



The Evolution of Digital Payments and its Impact on the Economy

Nakul Jindal

Abstract

The topic of this research paper is the advancement of digital payments in terms of how the technology has evolved. We will also be going over the implications of the implementation of digital payments on the economy. We will be seeing many different cases across different countries and any key distinctions. COVID-19 was catastrophic to most businesses. Cash based transactions were almost completely shut down. All payments taking place were almost completely restricted to digital transactions. This really accelerated the notion that cashless payments are a superior alternative to cash and people began questioning whether it is better to move online. The importance of this study is to see past trends in the evolution of technology, economics and business as a result of digital payments. This can help us predict the future and see trends along the way. It also helps us see whether digital payments at their current state are a suitable upgrade to cash and whether cash payments are obsolete and replaceable.

Keywords : Digital Transactions, Digital Payments Technology, Cryptocurrency, Cashless Transactions

Introduction

Digital payments have evolved a lot since their inception in the late 1800's. Things really kicked off when the US launched its Advanced Research Projects Agency Network in the 1960's [1]. The platform helped build the internet, paving the way for payment methods. The Stanford Federal Credit Union was one of the preliminary pioneers, being the first financial institute in North America to offer online banking services to customers. This was in 1994[2].

In the late 1990's came PayPal. PayPal is credited to have rapidly accelerated the evolution of the digital payments landscape to what it is today.[3] PayPal went on to pave its name in the market, becoming one of the first online payment's providers to be established globally. PayPal was extremely innovative and introduced many practices which have remained mainstays in

most online payment provider's services to this very day. It was one of the first companies to allow users to make payments and carry out transactions by making use of mobile applications or using something as simple as one's email address.[3]

After witnessing how the Western world was adopting digital payments and not wanting to get left behind, rumblings of digital payments technologies became prevalent in Asia. China's digital payment revolution started with two tech juggernauts: Alibaba and Tencent. Alibaba was established in 1999 as a B2B ecommerce company[4]. Alibaba introduced Alipay in 2003 due to the distrust in digital transactions between strangers. Later in 2005, Tencent followed with Tenpay. This was created to support its multiple other ventures.[4] Digital payments in India can be traced back to 1996, where the Industrial Credit and Investment Corporation of India, known as ICICI offered digital services to their clients[1]

Ever since then digital payments have evolved and changed to make users' experience easier, effortless and efficient. From debit and credit cards to NFC and being able to pay from smartphones to cryptocurrency,[5] the evolution of digital payment methods have been expansive and have put the conventional norms to shame, so much so that completely removing cash has become a prevalent debate.

COVID-19 has also caused a huge increase/ shift of consumer demand online creating opportunities for emerging digital industries. Hence further resulting in an increase in digital transactions. The businesses that did not close down shifted to work-from-home/ working online and hence the payments they received also had to be online, so digital banking went up as well.

Methodology

Research Aim

As discussed before, the aim for this research is to see how digital payments have evolved from its creation in terms of technology and how it is affecting the economies of the world in the present day. How are businesses coping from it ? Is it a boon or a burden ? Taking a look at also

a comparison between efficiency of cashless and cash transactions will tell us whether digital payments are ready in today's world climate to step in and completely replace cash based transactions.

We will see how digital payments were introduced in different countries, as well as how they adapted and how each country's payment schemes differ from each other. We will be comparing developed countries with developing or underdeveloped countries to get a contrast between the varying income groups and how they are able to adapt and whether implementing these technologies in their daily lives is easy or a struggle.

Secondly, we will compare businesses and how much change has been in their efficiency and work since they have begun using digital payments. We will be mainly making use of COVID statistics because that is when most of the businesses were operating using digital payments on a large scale and when customers were mostly using digital payments to make transactions.

Discussion

1. Effect on technology

Electronic payments have been around since as far back as the 1870s, when Western Union debuted the electronic fund transfer (EFT) in 1871. Since this debut, the ability to send money/pay for things without having your physical presence required has enamored people.[6] This technology has come a long way since its inception in the late 1800's from being gimmicky to something used in everyday life.

In 1997, David Chaum launched the very first digital payment system, dubbed simply as "Ecash". It allowed for user anonymity in digital transactions. However, the system never really went mainstream and never gained widespread notoriety due to difficulties with the technology and some hurdles regarding rules and regulations.[7] However, in 1998, Paypal emerged as an alternative to the norm. It allowed users the ability to perform various varying digital transactions with just an email address linked to either their credit card or their bank account. Paypal's

user-friendly interface and simple, easy to understand and even easier to use process helped it form a monopoly for payment platform for online auctions and e-commerce sites.[3]

As online shopping was soaring to new heights in terms of popularity and usage in the early 2000s, online retailers sought out ways to make digital payments even more convenient for their customers. Mega companies such as Amazon and Google, to name a few, each came up with their own payment systems. At the times these were called “Amazon Payments” and “Google Checkout”. In 2011, the digital payments sphere reached another milestone with the launch of Square. Square was a service that allowed businesses of all sizes to accept credit card payments from mobile devices and card readers[8]. This revolutionized payment processing for independent vendors and small merchants. In the late 2000s, the creation and widespread introduction of smartphones into modern society created a new path for mobile payments. Users could utilize their smartphones to perform payments with mobile payment systems such as Apple Pay, Google Wallet, and Samsung Pay to name a few. Near-field communication (NFC) technology is used in these systems to allow for secure communication of information from the device to the payment system of whoever the goods are being bought from.[9] Mobile payments have grown in popularity in recent years, with many consumers opting to make payments using their cellphones. The lingering doubts with security in regards to mobile payments have also drastically reduced since the inception of biometric technology. Biometric authentication allows for the owners of the device to make use of authorized fingerprint, voice or facial recognition to give the final green light to any authorized payments .[9]

The interplay between finance and technology due to the development of the internet has led to the development of payment technologies that we utilize today and this rapid technological innovation has helped lay the foundation for widespread financial inclusion. However, despite the progress, there remain critical issues that need to be addressed to achieve the ideal technological systems for a sustainable and inclusive cashless society.[10] A study by Khando Khando, M. Sirajul Islam, Shang Gao provides a comprehensive understanding of the and challenges associated with the implementation of new digital transactions systems and technologies, via a detailed literature review.[10] The study largely covered 4 of the main

classifications of digital payments. These 4 were e-payments, cryptocurrencies, card-based payments and mobile-device based payments.

Through their research, the conclusion they were able to draw was that there are still many persisting problems in relation to digital literacy in lesser developed countries. These issues can be split into various sub-classifications.[10]

The behavior of individuals is heavily influenced/ diluted by society as a whole and even more so by members of one's social circle. This may be due to the nature of relationships and social harmony. 20 out of the 58 studies concluded that issues such as trust, impersonalization, culture, satisfaction, loyalty, social media impact, user perception and acceptance by age group to name a few. "Trust" in this scenario refers to the accumulated social perception of the belief of the customers, customer integrity, benevolence and ability to influence willingness to utilize technology. The study identified "trust" as a key barrier to overcome for emerging digital payment technologies. Security concerns related to e-banking and mobile banking such as loss of money due to transaction errors or bank account hacking and misuse , resulted in a "lack of trust".[10]

Technical challenges were another set of challenges that the research identified. These were the most prevalent issues. Thus, out of 58 studies, 38 of them were inclusive of some form of technical problems, such as privacy, security, access, fraud etc.. Overall, technical challenges were largely related to '*safety, reliability and safety issues*'. The studies largely highlighted breaches in security and minimal protection against fraud and cyberattacks as reasons for a reduction in consumers using digital payments. Similarly, in terms of 'privacy', the interception of confidential information, incomplete/interrupted transactions and customers frequently getting denied while using the digital payment platforms had an effect in lowering consumer trust and engagement. It was indicated that people in these places had a common misconception regarding the scope and magnitude of privacy risk and the actuality of the situation. This had a substantial effect on how many people would use digital payment platforms or perform digital payment transactions. Furthermore, it was found that although there are other negative impacts imposed by the privacy risks, the significant effect is the loss of customer trust. It is important to

note that these concerns were well warranted as due to the lack of technological infrastructure in such places, the transactions placed/received were bound to have some glitches.[10]

There were also other challenges that were faced but were not as prominent as social and technological challenges such as legal, awareness and some others that went unidentified.

The conclusion that we are able to draw from this study is that after doing research on the 4 main horsemen of digital payments, the issues faced with implementing them can be split into 5 parts : technological, legal, economic, social and unidentifiable. The key problem is in regards to technology. Key reasons for technological issues were things such as lack of privacy, security of technical infrastructure were the main challenges associated with the emerging digital payment technologies. When we talk about social challenges faced, the aforementioned 'trust' was found a core challenge.[10]

This first study was quite generalized, taking a multitude of countries around the world and taking heaps of data to make their conclusions. I think to get a more nuanced view, we need to take specific statistics from a country where digital payments have risen astronomically in the last few years. I think a developing country such as India, where the financial literacy is rising, the infrastructure is improving and technology is being rapidly developed would be good to look at. A study by Renu Singh and Garima Malik looks at the Impact of Digitalization, specifically on Indian Rural Banking Customers with a reference to digital payments. A few things to note about this study was that it was done in 2019, before the start of COVID-19[11]. This means that the usage of digital transactions is not as widespread as it used to be. Also this study has heavy emphasis in the development of payment schemes in rural areas and less so on the more developed parts of India. However this is fine because the most growth in frequency of digital transactions performed occurred in these regions.

After analyzing the piece we can see that the key problems with digital transactions in rural areas are lack of literacy, financial literacy and technological literacy. It makes it very hard for both customers and vendors to successfully operate PayTM, Aadhar Pay, UPI. System to link digital wallets and perform seamless tap to pay features is very complicated, having to link the bank account to Aadhar Pay and then to the digital wallet. Most people in rural areas don't have

the kind of expertise and knowledge on technology to successfully do this. Digital transactions can only replace cash if they are as seamless, otherwise it is just a burden. Hence the government has started improving infrastructure in rural areas to support digital payments platforms. The Internet has been established in lots of these rural areas free of cost. The government has also been trying to make the rural population of India more technologically literate for them to be included into the E-financial system. This has all occurred to the last decade or so and is coming into fruition. When looking at statistics we see that the rural population has been able to adapt to the technological change quite well. Once we examine the PhonePe Pulse data, we can see that nearly 80% of PhonePe's transactions come from tier 2 and 3 cities. The age demographic poses a different issue however. It seems that most of these transactions are taking place through the younger population. The older generations, especially those closer to their retirement age and already retired, are a little stagnant to the change[11].

Another key thing to note was the social backlash, especially from the older people. In India, elderly are highly respected and their words are given a lot of weight. The elderly in the rural areas were stagnant to the change which resulted in the rest of the family members also being reluctant to adopt usage of digital payments [11].

In conclusion, we can see that across the world and even in the more rural areas, where the growth is most predominant, digital payments face issues with widespread financial literacy. This lack of awareness has led to a lack of trust in these platforms and a lack of knowledge on its benefits and efficiency which is in turn hampering its growth. Governments are trying to incentivize using digital payments; they are also trying to improve the supporting infrastructure and spread awareness about its benefits.

COVID-19 has been a big catalyst in the shift from cash to digital in the past 5 years.

2. Post COVID vs Pre COVID impact on number of digital transactions

The COVID-19 pandemic was one of the most tragic global phenomena in recent memory. According to statistics from WHO and other international health and safety organizations, the estimated death toll of the virus was over 3 million in the year 2020[12]. The extremely contagious nature of the virus puts the whole world in a stranglehold[12]. Most industries suffered heavy losses and business operations were at an all time low. The governmental census report stated that in 2020, 6 % of companies canceled, 9.7 % postponed, 8.2 %, and 1.5 % budgeted capital expenditures at the time of the pandemic[13].

However, one industry that flourished during the pandemic was digital transactions. The Red Book Statistics from the BIS (CPMI) show that most of the consumers have made the switch from from physical cash to digital/contactless payments at an unprecedented rate.[14]

The coronavirus pandemic led to an increase in the usage of online payment instruments. In the majority of low to middle-income economies (with the exception of China), over 40% of adults made their first merchant in-store or online payments using a card or mobile device for the first time since the start of the pandemic. This statement was also true for more than 1/3rd of adults in all low- and middle-income economies who paid a utility bill directly from a formal account.[14]

The reasons for the decline in credit and cash payments and the subsequent rise of digital payments is due to multiple factors stemming from COVID-19. These include the worldwide switch to working-from-home, temporary shutdowns of shops, hotels and restaurants as well as the increase in e-commerce activities and the governments across the world providing COVID-19 financial aid packages.

One thing to realize is that this rapid increase was not only concentrated in rapidly developing countries who are making rapid developments in technology and innovation, but the increase in digital payments was substantial even in developed countries where they had been well established for a while.

World Bank statistics state that in Europe and Central Asia, account ownership went up by 13 percentage points since 2017 to reach an astounding amount of 78% of adults. About ¾ of

adults used an account to make or receive a digital payment. COVID-19 further drove up the usage as 10% of adults made their first digital payment during this time period. New digital transactions technology could further result in an increased account usage for the 80 million adults that still make cash payments. Of these 80 million, 20 million adults were from Russia and another 19 million adults in Turkey. Russia and Turkey are the two biggest economies in this region and have the most scope for more digital transactions.[15]

To compare, let's take the Sub-Saharan African region. E-payments in Africa have been rapidly increasing ever since 2000 and have increased even more since the start of COVID-19[16]. According to a study from McKinsey, in 2020, Africa's e-payments industry was able to generate approximately \$24 billion in revenues. This includes both domestic (payments that took place in Africa) and cross-border/international transactions. \$15 billion of the \$24 billion generated was a part of domestic electronic payments. Surprisingly, on average, only 5% to 7% of all payment transactions took place or were made through digital/electronic/mobile means. For comparison we can look at Turkey, which we had aforementioned. In Turkey, over 50% of payment transactions took place through electronic or digital channels. [16] This shows how astronomically large the scope for increasing e-commerce is in Africa. We also have to take into account that the opportunity is still especially large on the continent (as compared to other continents), as the technology gradually develops bringing about changes in convenience and stability of these payment methods. To further prove the previously mentioned point, around 80 percent of respondents to McKinsey's survey of payments experts across all over the continent of Africa firmly believe that the digital switch to digital transactions is not a case of whether but when. It is largely believed that the shift to e-payments and the increase in e-commerce in Africans not only endure and persist, but will in fact accelerate with rapid pace[16]. Overall, McKinsey anticipates that between the year 2020 and, in merely half a decade, in the year 2025, the e-payments market and e-commerce as a whole in Africa will experience growth of about 150% to reach almost \$40 billion in revenues from only payments in domestic transactions, with the total figure going up to about about 188 billion in transaction payments[16].

A key thing to understand is that this growth is unlikely to be collective across the continent. This is not to say all regions of Africa won't experience growth in the digital payments sector, they will. However, countries such as Egypt, Ghana, Kenya, Nigeria, and South Africa—have managed the transition to digital faster than others and either have or are rapidly developing the appropriate infrastructure and relevant policy frameworks to deliver a sophisticated electronic-payments system[16] It is likely that around half of future electronic-payments revenue will come from these five countries[16]. Growth of digital payments technology depends on factors such as infrastructure development, e-commerce penetration, rules and regulations, and a variety of other factors which change from country to country and market to market. It is likely that around half of future electronic-payments revenue will come from these five countries[16]

After collecting all of this various data from a plethora of studies the points stated at the start have been articulated, reinforced and fleshed out. COVID-19 played a pivotal role in the meteoric rise of digital payments and its usage in the everyday as an alternative to cash. Secondly, we see how the growth was widespread and rapid all across the world and not just one country pumping the numbers up. However, to truly grasp the scale of the reliance on digital payments and its truly long range of uses, we can see the trends across transactions from the start of COVID-19 and onwards and how the trends different from country to country.

Conclusion

To give a quick summary, in essence, the recent and heavy usage of digital payment technology has caused technology to evolve in line to increase efficiency, quickness and easiness of how digital payments work. Technologies used by banks and have become almost mainstay in everyday life such as credit cards and debit cards have added multiple new features and provided in app integration and many other features. New developments such as NFC payments and digital wallets are also becoming prominent in Western society as people appreciate the lack of hassle of storing money digitally.

As we have seen after breaking down data from many websites and research papers regarding the effects of digital payments, most of the practical implications of digital payments, and a lot of

the advances in the quality of life technology have come in the past 5-10 years. There is a lot of scope of study of future implications of technology, particularly regarding things such as NFTs, blockchain technology.

A lot of work and observations regarding studying data should be done on the spreading of technology in rural areas and making the technology more globally integrated. As we have seen in the data and research, most countries have their own separate national apps and platforms for digital payments and aside from the bigger Western countries, integration is minimal with smaller countries, especially in Eastern Europe, Africa and Asia. Integration could be helpful in reducing issues and making the process seamless when traveling and reduces the issue of converting currencies when traveling.

References

1. A Brief History of Online Payments - Where Electronic Payments Began. (2022, November 29). Anyconnect. Retrieved October 4, 2023, from <https://www.ayoconnect.com/blog/brief-history-of-online-payments-where-electronic-payments-began>
2. About Us. (n.d.). Stanford Federal Credit Union. Retrieved October 4, 2023, from <https://www.sfcu.org/about/>
3. O'Connell, B. (2019, August 26). *History of PayPal: Timeline and Facts*. TheStreet. Retrieved October 5, 2023, from <https://www.thestreet.com/technology/history-of-paypal-15062744>
- 4..Muro, M., & Jacobs, J. (n.d.). China's digital payments revolution | Brookings. Brookings Institution. Retrieved October 4, 2023, from <https://www.brookings.edu/articles/chinas-digital-payments-revolution/>



5. How and when did Bitcoin start? The complete Bitcoin history. (n.d.). Cointelegraph. Retrieved October , 2023, from <https://cointelegraph.com/learn/the-history-of-bitcoin-when-did-bitcoin-start>
6. What Are Electronic Payments? | Electronic Payments History. (2023, May 1). CSG Forte. Retrieved September 7, 2023, from <https://www.forte.net/electronic-payments-a-brief-history/>
7. Kagan, J., & Khartit, K. (n.d.). eCash: Overview, Rise and Fall - Banking. Investopedia. Retrieved October 4, 2023, from <https://www.investopedia.com/terms/e/ecash.asp>
8. Cussen, M., & Stapleton, C. (2022, March 20). Square, Inc.: What It Is, How It Works, Products and Services. Investopedia. Retrieved October 4, 2023, from <https://www.investopedia.com/articles/tech/021017/square.asp>
9. The Evolution of Digital Payments and E-Commerce. (2023, April 24). Finance Magnates. Retrieved September 7, 2023, from <https://www.financemagnates.com/fintech/payments/the-evolution-of-digital-payments-and-e-commerce/>
10. The Emerging Technologies of Digital Payments and Associated Challenges: A Systematic Literature Review. (n.d.). MDPI. Retrieved September 7, 2023, from <https://www.mdpi.com/1999-5903/15/1/21>
11. Singh, R. (2019). Garima Malik. Impact of Digitalization on Indian Rural Banking Customers: With Reference to Payment Systems. <https://journals.sagepub.com/doi/pdf/10.1177/2394901519825912>
12. The true death toll of COVID-19: estimating global excess mortality. (n.d.). World Health Organization (WHO). Retrieved October 4, 2023, from <https://www.who.int/data/stories/the-true-death-toll-of-covid-19-estimating-global-excess-mortality>



13. Small businesses and their challenges during COVID-19 pandemic in developing countries: in the case of Ethiopia - Journal of Innovation and Entrepreneurship. (2022, January 10). Journal of 16. Innovation and Entrepreneurship. Retrieved October 4, 2023, from <https://innovation-entrepreneurship.springeropen.com/articles/10.1186/s13731-021-00191-3>
14. Impacts of the COVID-19 Pandemic on Business Operations. (2022, June 15). Census Bureau. Retrieved September 7, 2023, from <https://www.census.gov/library/publications/2022/econ/2020-aces-covid-impact.html>
15. COVID-19 Drives Global Surge in use of Digital Payments. (2022, June 29). World Bank. Retrieved September 7, 2023, from <https://www.worldbank.org/en/news/press-release/2022/06/29/covid-19-drives-global-surge-in-use-of-digital-payments>
16. The future of payments in Africa. (2022, September 7). McKinsey. Retrieved September 7, 2023, from <https://www.mckinsey.com/industries/financial-services/our-insights/the-future-of-payments-in-africa>