter fraud in the form of fake money, which both can be avoided with the aid of non-cash transactions. Especially with currencies other than the home country, it is difficult for customers to evaluate whether it is counterfeit money or not (Schuster, Schnaider & Klassen, 2015).

There are many advantages paying with NFC, but one should not forget about the disadvantages that can occur. In almost every shop you can pay cashless using NFC-technology. Everyone can pay up to an amount of € 25, - five times in a row without the requirement of an authentication process. That means that if a debit or a credit card gets lost, or even worse stolen, anyone who does not own the card can also use it to pay up to the limited amount set out by the bank. In such a case one should block the card as quickly as possible (Kloß, 2021).

It is also tremendously helpful if a certain limit is specified so that one can withdraw only in specific time periods or up to a by the customer predetermined limited amount. If you have lost your card or it got stolen and you notice that someone wants to pay with your card, one should immediately contact the emergency line of the card provider. In this context it is beneficial to note that every payment can be tracked (Zentrum für Europäischen Verbraucherschutz, 2021a).

Furthermore, security risks are also a possibility which should be seen as disadvantage. Various vulnerabilities in the security design and hence resulting attacks are often reported. Security researchers try to remedy these weaknesses. In order to not impair the attractiveness and the ease of the usage of NFC based devices, it is difficult to eliminate

structural weaknesses, so that further attacks will still remain inevitably possible. Data can be accessed while using NFC- technology without the costumer's knowing of this circumstance with the help of different methods. There are different types of attacks that can apply. Considering attacks that do not require authentication, one well-known example with respect to this are relay attacks. In this case an NFC receiver device is brought close to a device with an NFC chip for example a credit card or an unlocked smartphone which is connected to an additional end device via a data connection. With this connection the communication with a POS-terminal is ensured, where now the NFC device of the victim communicates with the POS device. The forwarding goes unnoticed. This allows to trigger a payment at the expense of the victim. To handle payments where authentication is needed advanced methods are required (Hoffmann & Rastegar, 2021b).

Another important point that needs to be addressed is the protection of personal data. As soon as someone pays cashless information's are disclosed. Data such how much one pays for something, at what time and where or even what you are buying will be passed on. A number of security precautions are used to reduce the risk of hacker attacks and prevent the data from misuse. However, the personal data can never be entirely safe (Hulboj, 2021a).

Moreover, paying with the NFC-technology is usually not for free. Many Banks charge a certain fee for paying cashless. But it depends on the country how high the fees are when paying cashless (Wenig, 2020).

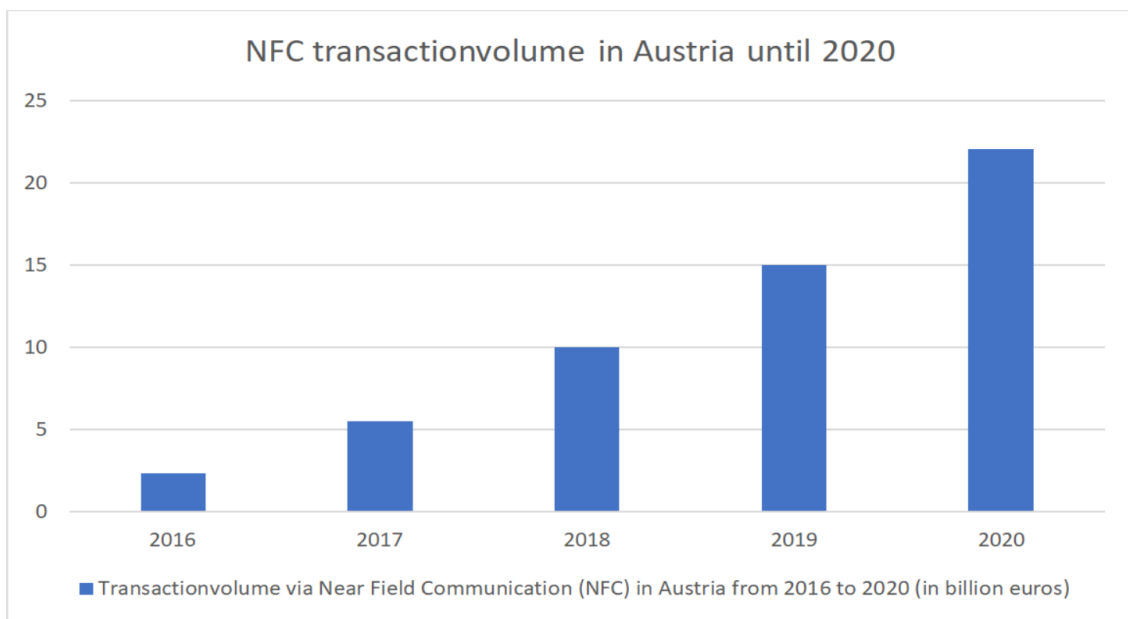
Up to 75cent per card payment can be charged. In addition, the fees can vary from bank to bank. If one, considers how often the majority of people pay with card instead of paying with cash, the costs at the end of the year for just one person would be several hundred of euros

just for paying without cash. Such costs are mostly incurred indirectly because they are included under booking fees or account management fees (Biallo, 2021).

Also, if someone plans to travel abroad information about the costs that will be charged for NFC-transactions should be obtained. Within the euro area there are no direct fees charged for paying with cash or without cash. But if you travel outside the euro area, one will be charged fees and minimum expenses when you are paying cashless. In addition, there may be restrictions paying with NFC-technology due to security systems like, for example, Geo Control. One can only pay up to a certain limit and if this limit is exceeded, the bank would have to unlock the limit, provided the cardholder wants that, so that further transactions can be executed. (ÖMTC, 2021)

The following statistic shows that the transaction volume using Near Field Communication based on Austria is constantly increasing. Many factors can be decisive for this trend, such as the increasing number in users who own a smartphone compared to the past. In 2016 the transaction volume was about 2,3 billion euro. In the year 2017 the transaction volume increased to almost more than twice the amount of the initial value in the previous year. Over the time it rose to 22 billion euro up until 2020. Within these four years the transaction volume has increased by a multiple. Here a clear trend can be noticed where s steadily increasing amount of people are switching to NFC payment methods.

FIGURE 2



(Wollny, 2021)

1.2 Incurred Costs

Many people use contactless payment methods because it is often easier and faster for them. However, most of them forget about the costs that may arise when using NFC techniques.

When paying with credit card or bank card, retailers and banks are not allowed to charge additional fees/ surcharges merely due to the fact that a specific card is used. This rule applies to all buyers within the EU. Exceptions where the EU regulations do not apply would be credit- and bank- cards accounting to the three-party- procedure such it is the case with American Express or Diners Club. Also, for business cards additional fees may be charged for their use.

Moreover, if payments are made in an EU country but other than the euro the Bank can charge exchange fees for using a card in another country. However, before buying something, it must be explicitly stated that such exchange fees have to be paid (Your Europe, 2021a).

What should be considered are the account management fees that different banks charge for having a bank account. These fees depend on the different banks and therefore the costs can vary (durchblicker, 2021).

With credit cards it is possible to pay without cash anywhere in the world. While no costs are charged when using the credit card for purchases within the euro area, manipulation fees are charged for purchases of it. Depending on the credit card company they can vary between 1,5% to 2%. In countries where the euro is used as currency, but the country does not belong to the EU like for example Monaco a processing fee is charged even though you pay with the same currency with your credit card. If one intends to travel abroad, you should inform yourself at your bank about the different fees or expenses that can be charged. In addition, it is also helpful to find out about the exchange rate since there can occur rate fluctuations.

The graphic below shows the different costs of using debit cards located outside of the EU which can arise. Various banks are listed. It depends on the respective bank how high the transaction fees can actually be (Arbeiterkammer, 2019a).

FIGURE 3

Bank	pay with card outside the euro area	withdraw money with card outside the euro area
Bank Austria	1,25 Euro+0,75% of the amount	2 Euro + 0,75% of the amount
BAWAG	1,09 Euro+0,75% of the amount	1,82 Euro+0,75% of the amount
easy bank	1,09 Euro+0,75% of the amount	1,82 Euro+0,75% of the amount
Erste Bank	1,09 Euro+0,75% of the amount	2,36 Euro+0,95% of the amount
HYPO NÖ	1,09 Euro+0,75% of the amount	1,82 Euro+0,75% of the amount
ING DiBa	1 Euro	2 Euro
Oberbank	1,09 Euro+0,75% of the amount	1,82 Euro+0,75% of the amount
RLB NÖ Wien	1,50 Euro+1% of the amount	2 Euro+1% of the amount
Volksbank Wien	1,09 Euro 0,75% of the amount	1,82 Euro+0,75% of the amount

Source: Data from the banks, survey May 2019, alphabetical order

(Arbeiterkammer, 2019a)

Nowadays it is more and more common to pay with NFC. Still a safety concerns often arise within this context. What many people are not aware of is, that they often pay with their personal data when paying with NFC. Everyone who pays contactless reveals information about themselves. The most known examples are the purchase amount, one's name, where

and at what time someone bought something and what specific good or product. (Hulboj, 2021b).

As soon as a payment is made using NFC, card data and other information required for processing transactions are exchanged. Not only the retailer receives certain data about the purchase, but also certain service providers that are required for the process. In principle payments with NFC are considered as a secure process, as there are certain security standards and statutory provisions about data protection so that data misuse is avoided. However, as with all other electronic payment methods there is a certain risk that transaction data can be misused for internal company purpose or that data is stolen under specific circumstances (Paul & Stahl, 2019a).

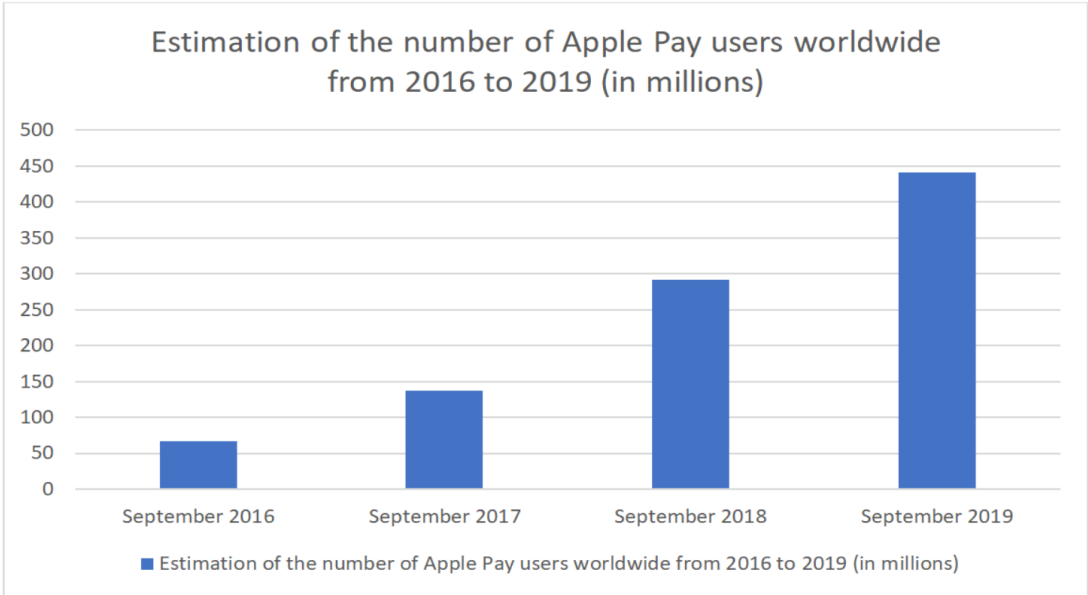
What is more, conclusions can be drawn about purchasing behaviour. A data collection and data processing are triggered with every payment process. All the data which is collected is then used profitably by various companies. In this way user profiles can be easily created so that a wide variety of information can be adjusted in the process of a company (BfDI, 2019).

The modern payment method Apple Pay is becoming more and more popular. This type of payment method replaces bank cards, credit cards and cash through a payment procedure which ought to be safer and more private. One advantage of Apple Pay is, that it is accepted by traders worldwide which makes the payment process even easier compared to the traditional NFC methods. Setting up this payment method only takes a few seconds. To pay with this service a credit card, debit card or prepaid card must be added in the wallet app on an iPhone. On top of that the cards should also be stated on other devices, so that Apple pay

can be accessed through them as well. This service works with a wide variety of different card providers from around the world and over the time the number of banks that support Apple Pay have been increasing. Examples for such banks in Austria are: N26, Raiffeisen, BAWAG, BKS Bank, Erste Bank and Sparkasse, Hypo Noe, Oberbank, Volksbank, Wise, BTV, Hypo Bank Tirol and many more (Apple, 2021).

The graphic below shows the estimated number of people worldwide from 2016 to 2019 who were using Apple Pay. A clear increase in the user numbers can be seen. In 2016 around 67 million people were using Apple pay, while up until 2019 the number of users has more than sevenfolded and grew to 441 million people.

FIGURE 4



(Rabe, 2021)

There are no costs for apple pay users internally. If someone pays with Apple Pay abroad, the certain fees that may arise should be checked in consultation with the associated bank.

The requirement for an Apple Pay account is the possession of an iPhone, iPad, Mac, or an apple watch, which can be a high-cost factor.

Additionally, Apple charges the banks a certain fee which is 0,15% per transaction. However, in some counties this fee may be different depending on the arrangements. It is however also unclear whether the banks indirectly charge the customers certain fees, for example through higher credit card invoices, which it is suspected to be the case (Klotz, 2015).

3 Cash Transactions

This section is intended to outline the advantages and disadvantages as well as the costs which occur when paying with cash. In contrast to payment transaction connected with NFC technologies, there are also conventional payment transactions in the form of cash. Cash is a physical means of payment that appears in the form of coins and banknotes. It enables immediate payment for different services (Wirtschaftslexikon24, 2021).

Money is everywhere in everyday life and often the various forms of money are no longer considered as the generic term money for many people covers all kinds of payment.

3.1 Advantages and Disadvantages

There are also certain advantages and disadvantages when paying in cash. One positive aspect when paying with cash which needs to be mentioned is, that cash transactions are always completely anonymous. It cannot be traced where the money came from, when a transaction is being carried out and for what the cash was being used. This anonymity cannot be guaranteed through NFC transactions. This also prevents the misuse of personal data. By using cash, a person`s privacy remains intact. Many Companies try to get as much

customer information as possible using modern data analysis procedures in order to create a targeted customer profile and to present offers and advertising to the persons which are tailored to the individual needs. Privacy, which occurs when paying with cash, slows down the increase in information asymmetry between the most diverse participants such as citizens, government institutions or different organizations. When dealing with organizations that are more powerful than an individual itself, privacy plays an important role when it comes to the protection of one`s own position (Mai, 2019a).

Another advantage worth addressing is that there cannot be a technical problem when paying with cash. Payments in this form are always possible and they do not get interrupted by any technical difficulties as it can be the case with NFC transactions. System failures can occur in every company if they possess some sort of technical infrastructures. IT failures play a major role as they can have dramatic consequences for a company. Such consequences for example can be loss of data, loss of sales or damage of the company`s image. Certain security checks and precautions can minimize IT-failures. Nevertheless, there is always chance that the technical infrastructure does not work, even if high safety measures are applied that try to ensure no service failures (IT-Service.Network, 2017).

One of the disadvantages when paying with cash is that there exists the possibility to launder money and to make „dirty“ money . These funds come from unlawful obtained pecuniary benefits. The implementation of contactless payment is intended to reduce crime as it would decrease money laundering processes because of the fact that everything can be tracked. However, it should not be forgotten that contactless payment transactions can lead

to cybercrime and so crime does not only play a role at cash transactions (Noack & Philipper, 2016).

Cash can also lead to illegal activities which can be carried out in the shadow economy and money laundering is promoted. Cash plays an important role in criminal activities. For example, in drug dealing. Nevertheless, it is questionable whether the abolition of cash can really curb criminal activities (Krueger & Seitz, 2017a).

In a money laundering process, the true origin of illegally acquired assets are concealed. This serves to create a veil of legal cleanliness around the object. To subsequently enjoy such objects they are saved, invested, or consumed within the legitimate economic system. The money economy makes it possible for criminals to earn the proceeds of crime in cash and to launder it without being caught (Gobena & Kebede, 2021a).

Another criterion that speaks against paying with cash is, that the payment process at the point of sale takes much longer. Contactless payment can save time, costs and resources. In the payment process „speed“ plays an important role . However, a quick payment usually does not necessarily reduce the overall process at the cash desk itself. This is for example the case when goods are scanned in a faster way compared to the traditional process, because after the payment process has been completed there still remain the already paid but not yet packed goods. This additional time must also be taken into account. It is therefore not possible to make a general conclusion relating to the argument of speed (Krueger & Seitz, 2017b).

Furthermore, corruption occurs more frequently in cash-intensive economies than in cash-less economies. Government intervention is encouraged by market gaps or failures. Lax regulations are being imposed on the country's megaprojects. A combination of lax governmental regulations and governmental intervention makes the cash-based countries more vulnerable to corruption than countries where only a little fraction is paid with the aid of in cash. As a result, this enables for state officials to abuse state power and misappropriating public property. Different activities like fraud, trickery, extortion, theft, embezzlement and many more such activities will evolve over time (Gobena & Kebede, 2021b).

3.2 Incurred Costs

Today most people pay with the well-known payment instrument of "cash", in the form of coins and banknotes. Many people do not think about the costs which can arise for them. For these people money serves as a pure means of payment. When paying cash different costs incur and usually cannot be avoided.

The use of cash causes several costs such as taxes, fees or higher prices. Account management fees and fees for withdrawing money from an ATM will be charged. Usually, it is the case that customers have to pay high fees for additional services. This is, for example, the case when withdrawing money from ATMs or facing account management fees, as previously already discussed. With almost all banks these fees depend on the choice of account model. These different models also include a wide variety of various services. The payment process with cash itself is for all users free.

If a person withdraws money from a cash machine not belonging to their institution, higher fees will probably be charged than at their own ones. Fees may also be charged if a customer withdraws money outside the business hours. The risk for various banks that costumers will look for a more profitable bank is high (Mausbach, 2020).

Moreover, when traveling abroad one should consider the costs that can arise in the different countries when withdrawing money. When someone is withdrawing money from another bank abroad fees between zero to ten euro will be charged. The amount of the respective fees is determined by the bank where one person has a bank account. Additional fees can be charged by ATM operators in the respective country. One should have a look for machines that on which is written "0% Commission". A conversion fee is charged as soon as someone withdraws money in a foreign currency.


If you are going to pay in countries where the euro is not the currency, it is the best to withdraw cash only on site. Due to poor exchange rates and high fees, it is usually not worth changing the money in another currency in your home country. In another country with a money machine where there is a different currency one should always look for the letters "without conversion" or "direct pay out". The money comes out at the current exchange rate in the respective currency.

If you are travelling with an amount higher than € 10.000, - in cash this money must be reported to the customs when crossing the border. There are countries that have implemented a cash limit. In this case one should find out exactly in which country which limit is set (Zentrum für Europäischen Verbraucherschutz, 2021b).

When withdrawing money in Europa the costs are either covered in the quarterly account management fees or individual fees are charged. Also, additional fees can be charged from third parties. These expenses will be deducted together with the amount of money withdrawn (Kollmann, Rupprecht & Prantner, 2020).

The following graphic shows the currency conversion in the foreign payment transactions of the largest bank in Europe. It can vary depending on what time it is at the moment. In this graphic not all currencies are included. There are more currencies to compare on the HSBC bank website itself.

FIGURE 5



Wahrung	Referenzmittelkurs	HSBC Geldkurs	HSBC Briefkurs	Auf-/Abschlag auf Referenzmittelkurs	Datum/Uhrzeit
EUR/AED	4,13940	4,12690	4,15190	0,01250	10.12.2021/12:26:51
EUR/AUD	1,57635	1,57135	1,58135	0,00500	10.12.2021/12:26:51
EUR/BGN	1,95600	1,95000	1,96200	0,00600	10.12.2021/12:26:51
EUR/CAD	1,43275	1,42875	1,43675	0,00400	10.12.2021/12:26:51
EUR/CHF	1,04200	1,03900	1,04500	0,00300	10.12.2021/12:26:51
EUR/CNH	7,18315	7,14815	7,21815	0,03500	10.12.2021/12:26:51
EUR/CZK	25,37050	25,25050	25,49050	0,12000	10.12.2021/12:26:51
EUR/DKK	7,43615	7,41615	7,45615	0,02000	10.12.2021/12:26:51
EUR/GBP	0,85435	0,85185	0,85685	0,00250	10.12.2021/12:26:51
EUR/HKD	8,79035	8,76535	8,81535	0,02500	10.12.2021/12:26:51
EUR/HRK	7,52615	7,46615	7,58615	0,06000	10.12.2021/12:26:51

(HSBC bank, 2021)

4 Evaluate between payment methods

This section is intended to compare the costs as well as the advantages and disadvantages of NFC transactions versus cash transactions. It is important to distinguish between these two payment methods in order to be aware of the differences and what effects they will have in the end. Furthermore, the comparison serves so that everyone can form their own opinion about the two payment methods.

If one pays within the EU with the credit- or debit card, no additional expenses will be charged provided the country has also the Euro as currency. If this is not the case, additional fees may arise. However, one must be advised in advance that such fees can be charged (Your Europe, 2021b).

If one pays outside the EU area with a credit- or debit card processing fees can be charged. The height of the fees depends on the respective bank (Arbeiterkammer, 2019b).

The same circumstance applies for cash. If one is paying with cash in the same currency than no additional costs will be charged but if you must convert the money into another currency in order to be able to pay, certain conversion fees can and will be charged. If you withdraw money in another country that has a different currency, and the required money is differing from that of one`s home currency, it is the best to withdraw the money on site so that you get the money at the current exchange rate in the respective currency. Here however, it might be the case, that some money of the foreign currency is remaining different from that

of one`s home currency because not everything was spent. Coins for example, are excluded from being exchanged (Zentrum für Europäischen Verbraucherschutz, 2021c).

Another important point that should be considered are the personal costs one pays for. Every time when paying with NFC, everyone reveals their own personal data. Data such as what one is buying, where, when and for how much. This can be dangerous (Hulboj, 2021c).

Nowadays there are security standards that prevent personal data from falling into the wrong hands but the probability that this data does not get stolen or misused is never zero. The data that is collected about one`s person is transferred to tall of the actors that are involved in the process. One should therefore be very careful when it comes to revealing data about oneself (Paul & Stahl, 2019b).

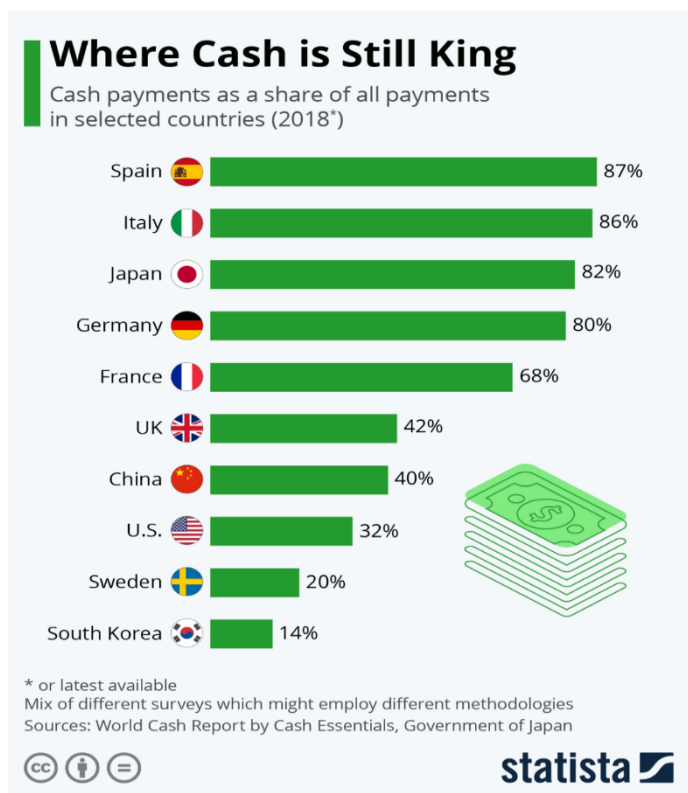
In contrast to NFC payments, there are no personal costs that occur when paying in cash. These transactions are completely anonymous. No data is disclosed such as from whom the money came from, at what time and for what it was used for, as it is, on the contrary, unfortunately the case with NFC transactions. A person`s privacy remains intact. The misuse of personal data is in this case effectively being prevented (Mai, 2019b).

When making the use of NFC technologies and one should lose their debit card or worse, it gets stolen, another person can only spend a certain amount with that unlawfully obtained card without an authentication being necessary. However, every transaction is being tracked and displayed, which can be helpful to comprehend where and when something was paid

with a specific card. If one notices that someone else is using their card without their permission, the card should be blocked immediately (Zentrum für Europäischen Verbraucherschutz, 2021d).

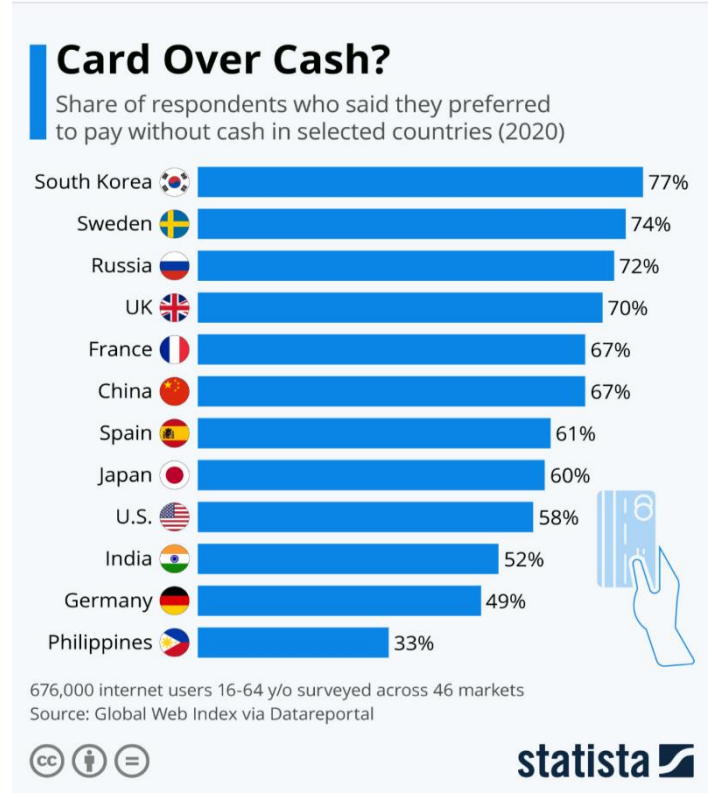
When paying with cash the money you lose or the money that gets stolen is gone. This can be a large or a lower sum. For example, when someone steals € 100, -- from a person then they are gone. This can be also the case if the amount of money is higher or lower. The point is that with a credit- or debit card someone else can only pay with that card until a certain limit is reached while when having cash with you no matter how much the amount of money is, all of it can be stolen or lost at one time in one heap.

FIGURE 6



(Buchholz, 2020)

FIGURE 7



(Buchholz, 2021)

In the above graphic on the left hand side, one can see the cash payments as a proportion of all payments in selected countries in 2018. It can be noticed that the people in the European countries, with the exception of Sweden, prefer to pay in cash. In Spain the share was even at 87% and in Italy at 86%. In Sweden, however, the share was only at 20%. The graphic above but this time on the right hand side shows the share of respondents, who said that they prefer to pay cashless in selected countries in 2020. South Korea is with 77% in a leading position followed by Sweden with 74%.

5 Effects of Covid-19

Because of Covid-19 many people have changed their payment habits. More and more people are switching to contactless payment, primarily due to hygienic reasons. Supermarkets and various shops also recommend contactless payment which certainly also contributes to the circumstance why that many people are switching to contactless payment methods (Pirkner, 2020).

5.1 Changes

Many people are switching from cash payments to NFC transactions during the Covid-19 pandemic. Paying with cards which are equipped with NFC technology as well as mobile payments are becoming increasingly popular.

Cash is more often used as a store of value. The money is kept in the purse, bureau pocket or at other places. People who invest their money in bank accounts, stocks, crypto currencies or NFT's have planned that this money should not serve as a short-time transactions, but

instead is intended to serve as a store of value. While the overall demand for cash has increased, the cash that is being used as a payment instrument has tended to decline. The decline of cash as a means of payment is also justified by the fact that the shopping behaviour of consumers has changed during the pandemic. Another influencing factor that plays a major role is that the consumers are steered by the merchant or even the government to pay cashless as often as possible. More and more sellers asking their customers to use the card instead of cash for the payment process.

The uncertainty whether cashless transactions will prevail over cash transactions and whether cash will continue to be valued by customers as a means of payment is still unclear as long as the pandemic continues (Coyle, Kim, & O'Brien, 2021).

There is not only an increase in the tendency to switch towards contactless payment methods, but also the surging number of online purchases during the pandemic triggered by Covid-19, led to the fact that non-cash payment procedure became increasingly popular. The purchasing behaviour of the customer has simply changed during the pandemic. Many people will solidify these changes and make them to their new habits while others will return to their old payment methods and well-known habits. Despite the increasing implementation of cashless payment technologies, cash remains an important means of payment particularly in the event of fallbacks and disruptions in the electronic payment process (Sintonen, Takala, Liikanen & Hellqvist, 2021).

5.2 Future Trends

Covid-19 has rapidly changed the lives of many people. Besides many other things also the choice of payment method and consumer behaviour of many people has changed through the pandemic. More and more people want to pay without cash whenever possible. The number of customers buying online has amplified and online shopping is becoming more popular than before. Many of the payment processes developed during the pandemic will mostly continue after Covid-19. As online purchases have increased, so has the number of criminal activities which pose an increasing risk. There are new forms of scams which is why it is important for everyone to watch out. A suitable solution must be found here to make this area safer (Fibonatix, 2021).

Contactless payments have been very popular for some time. Corona has promoted and accelerated this development. Due to various Corona measures more and more people are switching to cashless payment methods. Payment industries took advantage during the pandemic and encouraged the changing mindset of consumers and retailers (cardsKartencartes, 2020).

Due to the coronavirus, which is globally present more people, as already mentioned, want to pay contactless. Contact with other people is recommended to be kept as low as possible. Mobile payment is thus becoming more and more popular. For many people it represents a secure form of payment which at the same time better protects one's own health. Social influence also plays a major role in the spread of contactless payments methods because recommendations and suggestions from influential and well recognized people are

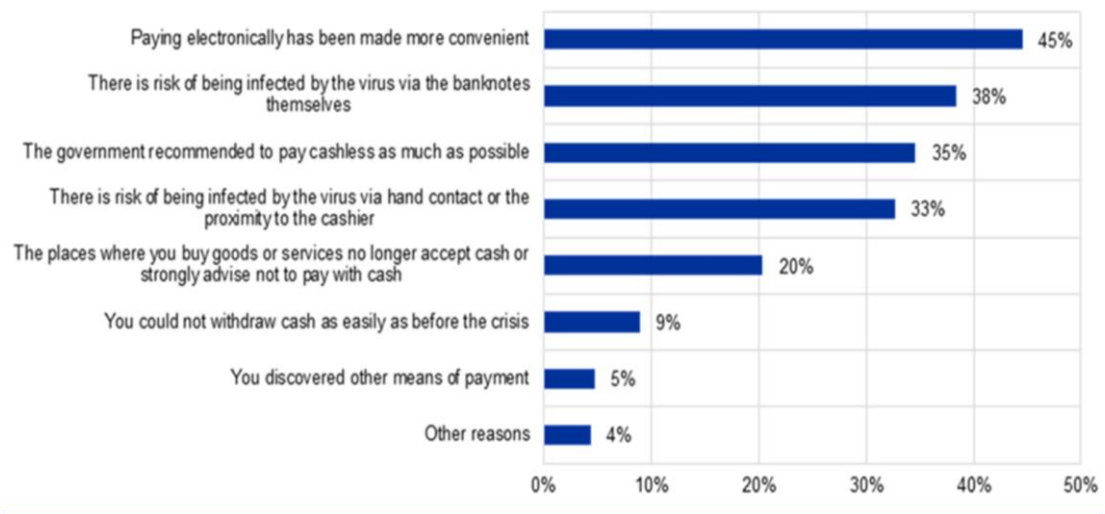
particularly affecting this trend during the corona pandemic. Because more and more people pay contactless for example with mobile payment, these payment methods will remain in the future as they are now an established payment procedure (Zhao & Bacao, 2021).

Moreover, one can see a clear trend towards contactless payment during the pandemic. Not only has the transaction with NFC based cards increased also mobile payment and QR-Codes are supposed to support the payment processes (Lorenz-Meyer, 2021).

In the following statistic one can see the main reasons, why people have changed their payment behaviour during the pandemic. It can be seen in this statistic, that the main reason for the change is simplification. Electronic payment has become more convenient for most people. The second point why consumers have changed their payment behaviour is the risk of being infected with Covid-19 when paying by cash. In addition, as the third point, it was stated that the government recommended to pay cashless as much as possible during the pandemic. In contrast to the second most important reason, the fourth reason mentioned contains the risk of infection through direct or proximity contact with the cashier instead of the risk of infection through banknotes and coins themselves.

FIGURE 8

Main reasons for changing payment behaviour during the pandemic



Source: ECB.

(European Central Bank, 2021)

However, it has been proven, that cash and coins do not pose an increased risk of infection with Covid-19. Infectiologists point out that Covid-19 is a droplet infection and therefore objects like coins and cash pose no higher risk to get the infectious disease. The virus can not be transmitted by cash. There is no solidifying evidence for this claim (Österreichische Nationalbank , 2021).

6 Conclusion

This last chapter has the aim to discuss the identified research question “Which identical or different costs are incurred when paying via NFC compared with the payment in cash?” and outline the findings which have been discussed.

Payment methods play an important role in many people’s lives. Payment methods such as money in the form of cash or cashless payment procedures are necessary in order to be able to pay for various products and services. Different payment methods are crucial when it comes to the payment process itself. Here one can differentiate between NFC based devices, with which you can pay, two examples being NFC based debit cards or the possibility of Mobile payment (Apple Pay) via the, Apple watch and many others means of payment or the well- known payment method in the form of cash.

Nowadays many people are not aware of the consequences that different types of payments, which they are using, can have. For them it is just a step towards satisfying their needs. Everyone should inform oneself about the different types of payment methods as they can result in various costs. While the costs for NFC transactions and cash payments within the EU, if the country is a member state and provided you pay with the euro, are approximately the same, additional costs of different amounts may arise abroad, when paying outside the euro area. Here the major factors of influencing the prices are the different banks, the exchange rates and some other factors, are the main drivers determining how high the actual fees are going to end up. Therefore, it is highly recommended to inform oneself about the different costs that can arise in the respective destination at the relevant bank before you go on a trip or journey abroad.

Furthermore, when making transactions using NFC based devices, regardless of the form, whether it is the mobile or a giro card and so on, it should be considered that personal data is passed on with every transaction processed with these devices. Everyone who is involved in this process receives information on what you have bought, where, when and for which amount of money. Also, your name will be stated. This data is mostly used to create customer profiles in order to create advertisements customized to your preferences or just to get to know as much as possible about someone, in order to use it to one`s own advantage. But is it really to your advantage if so much information about oneself is revealed? These personal details are mostly not used to your advantage. They primarily serve the companies. In such a case, everyone`s privacy is being violated.

Cashless transactions are good when it comes to the speed of the payment processes or if it is for hygienic reasons, even if these statements were not occupied to a 100%. But if one considers the security risks and the personal data that will be disclosed about oneself, one is more likely to be tempted to pay in cash.

There should not only be cash payments neither only cashless payment methods. A combination of both would be an optimal solution and could even lead to synergistic effects. NFC transactions enable online purchases and make the payment process easier, cash is anonymous, so privacy is not invaded, and it is always available and usable in case the NFC technology does not work.

It can therefore be said that paying with cash versus paying cashless, has both their advantages and disadvantages while the arguments for paying with cash are more convincing than that of NFC technologies. More emphasis should be placed on tightening the

security standards and the relevant laws in order to make this type of payment more secure and attractive.

Everyone should be free to choose which form of payment they prefer. However, the costs that may arise as well as the advantages and disadvantages should be carefully considered by every person before him- or herself.

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I hereby declare that:

1. I have written this course work myself, independently and without the aid of unfair or unauthorized resources. Whenever content has been taken directly or indirectly from other sources, this has been indicated and the source referenced.
2. This work has not been previously presented as an examination paper in this or any other form in Austria or abroad.

Titel: **“Critical Comparison of Charges for NFC Payment, instead of paying with Cash”**

Wien, 16.12.2021



Wiederherstellbare Signatur

x 

Camilla Lumbe

Signiert von: 0f0cd864-c9da-4096-8223-1f8e6dde86c0