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Use of Contactless Payment System to Prevent The Spread of Covid-19 in Indonesia

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ABSTRACT

World Health Organization has classified COVID-19 as a pandemic. Many hotels were forced to close because no guests came. Scientists agree that COVID-19 cannot be stopped, experts believe it can be delayed greatly using current "social distancing". This study aims to support the development of payment applications using the Contactless Payment (CP) method by presenting statistical data usage in people around the world. CP payments have become popular and are more accepted as a new payment method in both developed and developing countries. CP continues to grow and influences many factors such as greater spread, financial inclusion, and becoming more convenient, faster, and cheaper. CPs like this play an important role in shaping ecosystems, from regulators, financial institutions, toolmakers, retailers, or vendors, to consumers themselves. The results demonstrated that the technology developed was capable of speeding up and simplifying the hotel booking transaction process. The study's findings also show that the system that was constructed is helpful and that it can be used as part of the digital transformation of direct payments into online payments, as well as one of the options for decreasing the spread of the pandemic. The research conducted in this journal is using quantitative research. The use of CP in Indonesia after the pandemic increased in 2019 (0.3%) and 2020 (0.6%) from the previous year. The presentation method used is secondary data and literature study. This study will compare survey results from several kinds of literature.

Keywords: Covid-19, Contactless Payment, Digital Payment, Hotel Management

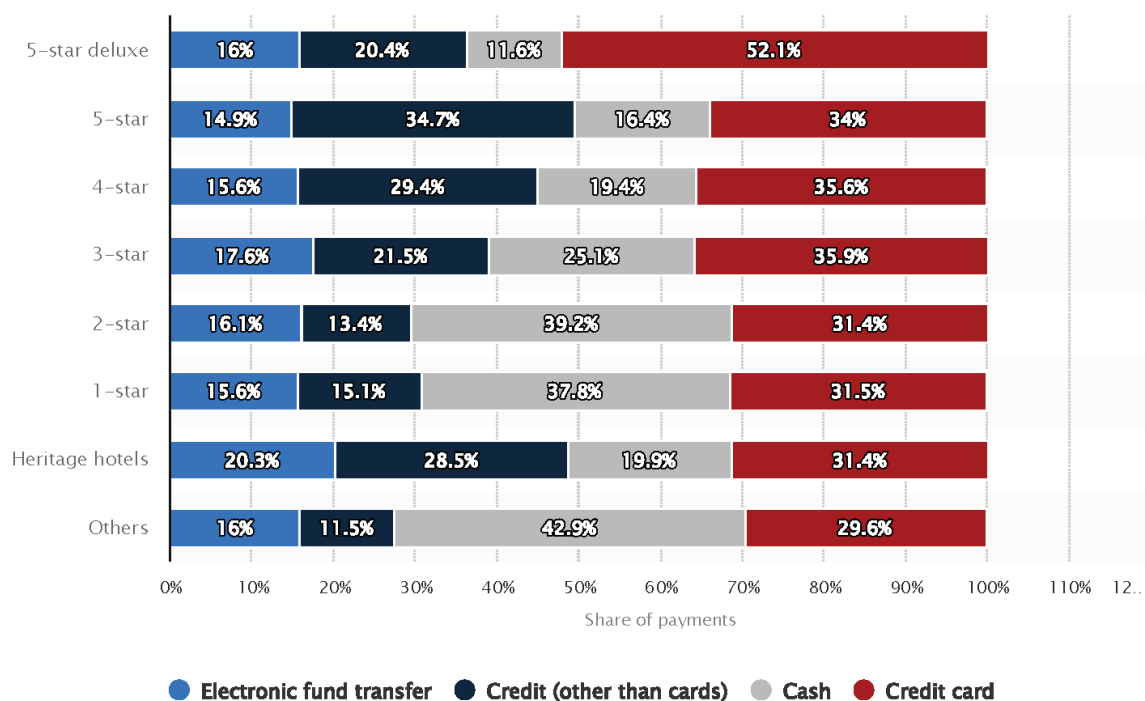
Introduction

In the year 2020, the declaration made by World Health Organization (WHO) marked the formal recognition of the global pandemic resulting from the coronavirus (COVID-19). One of how the severe acute respiratory syndrome coronavirus (SARS-CoV-2) spreads is by coming into direct contact with respiratory droplets generated when individuals sneeze, cough, or talk. Furthermore, it has been observed that the virus can persist on surfaces for extended durations, ranging from several hours to even days. After conducting a thorough examination of available literature and conducting preliminary inquiries into the correlation between the transmission of SARS-CoV-2 and air pollution in impacted areas, our findings indicate that contaminated environments can contribute to an increased rate of viral transmission. This effect is particularly pronounced in moderate to warm weather conditions and when humidity levels are significantly elevated [1]. While researchers agree that COVID-19 cannot be stopped, it can be greatly slowed with what are known as "social distancing" tactics. By reducing human interactions, we have the potential to decrease transmission rates, thereby extending the time it takes for cases to proliferate. Due to the exponential nature of the function, the implementation of measures can have a substantial impact on the overall number of cases as time progresses [2]. The policy of implementing Community Activity Restrictions (PPKM) during the COVID-19 pandemic has also caused various industries to use electronic transactions in the form of QR codes. Just by scanning the QR code or confirming, the payment is completed in an instant. By using a digital wallet, people can minimize direct contact when transacting. WHO warns that physical money (paper or metal)

is a source that can spread the Covid-19 virus. Since March 2020, the COVID-19 pandemic has had a substantial effect on the Indonesian economy. From the onset of the pandemic, it became evident that nearly all sectors of businesses experienced the repercussions of COVID-19, impeding economic activities and exerting strain on global economic progress, including the growth of Indonesia's economy [3].

After COVID-19, many businesses and consumers switched their business strategies to contactless and cashless payment methods. In essence, a business strategy refers to a method or blueprint adopted by a company or business organization to effectively compete within a specific market [4]. India is one of the countries that use this payment method. The statistics below show the findings of a survey on hotel payment methods in India during the 2017 fiscal year, broken down by star category. In India's luxury 5-star hotels, credit card payments constituted 52.1% of the payment methods used during the survey timeframe [5].

Distribution of hotel payment methods across India in FY 2017, by star category

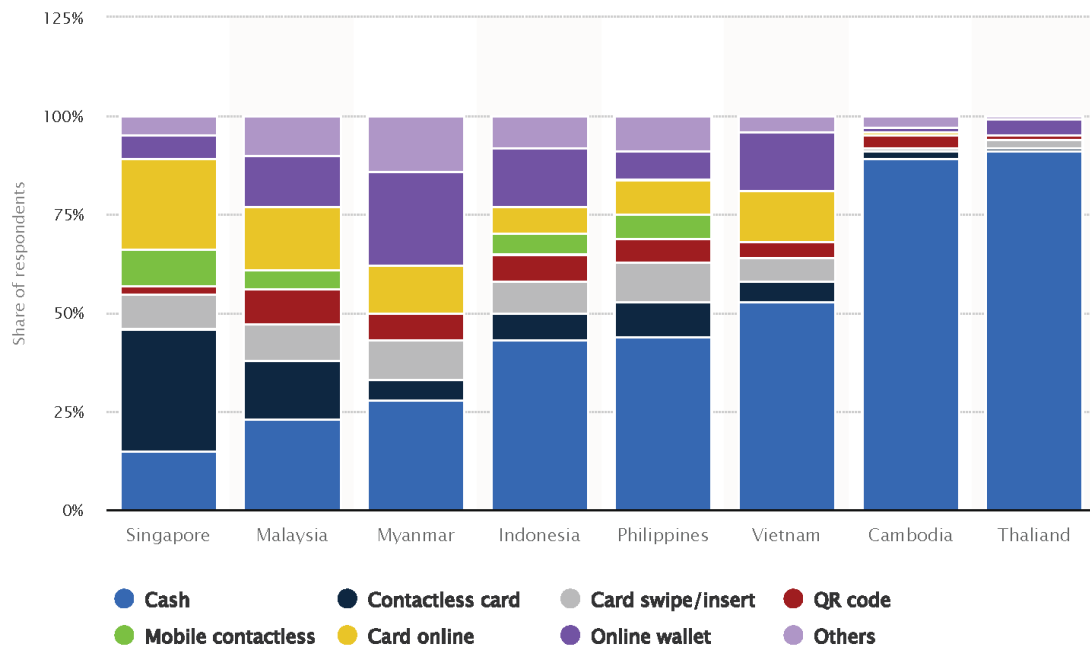


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Figure 1. Distribution of Hotel Payment Methods Across India 2017, By Star Category

The company employs a credit-based cash payment system to handle sales transactions, enabling it to be categorized under the company's accounting records [6]. The first implementation of mobile payment was carried out by a Thai operator around 2005. In Korea, the training mode of transportation also utilizes the services of this telecommunications operator to make direct debits or a reduction in the value of customer credit, as a non-cash transaction in purchasing train tickets [7]. The following is data on the use of Contactless Payment (CP) in Southeast Asia in 2020 [2].

Distribution of preferred payment methods in Southeast Asia in 2020, by country



Additional Information:

Asia; Visa Inc.; Clear; August to September 2020; 7,526 respondents; 18 to 65 years

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Figure 1. CP usage data in South Asia in 2020

The following is a detailed percentage of CP usage data in several Southeast Asian countries [2].

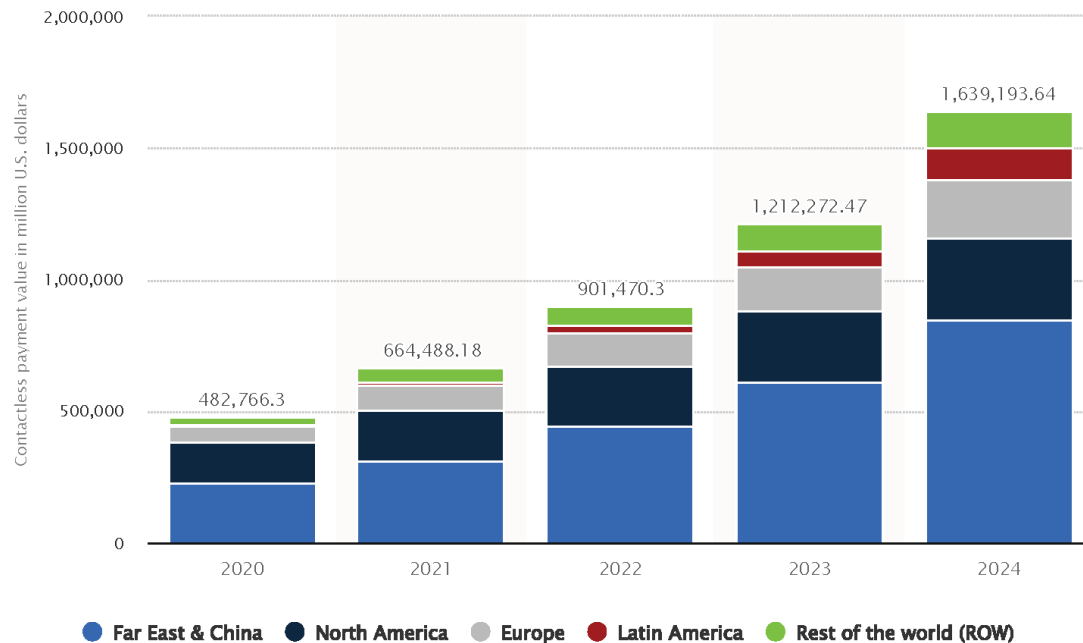
Table 1. CP Usage Data in Southeast Asia

Country	Cash	Contact-less Card	Card Swipe/Insert	QR Code	Mobile Contact-less	Card Online	Online Wallet	Others
Southeast Asia	45%	10%	7%	5%	3%	11%	11%	8%
Singapore	15%	31%	9%	2%	9%	23%	6%	5%
Malaysia	23%	15%	9%	9%	5%	16%	13%	10%
Myanmar	28%	5%	10%	7%	0%	12%	24%	14%
Indonesia	43%	7%	8%	7%	5%	7%	15%	9%
Philippines	44%	9%	10%	6%	6%	9%	7%	9%
Vietnamese	53%	5%	6%	4%	0%	13%	15%	4%
Cambodia	89%	2%	1%	3%	0%	1%	1%	3%
Thailand	91%	1%	2%	1%	0%	0%	4%	1%

From the presented diagram and table, it becomes apparent that CP usage has reached the 50% mark in Southeast Asia. The country with the most use of CP in Singapore, which is as much as 85%. Meanwhile, the country with the smallest number of use of CP in Thailand, which is 91%. Indonesia is in 4th place in the use of CP in Southeast Asia, which is 43%.

The following is CP data in the world in 2020 and improvements in 2024 [7]:

Market size of contactless payments in various regions worldwide in 2020 with forecasts from 2021 to 2024 (in million U.S. dollars)



Additional Information:
 Worldwide; March 2021; Retail payments
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Figure 3. CP Data in the World in 2020 and Improvement in 2021-2024

Based on the data above, it can be seen that the estimated market size of the use of CP worldwide from 2020 to 2024 will increase, with East Asia, China, Russia, the Far East, and Southeast Asia with the highest number of use of CP in the world. Then, it can be determined that many hotels have been forced to employ the CP method to assist slow the spread of Covid-19. As explained in the hotel management section where several hotels have been closed due to the covid pandemic. This payment method can help hotels increase their selling power because there is very little physical contact with many people.

Based on this background, this study intends to investigate the trend of cases using the CP method and see which countries use the method the most. In this study, we present 9 countries in South Asia and 23 countries in the world that have used the CP method. The contribution of this research is to analyze in detail the trend of using CP based on data from Statista. Then, determine the group for each country based on the type of CP based on data from statistics.

Method

The objective of this study is to examine how CP affects mitigating Covid-19 transmission. The research adopts a descriptive research methodology, employing secondary data and literature reviews as the means of data presentation. By comparing survey findings from various sources of literature, this study aims to assess the extent of CP adoption across different regions within a specified area.

The stages in this research are as follows:

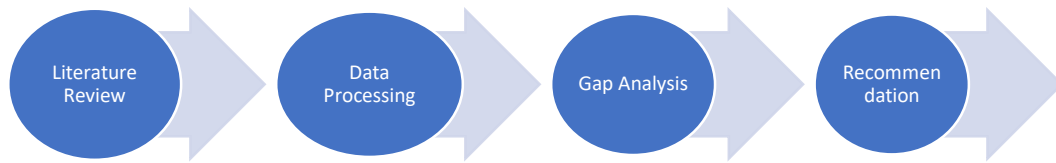


Figure 4. The flow of research stages

The first stage in the work of this research is a literature study. The literature study is the stage of data collection by collecting references and books as well as previous research related to CP, this aims to obtain strong information so that it can be a reference in conducting research. This stage is done by comparing several journals.

After the data and information were obtained from the literature review stage, the research work stage continued at the data management stage. At this stage, the data obtained from the results of the literature review will be processed by grouping based on their respective similarities. This grouping process aims to identify patterns or relationships between relevant data. Using classification methods or algorithms, data can be grouped into categories or groups that have similar attributes or characteristics.

The next stage is GAP Analysis, which is the measurement stage to find out the gap between one variable and another. At this stage, a comparison is made between existing data with the standards or targets set. By conducting this analysis, it can be known the extent of differences or gaps between the observed variables. GAP Analysis helps in identifying areas where there is a mismatch between the existing situation and the desired situation.

After the GAP Analysis stage is complete, the next stage is the Recommendation of results. The result recommendation stage is the stage that has the output of a design or idea compiled from the results of this research.

Results and Discussion

People's lives and services have been altered by the COVID-19 epidemic, which has pushed them into new technology in line with the growth of the "New Normal" lifestyle. Infection risk can be reduced with contactless technology. On March 11, 2020, WHO made an official declaration, recognizing COVID-19 as a pandemic [8].

The following is statistical data for COVID-19 cases worldwide in 2021[9].



Figure 5. Number of COVID-19 cases worldwide as of 16 December 2021, by country

Based on Figure 5 above, the number of COVID-19 cases in the world is 272,514,490. The country with the highest number of cases is the USA where coronavirus cases reached 51,290,979 as of December 16, 2021. While the country affected by COVID-19 with the lowest number of cases is Armenia, with 342,977. Based on the information shown in the picture above, it can be seen that the spread of COVID-19 has a very high rate of spread. It has a significant impact on the world, including Indonesia which has 4,259,644 COVID-19 cases.

COVID-19 has radically changed the world since then, and people have moved online in a variety of ways. This effect helps to speed up digital rendering. Due to the widespread impact of COVID-19, countries that previously did not adopt CP technology have now embraced it as their preferred method of payment. By utilizing CP and digital approaches, individuals can enhance their sense of safety about COVID-19, as they can circumvent physical contact with items like cash, coins, and even other people's hands. According to a survey carried out by RTi Research, approximately 30% of individuals in the United States have adopted Contactless Payment since the beginning of the pandemic. Moreover, it is expected that approximately 70% of these users will continue to use CP even after the COVID-19 situation improves. In Germany, the usage of CP has experienced a significant increase from 35% to over 50% due to the epidemic. China leads in the adoption of CP technology, with e-wallet purchases surpassing cash purchases by a margin of 23%. The adoption of CP technology is primarily motivated by the fear of contracting Covid-19. The perceived risk associated with COVID-19 can be considered a significant factor influencing the choice to implement and sustain CP technology. WHO recommends the use of CP whenever feasible to minimize the risk of COVID-19 transmission. CP pertains to payment transactions that remove the necessity for any physical contact between a consumer's payment device and a physical terminal.

Below presents information regarding the total count of Covid-19 infections in each province of Indonesia as of December 2021 [9].

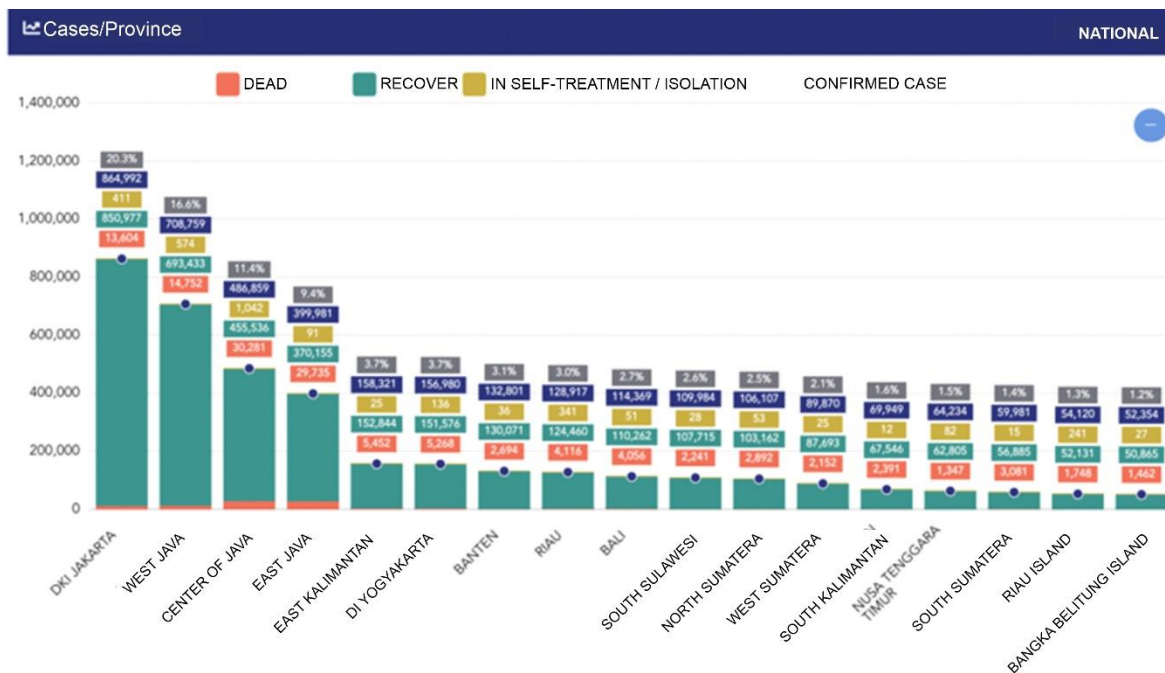


Figure 6. Number of Covid-19 Virus Cases in Indonesia as of December 2021

CP has gained significant popularity and wider acceptance as a novel payment method in both developed and developing nations. CP continues to grow and affects many factors such as greater deployment, financial inclusion, and becoming more convenient, faster, and cheaper. Digital payments like this play an important role in shaping ecosystems ranging from regulators, financial institutions, toolmakers, retailers, or vendors, to consumers themselves. Amidst the Covid-19 pandemic, the utilization of digital wallets as a payment method is on the rise due to their inherent characteristic of not requiring physical interaction with cash. WHO recommendation for physical distancing has inspired many consumers to carry out activities with minimal contact, including

making payment transactions. Digital wallets aim to substitute the presence of traditional wallets that typically hold physical currency, coins, cards, and similar items [10].

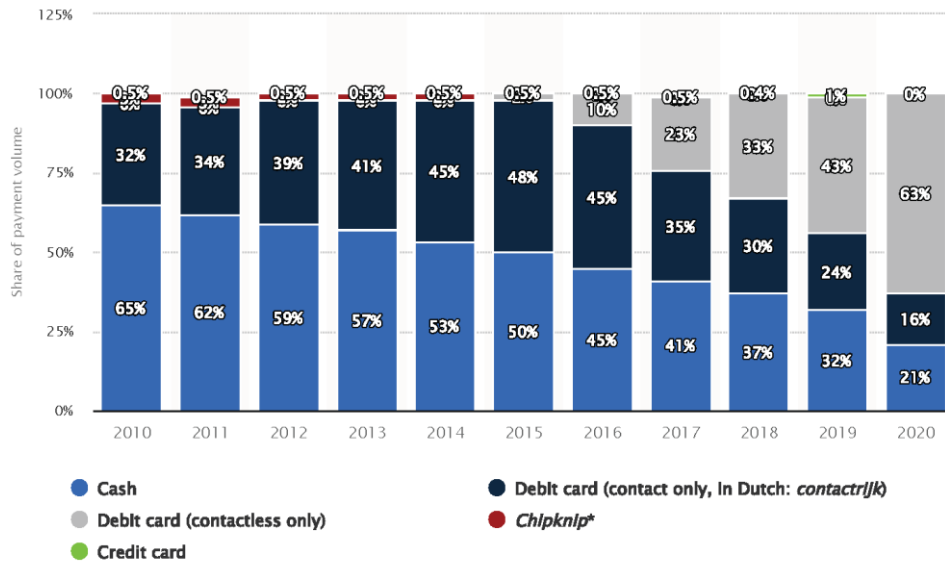
We can also feel the development of technology that continues to advance to make people's lives easier in terms of transactions. According to Sumanjeet, the electronic payment system is part of payment activities between owners of banking businesses or public services. This payment method uses a modern communication technology network facilitated by the Internet [11].

In Indonesia cases of the Covid-19 virus have increased sharply, making CP urgently needed. Electronic applications that are often used in online transactions via smartphones have almost the same purpose as cash or credit payments. Payment accounts in digital wallets are protected with a password, which the user must enter in every online transaction. The Indonesian government is actively promoting cash payment methods to switch to electronic payments. Electronic payment instruments are covered by Bank Indonesia's electronic money regulation, number 20/6/PBI/2018. Consumers have reacted positively to the shift from cash to electronic payment options. The proof is the increase in electronic money transactions every year. Increased use of electronic money [7]. The service function in transacting becomes easier and can be done in the palm of your hand. A multifunctional digital wallet application, all needs can be done directly from a smartphone. This electronic payment can function as a payment system that uses the internet network as an intermediary. The benefits of digital payments are various, including a simple transaction system that can be done universally wherever you are in the same country, guaranteed transaction security, and simpler and more efficient use of time and energy [11].

In developed countries, cash is the predominant payment method used at the point of sale. Retail payments, such as credit cards, debit cards, and digital money, have led to a decline in the use of cash. The latest innovative payment tools, for example, CP is an efficient and convenient payment, CP can also process payments quickly. CP impacts demand for cash, Fujiki, and Tanaka use data from a household-level survey from Japan, which shows that CP with credit cards and value cards reduces cash to use in terms of transactions, value, and volume. CP can remain a troublesome payment method of choice for many people due to privacy and security concerns [10].

CP method has grown rapidly in Finland. Based on the Finnish Taxpayers Association (2019) report, Finland witnessed over 500 million CP transactions made using payment cards in 2018, which accounted for nearly half of all card transactions. This figure is in line with the average across Europe. As per Finance Finland (2019), almost every adult in Finland, aged 18 and above, possesses a debit or credit card, with more than 85% of these cards equipped with NFC technology to facilitate CP [12].

Distribution of payment methods used at POS (points of sale) in the Netherlands from 2010 to 2020, based on transaction volume



Additional Information:
 Netherlands; DNB; 2010 to 2020

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Figure 7. Distribution of Payment Methods Used at POS (Points of Sales) in the Netherlands from 2010 to 2020, by transaction volume

Based on the provided chart, the Netherlands is among the countries that employ CP methods, with credit cards representing approximately 1% of total transactions at various establishments such as bars, restaurants, stores, hotels, and other points of sale in 2020. In contrast, transactions conducted without a debit card comprised 63% of the total transactions during that period, whereas cash payments experienced a decline of 32%. The Netherlands stands as the European nation with the least reliance on cash. The following are statistics on payment methods used in bars, restaurants, and hotels in the Netherlands between 2010 and 2020 [13]. The following is the data of mobile payment users in 23 countries in the world.

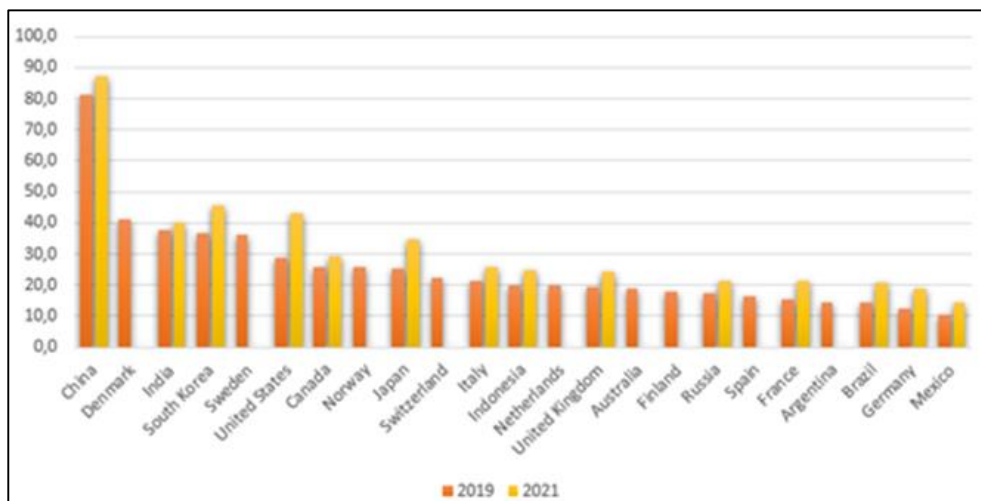


Figure 8. Mobile Payment User Data in 23 Countries

This study builds upon previous research to explore the impact of the e-money payment system in the digital era on the residents of Semarang City during the COVID-19 pandemic. To ensure data accuracy and consistency, the researchers conducted validity, reliability, classical assumption, and multi-correlation tests. Additionally, another study investigates changes in payment patterns in the Netherlands as a result of the Covid-19 pandemic. The researchers collected unique daily payment data from Dutch consumers, sourced from De Nederlandsche Bank (DBA) and the Dutch Payments Association (DPA). Subsequently, the data were analyzed using a combination of binomial logit and multinomial logit regression models, shedding light on shifts in payment behavior and the growing preference for CP.

Considering the overview of the preceding research, a common observation emerges among these three studies, indicating a shared objective of substantiating the proposition that the utilization of CP can effectively mitigate the transmission of COVID-19.

Table 2. Use of CP in Indonesia

Section A: The Value of Non-cash Payments	Unit	2012	2013	2014	2015	2016	2017	2018	2019	2020	Part A: Value of Cashless Payment
Section A: The value of non-cash payments											Total Value of Cashless Payment
Non-cash Value	Juta Rp/Millions	4.004.953.290	17.449.376.182	17.363.258.949	18.654.812.867	22.102.967.774	24.507.240.592	30.626.042.651	36.106.622.131	36.178.467.719	

Based on the table above, it can be concluded that the use of CP in Indonesia has increased in users every year. Using contactless technologies such as NFC (Near Field Communication), users can make payments by simply touching their card or device to a compatible terminal. The speed of transactions and convenience offered by CP has made it an attractive alternative to cash payments. In addition, amid the Covid-19 pandemic, CP also provides additional benefits in terms of reducing physical contact and maintaining hygiene. The following is data from Bank Indonesia regarding the use of cash payments in Indonesia from 2013 – 2020 [14]:

Table 3. Cash Payment in Indonesia

COMPONENT	Unit	2013	2014	2015	2016	2017	2018	2019	2020
Transaction Value	Rp Miliar/Billions of Rp	3.797.370	4.445.073	4.897.794	5.623.913	6.200.438	6.927.268	7.474.824	6.916.875
Cash Transaction Value	Rp Miliar/Billions of Rp	1.674.210	1.920.781	2.100.785	2.353.443	2.528.879	2.837.544	3.204.459	2.990.972

Based on the table above, it can be concluded that the use of cash payments in Indonesia decreased in 2020 due to the covid-19 pandemic. The pandemic situation has changed consumer behavior and affected payment habits. Social restrictions and concerns about the spread of the virus have caused people to prefer to use cashless payment methods such as bank transfers, digital payments, or debit/credit cards. Many shops, restaurants, and service providers are also encouraging the use of cashless payments to minimize physical contact. This has led to a drastic decrease in the use of cash as a means of payment.

Figure 9 shows the gap value. The gap value is obtained from the average cashless value minus cash with the average expected value of each indicator. The following is the Gap data generated from the table above, where the use of cashless is more and has increased every year. As shown in the table below, in 2019-2020 cash payment data decreased and cashless usage data increased during the Covid-19 outbreak. The Covid-19 pandemic could spark fears of the virus spreading through physical touch, including cash that often changes hands. People are starting to realize the importance of maintaining cleanliness and reducing physical contact with everyday objects, including cash [18].

In billion rupiah

Situation	Year	Cash	Cashless	Gap
Before Covid19	2013	1.674.210	17.449.376	15.775.166
		8,8%	91,2%	
	2014	1.920.781	17.363.259	15.442.478
		10,0%	90,0%	
	2015	2.100.785	18.654.813	16.554.028
		10,1%	89,9%	
	2016	2.353.443	22.102.968	19.749.525
		9,6%	90,4%	
	2017	2.528.879	24.507.241	21.978.362
		9,4%	90,6%	
2018	2.837.544	30.626.043	27.788.499	
	8,5%	91,5%		
Covid19	2019	3.204.459	36.106.622	32.902.163
		8,2%	91,8%	
	2020	2.990.972	36.178.468	33.187.496
		7,6%	92,4%	
Avg		1.307.405	13.532.586	22.922.214

Figure 9. Gap Analysis Cashless and Cash

The following is a graph of Cashless usage in 2013-2020:

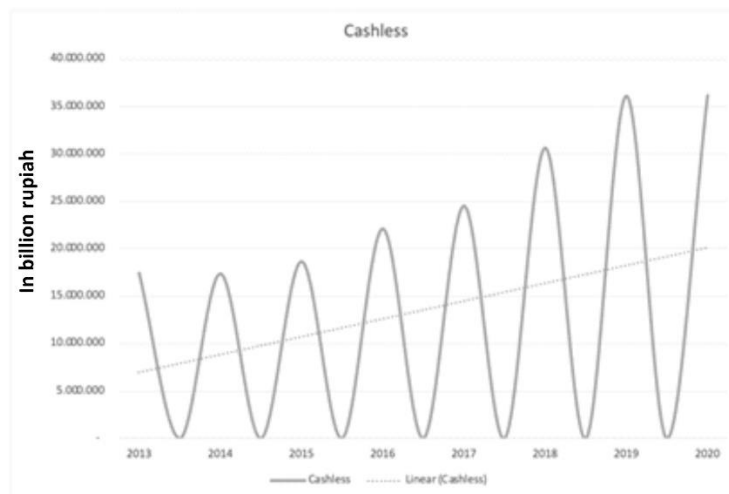


Figure 10. Cashless Usage Graph

Figure 10 illustrates a continuous annual growth in the number of cashless users in Indonesia. The data reveals a 0.3% increase in 2019, followed by a rise to 0.6% in 2020. The current scenario indicates a preference for cashless payment transactions over the use of physical cash, observed during the COVID-19 outbreak. By transacting payments using cashless, it is hoped that this will reduce the wider spread of the COVID-19 virus. People tend to prefer to use non-cash payment transactions rather than cash. This phenomenon can be seen in the increasing use of credit cards, digital wallets, and other online payment methods. One of the main reasons why people are switching to cashless transactions is the ease and speed it offers. By using this payment method, one does not need to carry cash physically, simply by using a card or app on their smartphone. In addition, cashless payments also provide a higher level of security, reducing the risk of loss or theft of physical money.

The following is a graph of cash payments in 2013-2020:

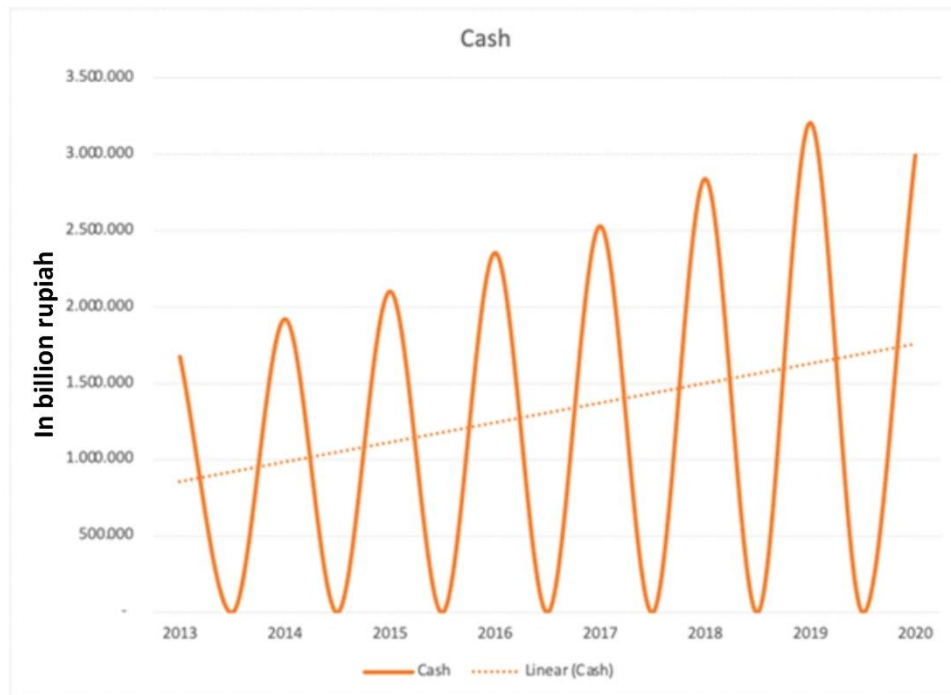


Figure 11. Cash Payment Chart

In Figure 11 it can be seen that the amount of cash used in Indonesia continues to decline after the pandemic. In 2019 it decreased by 0.3% and in 2020 it fell to 0.6%. During the COVID-19 pandemic, individuals displayed a preference for utilizing cashless payment methods instead of physical currency, as evidenced by the prevailing circumstances.

Based on the previous debate, the researcher explains cashless transactions that have been taking place since 2009, when the Bank Indonesia Regulation (PBI No. 11/12/PBI/2019) on electronic money was enacted. The launch of the National Non-Cash Movement (GNNT) by Bank Indonesia in 2014 only added to this. Furthermore, non-cash payment services and facilities have been quietly emerging in the Indonesian economy since then.

When positive cases of COVID-19 in Indonesia are increasing, non-cash payments are a way out as a way to prevent the spread of COVID-19 by avoiding direct contact. In addition, non-cash payments are considered more practical and efficient, because the payment method only uses a scan of a QR code or confirmation, payments can be completed in an instant. In the context of electronic money services, Bank Indonesia divides them into two categories. This refers to the regulation issued by BI, namely Regulation Number 20/6/PBI/2018 concerning Electronic Money.

Strengthening digital technology to support Hospitality economic activities, where this effort is a form of continuation of the short-term strategy. However, in the long-term strategy digital technology must be the main platform in the Hospitality business process. Where, in the future, it is hoped that Hospitality can use digital technology to process non-cash payments.

From the data above, it can be said that CP is the right choice for the Indonesian people to make payments during the Covid-19 pandemic. And based on a literature study of several previous studies, it is said that CP can encourage consumers to reduce the risk of transmitting the virus, other reasons such as being more comfortable because they don't need to carry cash, being easy to use, and being safe.

The following is the actor's interaction with the system which is illustrated by a use case diagram. Use cases play a crucial role in the Unified Modeling Language (UML), providing a cohesive narrative of a system's behavior [15]. This system consists of four actors, namely the customer, admin, finance department, and manager. Each actor has different access rights from one another.

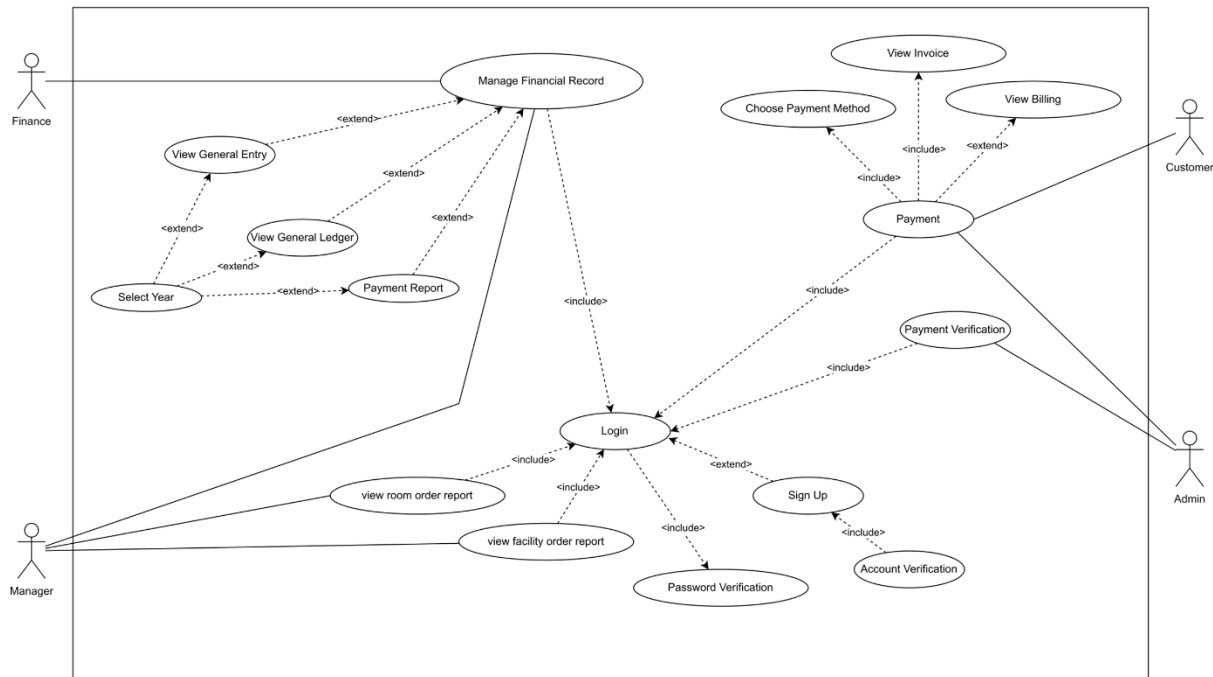


Figure 12. Use Case for Room and Facility Booking Payments

Based on the picture above, Hospitality can be explained as follows:

- a. Customers
 Can do both booking and check-in online. Customers can see billing access first in the system before making a payment, customers can also access the payment method they want to choose and get access to the system to see invoices from the results of payment transactions.
- b. Admin
 To help guests make the booking process, check-in, and check-out, issue billing, receive payments, and make room and facility reports.
- c. Finance
 To make journals, ledgers, and financial reports.
- d. Manager
 To check journals, ledgers, and financial reports, make decisions, and receive financial reports. The manager can also check room reservations and other facilities within a certain time.

Conclusion

The rapid transmission of Covid-19 occurs through various means, one of which involves the respiratory transmission mechanism of the severe acute respiratory syndrome coronavirus (SARS-CoV-2). This virus spreads among humans through actions such as sneezing, coughing, and the release of respiratory droplets into the air. However, there is ample evidence that infectious viruses can survive for hours to days on inanimate surfaces. Therefore, this study aims to examine the trend analysis of confirmed cases in all affected countries and try to find solutions to suppress the

spread of Covid-19 by increasing the CP method. Because consumers do not have to come into direct contact with other people's surfaces such as banknotes, coins, or even your hands, CP and digital methods involve less physical connection and users feel safer against COVID-19 infection. Since the outbreak, around 30% of US respondents have started using CP, according to a survey by RTi Research. Furthermore, after COVID-19, approximately 70% of these users were allowed to continue using CP. As a result of the pandemic, the utilization of CP in Germany experienced rapid growth, increasing from 35 percent to over 50 percent. When it comes to the adoption of Contactless Payment technology, China boasts the highest rate, with e-wallet payments surpassing cash transactions by a margin of 23%. Based on statistical data, CP is utilized in 23 different countries, encompassing China, Denmark, India, South Korea, Sweden, United States, Canada, Norway, Japan, Switzerland, Italy, Indonesia, Netherlands, United Kingdom, and Australia. Additionally, Finland, Russia, Spain, France, Argentina, Brazil, Germany, and Mexico are also included in the list. Where the majority of the CP methods appear in China, which represents >80% of China's population in 2021.

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