

# THE RISE OF CONTACTLESS AND DIGITAL PAYMENTS: POST-PANDEMIC CONSUMER BEHAVIOR SHIFT

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**Abstract-** This paper aims to discover the effect of COVID-19 on customers' intentions for digital and contactless payment methods, and to achieve this aim, both secondary quantitative and qualitative data collection and analysis have been taken into consideration. Technological progression has necessitated that today's customer depends on their mobile phone because everything is faster, easier, and more convenient to use from the mobile phone as opposed to a desktop computer or laptop. This change in customers stimulated innovations in the fintech sector, increasing economic incorporation. The COVID-19 pandemic rushed the development of digital payment systems, motivating habits of customers on a long-term basis. On the other hand, Downtime or glitches in payment systems can happen and, some of the time, can interrupt transactions, causing a source of frustration and inconvenience. Moreover, digital and contactless payment increases financial inclusion.

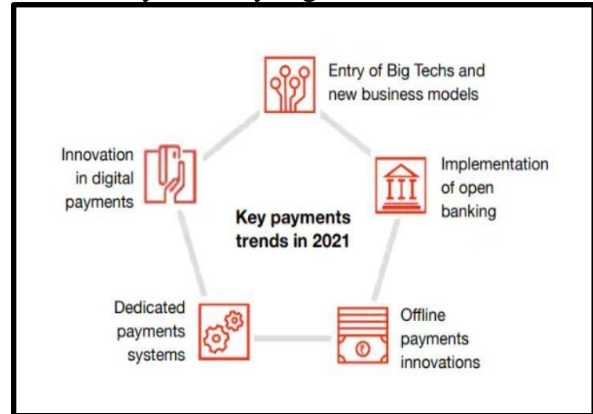
**Index Terms-** Digital Payments, Online Payment, Contactless Transactions, Consumer Behaviour Shift, COVID-19

## I. INTRODUCTION

### A. Background to the Study

Payments through mobile phones are now the easiest mode of payment rather than primitive modes of payment, giving the impression that the whole world is now getting digitalised. Contactless payments, where personal or face-to-face contact with the service provider is either less or non-

existent [1]. This has also decreased the use of currency in many regions of the world.



**Figure 1: Key Payment Trends**

[2]

Figure 1 has highlighted key payment trends of 2021 including, innovation in digital payments, implementation of open banking, dedicated payment system, and others [2]. Digital transactions have observed a 27% hike in the FY 2020 and 2021 and processed 12.5 billion transactions of the total 46 billion digital transactions [3]. Digital payment trends have also been helping banks to decrease cash requirements on Branches and ATMs. Thus, COVID-19 has led to a transformation in payment preferences to be more adaptive towards digital or contactless payments.

### B. Overview

The global pandemic in 2020 rushed the integration of digital transitions as users valued flexibility and safety. Companies and financial sectors reacted by developing their digital infrastructure, causing a major transformation in consumer preferences. QR codes, E-wallets, tap-to-pay, UPIs, and others

are greatly acknowledged by customers worldwide, decreasing the load on cash transactions. Consumers' decision to use contactless payment is an endogenous choice [4]. Thus, after COVID-19, digital transactions are rising, forming global commerce by creating secure, flexible, and faster payment solutions compared to manual or cash-based transactions.

### ***C. Problem Statement***

The faster rise of digital transactions and payments after COVID-19 has reformed the preferences of the customers; however, it has also led to some challenges, including financial inclusion gaps, cybersecurity threats, and resistance to change from the end customers to change their way of payment. Observing these transformations is major for companies, policymakers, and financial sectors to coordinate a quick transition. Thus, this research has been cultivating the role-play of COVID-19 on the payment choices of users, showing awareness, adaptability challenges, and thriving advancement through digitalisation. IoT enables the application of digital electronic payments without the threat of losing money [5]. Thus, by interpreting trends and choices of costumes, this paper can create evaluations to decrease certain limitations, improving payment security and enhancing financial incorporation, leading to more thriving and digital economic conditions.

### ***D. Objectives***

The primary goals of this paper are: 1. To identify the effect of COVID-19 on customers' behaviour for contactless and digital payments. 2. To highlight core factors enhancing the incorporation of digital and contactless payment processes. 3. To observe security threats and concerns related to the process of digital payments. 4. To propose strategies to increase awareness and strengthen adaptation of Contactless and Digital Payments among customers. Therefore, these research objectives aim to

discover the effect of COVID-19 on customers' intentions for digital and contactless payment methods.

### ***E. Scope and Significance***

This paper aims to discover shifts in customers' behaviour and intentions after COVID-19 toward digital payment modes, concentrating on technological advancement, trends, financial incorporation, and privacy concerns. This investigates the contribution of banks, fintech companies, and the authoritative sector to reform the cashless and digital economy. Additionally, the significance of this paper revolves around the knowledge of how digitalisation in payment infrastructure decreases cash-based transitions, improves the efficiency of transitions, and leads to further financial development. The proportions of transactions for contactless cards per inhabitant were identified to be rising rapidly in both advanced and emerging market economies [6]. The outcomes of this paper will be beneficial for companies, financial institutions, and policymakers. Moreover, this paper will be a thriving one towards the improvement of the faster and future-based ecosystem of payments.

## **II. LITERATURE REVIEW**

### ***A. Effect of COVID-19 on customers' behaviour***

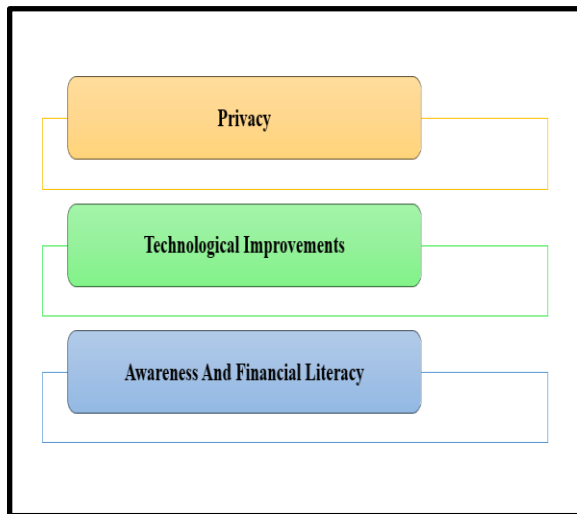
The relative costs and benefits of different payment methods have temporarily been changed by COVID-19. Online is where the new and renewal policy payments are being made since insurers saw a rise in digital payments due to COVID-19. The pandemic may have given a sizable push in the endeavour to marginalize cash transactions, but not so far as to eradicate it effectively [7]. Lockdowns and social distancing norms forced both customers and companies to incorporate online payment methods, decreasing the dependence on cash transactions. Around 79% of users agreed to

use contactless payments due to safety and cleanliness [8].

Companies that incorporated digitalisation in their payment infrastructure created a major competitive advantage in this market, increasing the satisfaction rate of customers. For example, Starbucks created its mobile application to initiate and improve digital payment infrastructure. More than 26 million active users engaged with the loyalty and Rewards program of the company, and more than 50% of purchases were done using online payment methods [9].

**B. Factors enhancing the incorporation of digital and contactless payment**

Adaptation of contactless and online payment infrastructures is encouraged by multiple code elements such as technological improvements, security measures, flexibility, authoritative guidance, and financial awareness.



**Figure 2: Factors Influencing Digital Payments**

[Source: Self-Created]

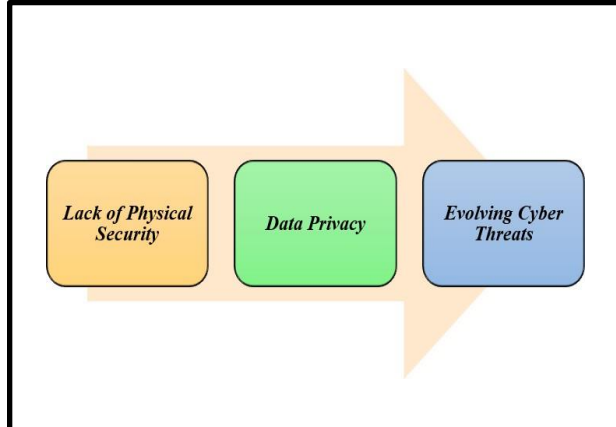
Flexibility in this regard is critical as online payment methods can create seamless, less complex, and faster transactions than the traditional or cash-based method. Privacy, on the other hand, is also important as users prefer domains with strong fraud detection and end-to-end encryption. Technological improvements, on the other hand, such as

NFC, biometric authentication, IoT, and blockchain, have been improving accessibility and trustworthiness among users. Contactless payment cards are one of the current innovations in digital payments [10]. Furthermore, awareness and financial literacy have also been affecting the adaptation of digital payment modes among users, specifically among older adults or people living in rural areas who hesitate to incorporate digitalisation as their banking alternative due to a lack of knowledge. In addition to this, policies from the government, including PSD2 directives of Europe, have enhanced online transactions by specifying ace of use [11]. Moreover, companies and financial institutions need to refer to these attributes by improving security measures, promoting awareness and developing the overall experience of the customers to increase the digital payment adaptation rate after COVID-19.

**C. Security threats and concerns of digital payments**

Transactions and contactless payments are convenient but are prone to security problems such as fraud, data breaches, malware/phishing, and unauthorized access. Privacy issues and weak or poor authentication processes are major threats to digital payment infrastructure [12]. Digital transactions are easy and offer the prospect to fraudsters to use many different tactics such as phishing, card-not-present fraud, and others. Sensitive data such as credit card details, passwords, and personal identifying numbers are at risk if the system is on an unsecured system or has weak security protocols. Devices can be infected by malware and information stolen, and phishing attempts trick users into revealing information to phishing emails, messages, or websites that are deceptive. Involving the user credentials, cybercriminals, in turn, can access accounts without any authorization,

carry out fraudulent transactions, and lose money.



**Figure 3: Security threats**

[Source: Self-Created]

The lack of physical security for mobile wallets is not as physically secure as traditional payment methods, making the risk of theft and unauthorized access more possible. Even though vulnerabilities in digital payment systems are being constantly discovered by cybercriminals who keep developing new techniques and tools to exploit them, this is still viewed as a persistent threat [12]. With contactless systems collecting a large volume of data, there are privacy concerns and questions about whether users' behaviour can be tracked.

#### **D. Increasing awareness and strengthening adaptation of Contactless and Digital Payments**

Thus, to develop online and contactless payment infrastructure, companies as well as authorities need to concentrate on financial incorporation, customer awareness, and cybersecurity improvements. Enlarging digital infrastructure and education in developing regions, marketing inexpensive mobile phones, and oversimplifying payment processes increase visibility. Furthermore, improved multi-factor authentication, end-to-end encryption, and AI-based fraud detection increased privacy and security measures. TAM proposed is the most powerful framework to describe the action in the new

technology acceptance, particularly in digital technology adoption [13]. Furthermore, TAM or the “Technology Acceptance Model” as a theory supports by describing the security enhancement of online payments and its adaptations.

### **III. METHODOLOGY**

#### **A. Research Design**

Research design is identified as a strategy that is incorporated to implement the research plan, method, and strategies. Thus, to investigate the “effect of COVID-19 on customers' intentions for digital and contactless payment methods”, this paper has selected an explanatory research design. Explanatory design is a two-stage process that includes quantitative data being incorporated as the basis on which to propose and describe qualitative data [14]. This research design assists the outcomes of this paper by interpreting the “cause-and-effect correlation” between the trend of online payments and the effect of COVID-19. This research design also guides the identification of elements of increasing privacy measures, adoption, knowledge, and interventions with the help of both quantitative and qualitative findings. On the other hand, descriptive and exploratory were not selected due to their lack of informal depth in describing behavioural transformations.

#### **B. Data Collection**

This research has been conducted through a multi-research method by incorporating both secondary quantitative and qualitative data collection and analysis techniques. Journal articles and case study examples are the data sources used for the secondary qualitative analysis. On the other hand, statistical charts, graphs, and data are chosen and collected to do the secondary quantitative method in this paper.

#### **C. Case Studies/Examples**

Case Study 1: Contactless Payments Through Walmart Pay

Walmart has launched Walmart Pay, enabling its consumers to pay by scanning QR codes [15]. This has decreased checkout time for both the employees and customers, leading to an increased satisfaction rate of customers.

**Case Study 2: Digital Payment Expansion in PayPal**

PayPal has observed a rush in online payment modes after COVID-19, needing more effective fraud detection technology. This company has observed a 30% rise in the whole payment volume in the first quarter of 2021 [16].

**Case Study 3: Acceleration of Contactless Payment- A Case Study of Visa**

Visa has diversified its NFC and tap-to-pay payment processes to achieve increasing demand for contactless payment from the end of costumes after COVID-19. A major one-third of all Visa transactions worldwide were done digitally, with a 40% YoY increase in the tap-to-pay feature [17].

**D. Evaluation Metrics**

Evaluation Metrics	Definition	Relevance to the paper
Transaction Volume	Total proportions of digital or online transactions made.	This has been assessing the market expansion and financial effect.
Adoption Rate	This is the proportion of users using online and contactless payment methods.	Calculates the overall transformations in customers' intentions after COVID-19.
Financial Inclusion Index	FI-Index is a type of composite index that calculates	Highlights limitations in accessibility in the incorporation.

	the extent of financial incorporation.	
User Satisfaction Score	CSAT calculates the satisfaction rate of customers along with service and product and is measured as a "percentage of satisfied users"; it is validated in the context of mobile payments [18].	Determines trustworthiness and usability rate of customers.

**Table 1: Evaluation Metrics**

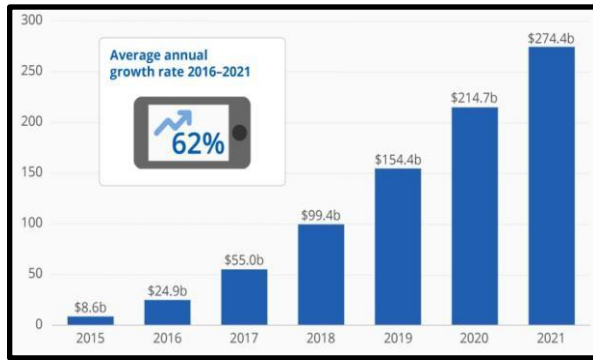
[Source: Self-Created]

The above table has highlighted quantifiable outcomes into security threats, adoption rates, financial incorporations, and other navigating companies that thrive on digital payment infrastructure.

**IV. RESULTS**

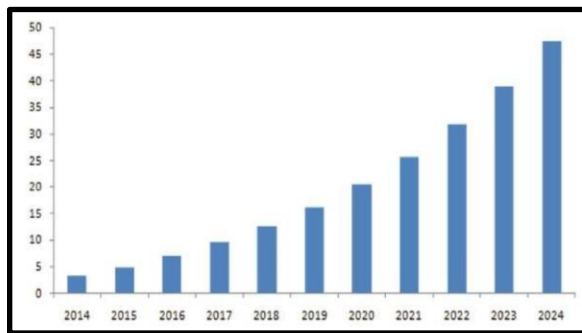
**A. Data Presentation**

COVID-19 rushed the transformation towards digital and contactless payments. Modifying customers' actions in a post-pandemic era in multiple ways, for example, payments through QR codes, e-wallets, UPI, tap-to-pay and others, increased online transaction rates among customers.



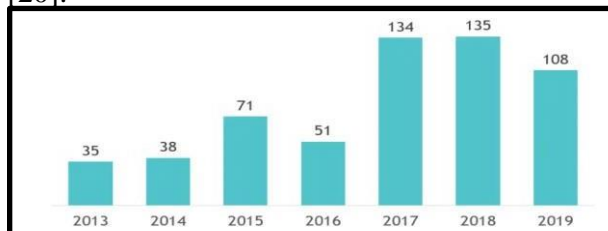
**Figure 4: Rise of Digital Payment Trend** [19]

Figure 4 has highlighted the growth of digital payment mobile payment volume from 2015 to 2021. This has increased from \$25 billion in 2016 to \$275 billion by the end of 2021 [19]. This shows a growth rate of around 62%.



**Figure 5: Growth of NFC** [20]

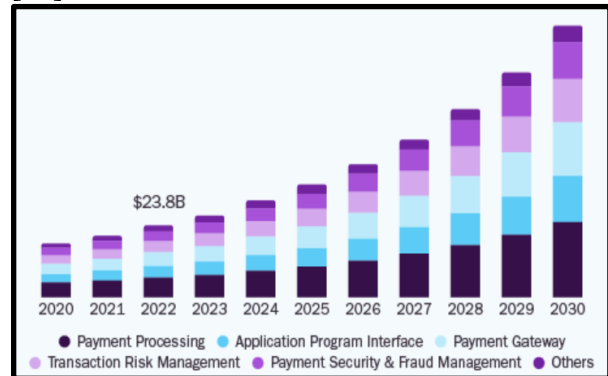
Additionally, the above figure shows the growth of NFC in the domain of digital payment modules as a factor contributing to the adaptation of online and contactless payments. NFC transactions have increased by 27% from 2018 to 2019 in the markets [20].



**Figure 6: Data Breach Issues** [21]

However, digitalisation in the payment module has its threats, including resistance to

change, lack of awareness, lack of knowledge, cyber security threats, and others. Figure 6 has highlighted data Breach Issues due to the digital payment process from 2013 to 2019. The highest proportion of DDoS attack traffic was around 30% in 2018 [21].



**Figure 7: Digital Payment Market Size** [22]

The above figure has highlighted the market overview and size of the digital payment sector from 2020 to 2030. The international digital payment market size is anticipated to increase at a CAGR of 21.1% by the end of 2030 [22].

### B. Findings

The 1st research objective shows the effects of COVID-19 on customers' behaviour for contactless and digital payments, and to achieve this objective, figure 4 has highlighted the incorporation and the growth of the digital payment process from 2015 to 2021. This market size has touched \$275 billion by the end of 2021 [19]. Additionally, figure 5 shows the incorporation of NFC in the market as a factor to improve the incorporation of digital and contactless payment processes. NFC technology has touched a 50% growth rate in these years with 27% of interactions [20]. On the other hand, data breach issues have been the most frequent threat to online and contactless payments in 2020 and 2021, from Figure 6, fulfilling objective 3. Furthermore, figure 7 highlights the growth trend and market size of Digital Payment, which helps to increase

awareness and strengthen the adaptation of Contactless and Digital Payments among customers [22].

**C. Case Study Outcomes**

Case Study Examples	Company	Outcome	Relevance to the paper
Contactless Payments Through Walmart Pay	Walmart	This launch has raised competition and major security vulnerabilities with increased checkout speed [15].	This case study example highlights the transformations of users to digital payment infrastructure because of flexibility and health awareness after COVID-19.
Digital Payment Expansion	PayPal	The total payment volume of the company has increased by 31%, with \$285 billion in revenue generation in 2021 [16].	This example highlighted the requirement to reinforce privacy measures in contactless and online payments to increase the

Acceleration of Contactless Payments	Visa	1 in 3 transactions through Visa were online and contactless after COVID-19 [17].	trustworthiness of customers . This case study example is relevant to this paper as it shows the increasing adaptability of online payments and technological improvements in the sector.
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**Table 2: Case Study Outcomes**

[Source: Self-Created]

The above table has highlighted the increasing demand for online payments, technological advancements, security requirements, and reforming digitalisation in payment modules after COVID-19.

**D. Comparative Analysis**

Author	Aim	Outcomes	Gaps identified
[7]	“This paper aims to explore the effect of the COVID-19 Pandemic on Digital Payments”	The downward effect of COVID-19's impact on the payment landscape has been profound and	Lack of statistical research

		major, yet not irreparable	
[10]	This paper aims to show the “Card-Sales Response” of contactless payment acceptance is larger for small merchants	“Card-sales response” of contactless payment acceptance is larger for small merchants	Lack of theoretical incorporations
[12]	This article aims to highlight “challenges and develop a Framework of Digital Financial Services”.	ISM framework highlight the role of “high-cost and low return-related problem (V11””, which triggers further issues of DFS	Lack of theory use
[13]	This paper aims to “analyse the intention of digital payment adoption by	Factor of perceived usefulness, variable of perceived ease of	Lack of descriptive discussion

SMEs”	usage, and trust are the core drivers encouraging the behaviour to use the digital payment system in SMEs
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**Table 3: Comparison of Secondary Articles**

[Source: Self-Created]

Comparative analysis in table 3 helps to fulfil research objectives by identifying aims, findings, and gaps specifying the incorporation of digital and contactless payments.

## V. DISCUSSION

### A. Interpretation of Results

The research findings fit the set research aim and objectives, showing the significant nature of Contactless and Digital Payments to influence Consumer Behaviour after COVID-19. Both qualitative and quantitative analyses were done to fulfil the parameters of RO1; for example, case examples of Walmart, Visa, and PayPal show the thriving nature of digital and contactless card payment to modify the intentions of customers. On the other hand, Privacy NFC, biometric authentication, IoT, and blockchain have been identified as factors improving the incorporation of digital and contactless payment processes. On the other hand, quantitative findings have highlighted the growth of NFC, supporting the arguments for the role of digital payments in influencing customers' behaviour [20]. In addition to these, data breaches, malware/phishing, unauthorized access, Privacy issues, and

others were identified as digital payment-based security concerns fulfilling the parameters of RO3. Moreover, initiatives such as financial incorporation, customer awareness, and cybersecurity improvements help to increase awareness and strengthen adaptation of Contactless and Digital Payments among customers [22].

### ***B. Practical Implications***

The implication of this topic lies in the thriving nature of online and contactless payment processes that have critical real-world usage for companies and financial sectors as users. Fintech and banks are required to increase their privacy and security assessment to detect and decrease fraud activities while specifying authoritative conformance [7]. Retail owners, on the other hand, need to apply smooth payment interventions to increase the trustworthiness of their customers and increase revenue generation. Furthermore, governments need to market financial incorporation by diversifying the infrastructure of digital contactless payment. Moreover, online and cashless transactions enhance efficacy, decrease handling charges, and contribute towards the growth of the cashless and digitalised era.

### ***C. Challenges and Limitations***

However, this paper had certain limitations, including its selection of only secondary research methods, which include biases in opinions that decrease further credibility of the outcome. After that, this paper used only 2 to 3 qualitative samples, including company examples such as Visa, Walmart, and PayPal, which decreased the generality of the research outcome further [15]. Furthermore, a study on the changes in customers' intentions and actions after COVID-19 needs longitudinal processes to highlight long-term trends compared to the study of short-term effects.

### ***D. Recommendations***

Professionals who want to incorporate Contactless and Digital payment processes need to integrate an omnichannel intervention by applying digital payment methods around mobile, online, and in-store purchasing. Professionals need to follow both national and international norms, including PSD2 and others [11]. Furthermore, they need to improve security measures by applying “multi-factor authentication,” “end-to-end encryptions,” and AI-based technologies to detect threats and fraud activities to safeguard online transactions.

## **VI. CONCLUSION AND FUTURE WORK**

In conclusion, the degree of digital and contactless payment increases financial inclusion. Further research on this paper needs to cultivate trends in customer behaviour for the long term in contactless and online payments, the effect of technologies such as IoT, AI, and others, and the contribution of authoritative norms in financial incorporations. Furthermore, discovering market conditions and the impact of biometric authentication reinforces the knowledge of worldwide digital payment and security enhancement.

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