TANGO WITH CENTRAL BANK DIGITAL CURRENCY:
A STUDY OF CUSTOMERS’ ADOPTION OF CENTRAL BANK DIGITAL CURRENCY

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TANGO WITH CENTRAL BANK DIGITAL CURRENCY

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by

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ABSTRACT

For the last two years, Central Bank Digital Currency (CBDC) was in the spotlight, from concept discussion to feasibility implementation in many different countries. This research paper consists of two parts. The first part is a conventional study covering empirical research from various factors that correlate to customers’ intention to adopt central bank digital currency. The analytic results have quantified a positive correlation between customer expectancy, external condition, performance expectancy, external conditions, and perceived risk for intention to use. The second part is taking an alternate approach presenting a problem statement on how CBDC can be deployed in HK on offering e-HKD with business use cases like application on foreign exchange for cross-border, consideration of interest rate, mitigation on customers’ risk alert, and extend use in green charity. Furthermore, through a series of interviews, I present views by financial institutions on risk perspective, and discuss both the business and technical challenges in offering CBDC. Last but not least, the support from local government and regulatory bodies.

Keywords: Central Bank Digital Currency, cross-border payment, mBridge, e-CNY, cryptocurrencies.
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CHAPTER I

1. Introduction

Central bank digital currencies (CBDC) has been discussed with remarkable momentum and led to growing literature in different financial forum. Auer et al. (2020) stated that many central banks has published wholesale and/or retail CBDC work. The tone from central bank board members on CBDC has turned more positively than a negative standpoint (Figure 1). From the start of 2017, the negative stance was dominant over 90%, turning to 60% in 2019 in three years’ time. In 2020, the magnitude was more like overall wholesale but still skewed to the negative stance on retail.

In particular, for China, there were pilot programs implemented in different cities and plans for venues in the 2022 Winter Olympics, which established a great building block for China to enter the "world financial market" and more significant involvement in setting global finance framework. This is China's physical fiat currency in digital form. China's central bank distributes power by blockchain technology to local financial institutes and payment companies, like Alipay and WeChat Pay. These providers are “licensed” to convey digital currency to retail and wholesale making transactions via digital wallets. It is China's first sovereign digital currency to control its exchange completely.

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I construct the argument with respect to Central Bank Digital Currency. We are moving into a cashless society. For people in China, most transactions are not using physical cash but electronic payment via third-party applications. Octopus dominates from the retail side for people in Hong Kong, while we also have peer-to-peer transfer from PayMe or Fast Payment Service (FPS). The customer’s risk perception from the recognized service provider like bank is well accepted. I am interested in understanding the customers’ view on this new digital currency to identify what factors contribute to the increasing adoption rate. From the deployment perspective, what are the options to conquer these challenges, such as one country three currencies, cross-border payment with foreign exchange, near field communication (NFC) technology, and last but not least, extending the use of CBDC to other business use case.

In 2018, Christine Lagarde, Managing Director of the IMF, once said, "We should consider the possibility to issue digital currency." In the same year, Andreas M.Maechler, Governing Board member of the Swizz National Bank, believes that digital money via Central Bank is not obliqued to ensure an effective system for cashless in retail. Digital money would give rise to an infinite risk of financial stability. CBDC will be a store of value in risk-free where fully backed from Central Bank and solid. There can be a potential risk of CBDC losing the deal. CBDC offers several advantages to retail payment with accessibility, efficacy, stability, and convenience. Electronic payment on commercial had been accessible for a decade; offering electronic payment from the central bank would have additional advantages.² (Bindseil, 2019).

China's progress in digital currency is already at the world’s forefront. On July 16, the "White Paper on China's Digital RMB R&D Progress" was issued by the People’s Bank of China. There are over 1.32 million digital RMB terminal trial scenarios as of June 2021, with more than twenty million personal wallets and three point five million public wallets. There are more than seventy million transactions with a total amount of about thirty-four billion yuan.

If all the trial amounts are traded with offline terminal pilots, each terminal pilot will trade approximately 26,136 yuan. There are 24.38 million personal and public wallets, and the average balance of each wallet is about 1,415 yuan. Because 3.51 million large-value public wallets are included, the unique wallet balance should be minimal after excluding large-value public wallets. High-level affirmation, central bank leadership, and multi-scenario use are the essential characteristics of China's digital currency. Due to the widespread use of mobile payment in Chinese society, it is easy to achieve barrier-free use and acceptance for digital renminbi payment. With the strong support of China and the achievements of the globalization of the renminbi, the global central bank's digital currency rule-making cannot be without China.

The G7 (seven of the world’s advanced countries including France, United States, Japan, Canada, Germany, Italy, and United Kingdom) has also remarked about Central Bank Digital Currency on 13th October. The Group addressed revolution in digital currency and payments has potential for significant benefits and incurred considerable concern from public and regulatory issues. A more resilient international coordination on these issues is required to help and ensure that public and private sector innovation delivers onshore and cross-border benefits secure for customers in the broader financial system. The principle affirms that the

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central bank's digital currency provides functions such as liquidity and pays particular attention to regulatory issues such as protecting user privacy during the issuance of digital currency. Analysts believe that G7's move provides more practical possibilities for central banks to issue digital currencies and initiates a battle for the right to formulate global digital currency development rules.

After watching the reckless "race" of digital currency, digital currency moves from the chaotic jungle of R&D to middle and right path of central bank supervision. The "principles" set by the G7 mean that Western countries must formulate digital currency supervision rules and seize the central bank's voice in digital currency supervision. The digital currency "principles" set by G7 are reasonable. Incorporating virtual currency into the control of the physical financial currency system can solve the speculative chaos of virtual currency and crack the ability of a virtual digital currency to harm the central bank's mission of travel money and financial stability.

In the long run, the central bank's digital currency has all existing sovereign currency operations and derives more functions based on technological innovation. Therefore, the central bank's digital currency supervision must likewise innovate and disrupt the current financial and monetary system. In this regard, the "principles" of G7 are conservative and self-interested.

In the global central bank digital currency competition and retaining innovative advantages of digital currency, it is necessary to scientifically and economically connect with the existing main currencies and correct unfairness and unreasonableness in the current financial and monetary system. Otherwise, global central bank currency competition will repeat mistakes of private savage speculation on digital currencies.
On Dec 4, 2020, there was an announcement from the Hong Kong Monetary Authority (HKMA) in cross-border payment development work together with the “Digital Institute of People's Bank of China.” In addition, there was a cross-border project on testing e-CNY on making the payment with corresponding technical preparation. Given currency circulation, the success will bring great convenience to Hong Kong and Mainland tourists. There was no confirmation on any tentative timetable, but it will undoubtedly be an additional payment choice to make cross-border consumption. Digital currency can be issued in a deposit account with the central bank to all household customers. The customer account can decide the payment function within a deposit bank account, including internet and app-based gadgets.

The focus from previous research papers is from CBDC as a commercial product perspective how it will be introduced to the world. From retail customers’ view, the gap is how they will treat this product. My research paper will close the variance in analysing different factors that influence the adoption of CBDC to provide an in-depth assessment of the positive pull and negative push on behavior intention.
1.1 Background

From Bank International Settlements (BIS) statement in 2020 January\(^4\), it has shown eighty percent of central banks of the world are heavily involved in Central Bank Digital Currency research (Boar et al. 2020), where nearly fifty percent is under investigation on a proof-of-concept. The statistic shows around ten percent of central banks plan to offer CBDC to retail use in coming years and twenty percent in the future six years (ibid., p. 7). Consequently, the momentum will expect to grow in years to come. The e-money concept is not new, but now the reach and the scale are remarkable due to the advanced mobile devices development around the world. Crypto assets (2008 Bitcoin) and private stablecoins (2019 Libra) materialization have ignited new speculation for oversight from central banks to experience money management with an extraordinary shift. There is immense pressure for central banks to manage payment systems in the financial market and react on these trends in new technology. The fundamental question is to provide twenty-four hours by seven days payment networks at base level financial services. Central banks’ interest is focusing on technological innovation in CBDC for wholesale and retail applications. The research and literature on CBDC shave boomed since 2015 — 2020 is exploded at swift momentum with over five times as many distinctive academic papers 'CBDC' in 2020 as compared to 2017, according to Google Scholar (Figure 2). \(^5\)

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\(^4\) CBDC pioneers: Which countries are currently testing a retail central bank digital currency? https://jonasgross.medium.com/cbdc-pioneers-which-countries-are-currently-testing-a-retail-central-bank-digital-currency-49333be477f4

The analysis indicates China, Sweden, Marshall Islands are innovators in the CBDC. In recent financial news on China, Central Bank uses digital yuan legalization and converts it as physical currency for circulation. China is one step closer to launch its digital currency with a lawful origination. China’s digital yuan has undoubtedly advanced several CBDC initiatives developed among other countries worldwide\(^6\). The Central Bank always concerns other cryptocurrencies like Bitcoin, Ethereum, or Libra in their increasing widespread power, limiting the central bank's control flows of funds.

1.2 What is Central Bank Digital Currency?

The existing characteristic of money has outlined in lack of one of three features (Figure 3). They are universal, electronic, and central bank issues. We have Central Bank reserves, cash, and digital money (e.g., cryptocurrencies) in cross-sections of different circles. CBDC locates in the sweet spot integrates all of the three forms. The creation of CBDC can be split into two parts. The first part refers to banknote, while the second part substitutes deposits with banks\(^7\). Replacing one form of money for another will not change the financial system. The latter upturns banks' reliance on Central Banks’ credit and reduces prospect deposits in the banking system. The new CBDC is potentially competing with each of the existing money states\(^8\). Whether CBDC is a complementary or replacement will require more in-depth assessment. There are various CBDC, including restricted or wide

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access, the degree of privacy, operational availability all time, and possibly interest-bearing characteristics\textsuperscript{9}. CBDC had raised questions about the role of central banks and financial institute structure. Traditionally, central banks do not have access to account-based to banks. Moreover, as cash is rapidly diminishing in-country, central banks assess the possibility of CBDC being widely used. The general public will adopt CBDC to reserve as another protected instrument on payment transactions. There are fundamental principles to retail CBDC. This new form of money is supplied and issued under controlled of the central bank. CBDC is liable to central bank balance sheet instead of commercial bank money that claims against a commercial bank. It is distributed at one-to-one parity with the central bank’s relevant fiat and should be seamlessly and freely convertible against commercial bank money. The consumer is not required a bank account to acquire the use of CBDC.

1.3 Research Motivation

Cash is not new to anyone, but the ‘form’ of money is changing from ‘touchable’ to only visible on mobile devices. I would be keen to discuss the money we use in my dissertation. Central Bank Digital Currency has just resonated the whistle. China has announced the trial of Central Bank Digital Currency to the world during the Winter Olympics in Feb 2022. There is a coincidence that HKMA also announced on June 8, 2021, about CBDC in Fintech 2025 Strategy. The critical success factor for CBDC is customer usage. CBDC and the consumer need to tango. When the digital currency is offered, are consumers intended to use the currency on a transaction? How passionate will consumers face off to the new digital currency form? The critical issue is to have acceptance of CBDC from the mainstream. The general perception of digital "products" is optimistic for teenagers, Generation X, Y, Z, or millennials. The trust in CBDC will be valued by the public depending on how well it fulfills its function. According to Berentsen and Schar (2018), it will need to be recognized as a credible store value for the central bank to issue digital currency successfully. Without credibility, if the public pertains worry in insolvency, or lack of confidence in ensuring a stable value of money over time, the public's valuation of a new currency will be zero. If trust is fragile, the likelihood of wide use of the currency is relatively low, regardless of whether CBDC can potentially benefit creditability in usage. The Seniors have their digital transformation journey. It will be interesting to know what principles dominate the acceptance or adoption of the first transaction on Central Bank Digital Currency. I will further review how Senior's adoption of digital currency from a different aspect.
1.4 Research Questions

The research question is established on adopting the Central Bank Digital Currency from retail consumers. Furthermore, impact on senior customers’ adoption to take on new technology. The factors which retail customers considered to use for payment in business as usual transactions widely. The question for research is: **What factors are affecting retail customers’ intention to adopt Central Bank Digital Currency for online payment transactions?** This study focuses on retail users and lean-to factors that affect their decision to adopt a digital currency to address the gap. Digital currency could match email and counter as the internet of money. I can take reference to customer behavior and perception in evaluating the adoption.
1.5 What is happening in Central Bank Digital Currency?

The People’s Bank of China issued the draft regulation law on Oct 27, 2020, giving a lawful status to the Digital Currency Electronic Payment (DCEP) system. This denotes the pioneer where “digital yuan” is defined as the portion of independent fiat currency. The draft law disallows any other party to issue yuan-backed digital currency interchange with RMB in the market. DCEP will circulate and exchange current physical banknotes and coins. The centralisation management control via Central Bank management will be appropriated to fight against cryptocurrencies. China positions in front of world to be running ahead in the high-tech race, issuing world’s first digital currency. There was another heavyweight promotion in Shenzhen earlier in October 2020. The largest-scale test gave out fifty thousand electronic "red packets" of 10 m yuan or USD one point five million to Shenzhen residents. The central government has ambitions that DCEP includes replacing fiat cash and maintaining central control over the currency via government. Furthermore, there is another advantage in digitizing the yuan with an outlook to internationalization by enhancing the worldwide use of international settlements.

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1.6 Advantage of Central Bank Digital Currency

The benefit starts with reducing costs associated with cash, increasing effectiveness on the payment system, reinforcing integrity in financial, and addressing potential issues related to private payment systems. In addition, the recent COVID-19 international crisis accelerates incentive payments and makes payment systems stronger against shocks.

1.6.1 Onshore usage

Transactions using digital RMB can execute without an internet connection, different from Alipay and WeChat Pay. The mechanism does not require any bank account to manage funds, and it will be a massive benefit to twenty percent of non-bank adults in China. The consequence is a significant milestone in lifting poverty. The e-CNY will mitigate illicit activities, such as money laundering, forging, and prohibited funding transactions. It can facilitate real-time data collection to provide a valuable reference for implementing monetary policies. In the future, an individual can conduct payments from all over the world. From the business's perspective, merchants involved in import and export sectors can also do transactions via e-CNY—the advantages include reducing turnaround time on trade settlement and mitigating the counterparty. Business partners who use many different currencies will not require third-party money to complete transactions under Belt and Road Initiates. The digital RMB further promotes the RMB’s internationalization and reshaping the current cross-border payment structure as an independent alternative means. The digital RMB consolidates the “dual circulation economy” by establishing the link between domestic and external constitutions from foreign interference. The digital RMB further permits the country to partner in global trade and further expand to reform economic governance in the world.
Commercial banks’ role in dispensing digital currency for customers must hold the same deposit amount in reserves with PBOC as digital yuan on the amount distributed. Thus, local and central banks will keep track of digital yuan flows from senders to receivers, which the central bank would like to do but cannot do as effectively with coins banknotes. It will also help the central bank in detecting any illicit funds transfer, such as money laundering and funding terrorist.

The wide use of the digital yuan would give regulators a better visible path on how money flows around in the financial economy. It also facilitates experimenting on targeting monetary policy interferences on some target economic groups and regions. Furthermore, it would allow banks to execute negative interest rates on saving deposits in extreme circumstances. Moreover, China can take this opportunity to have an established goal to internationalize its currency. Finally, the digital yuan can support acting as a catalyst to make it easier to encourage public customers traveling to use yuan from other countries while traveling abroad.

1.6.2 Offshore usage

Recently, the China Banking Association released the "Renminbi Internationalization Report (2020)". The "Report" is co-authored by 11 members of the Standing Committee from banks, including the Development Bank, China Minsheng Bank, and HSBC Bank (China). The "Report" summarizes relevant policies for RMB internationalization in 2020, introduces the development of RMB cross-border business and challenges faced by RMB internationalization, elaborates on the new development pattern of "dual cycles", the accelerated opening of the Chinese market, etc. A series of favourable factors have brought new opportunities to the development of RMB internationalization and proposed strategies and suggestions to promote the product, such as promoting trade and investment facilitation,
supporting the development of special economic zones, and deepening the influence of RMB in trade finance. The main content has focussed on three areas. Firstly, the progress of RMB internationalization policy. In 2020, China’s cross-border renminbi policy will continue to be optimized, and facilitation on cross-border use of renminbi will reach a new level. The Central Bank of China and other departments have actively introduced cross-border RMB policies, reflecting new thinking of multi-sectoral coordination to promote RMB internationalization. The GBA (Greater Bay Area), Hainan Free Trade Port, and Shanghai Free Trade Zone have launched regional policy pilots for critical innovations in cross-border RMB businesses based on their respective regional development. Secondly, the development scale of RMB cross-border business will maintain a sustained and rapid growth; the proportion of renminbi used in cross-border revenue and expenditure will hit a record high; cross-border renminbi revenue and spending will be more balanced; the scale of cross-border settlement in the securities investment field will achieve rapid growth. The proportion of cross-border payments continues to increase. Thirdly, the Banking Financial Institutions has strategies to promote RMB use in Cross-border. The Renminbi’s internationalization needs to be coordinated with the advantages of major national strategies and financial reform policies to be feasible and stable. Banking financial institutions must actively grasp, integrate, and serve this vital strategy, and take advantage of the trend to promote the growth of their business volume and the overall improvement of the RMB internationalization. In recent years, more product innovations, model changes, and policy deregulation related to the use of RMB cross-border payment have been piloted in various free trade zones (Hong Kong). As the essential RMB cross-border financial service provider banking financial institution, it is deeply understood that it can seize the next growth point of RMB cross-border business by grasping the policy opportunities and actively expanding the application to serve various market entities better.
It is recommended that a compilation of policy guidelines for cross-border RMB business be formed according to different business scenarios regarding foreign exchange policy management methods to promote better the formation of market entities’ compliance awareness and business compliance management for cross-border RMB business; it is recommended to continue to follow the "local currency first". Optimize relevant policies in principle, set more currency conversion factors and exchange rate risk factors in the system construction, provide RMB convenience in terms of quotas and deadlines, and guide market entities to use RMB as much as possible for cross-border settlement and investment financing business.
1.7 Critics of Central Bank Digital Currency

Innovation is good but not always as this is supposed to be. These include hindering monetary policy, competing with bank deposits, undermining bank intermediation, and enabling bank runs on deposits to CBDC during banking crises. In addition, operational risks include IT governance issues in cyber-resilience, data loss or leakage, and reputational risks. These can also lead to severe dangers in monetary stability. 11

There are some severe drawbacks to a CBDC in achieving adoption extensively, causing fiat banknotes to go extinct. Unless they are simple and easy to use, these digital assets could prompt a massive step back in the road to financial presence, isolating older consumers. Some nations have enforced or are considering legislation ensuring that shops continue accepting cash concerning senior adoption. In addition, there are concerns over digital coins on data privacy and cybersecurity, particularly fake e-wallets which are hard to differentiate from consumers. Despite the heavy promotion, these concerns will also apply to retail customers. The reinforcement will be the spotlight for oversight from central bank. The People Bank of China will face anti-counterfeit issues and coordinate digital currency application scenarios for authentication in the digital era. Central Bank Digital currency is new, particularly for seniors who may not access smart terminals. Unifying technological principles in ascertaining safety standards, business control process, and financial framework to ensure connectivity on different supports prevents transaction barriers.

1.8 Expected Contribution on theory and practice

The empirical analysis has indicated significant factors contributing to customers’ intention to use Central Bank Digital Currency. The data collected from the customer survey can be used for the correlation impact from each determinant. The expectation is to understand how they view the new digital currency from Central Bank from the customer’s perspective. The level to where customers intend to use more becomes necessary to avoid strong pushbacks with concerns over uncertainty different perceived risks. The research thesis can be used to reference stakeholders under regulatory, financial institution playing the role as second-tier, and local government support to promote and sustain usability between customers and retail business. The paper has addressed potential concerns and acted as a checkpoint if customer satisfaction can be achieved. To accelerate and enhance with further development in consideration for performance and effort expectancy on CBDC. The ease of use that can provide smooth transit from cash to CBDC increases the take-up rate.

Before and during the actual implementation, provide adequate support details in facilitating conditions. More importantly, mitigate perceived risks from a customer with stringent regulatory governance. To safeguard the ‘invisible’ dollar bills from the illegal transfer, personal data privacy loss, and fight against anti-money laundering with new technology in the financial system. The broader use of Central Bank Digital Currency can be maintained from extended merchant adoption, for example, in public transport or utility payment.

Consumers will prefer taking up CBDC is less risk-averse and move to daily needs as fiscal cash notes. Frequent exhaustive communications from the government to provide up-to-date information regarding CBDC. Further insight on CBDC is likely to become the mainstream in retail and wholesale transactions in near future to use all over the world, replacing traditional banking payment systems.
2. Literature Review

2.1 Institutional Background

Trends in cash circulation on the market influenced demand for CBDC within the country. The digital currency approach is seamless rather than traveling a distance for a cash withdrawal teller machine. The experience will make as appropriate as a saving debit card. The need will be comparable less for CBDC in nations like the US, where credit cards e-money has already suppressed the need for cash. The current payment system is too dominant in cash, and decreasing cash usage is motivating. China realized the implication of declining use of fiat money and emphasized decreased cash usage as inspiration. Other reasons are better monitoring to internationalize the exchange to create a new source of income. The impact of CBDC is only debated on theory before actual implementation. More importantly, the digital currency reconciles how general consumers react during launch.

2.1.1 Monetary Policy challenges on CBDC

The initiation of CBDC had raised questions about the delivery of public and private money and the central bank's ability to consume CBDC to conduct monetary policy directly to the financial system. The questions in the interest of macroeconomics become apparent when reviewing two other recent and parallel trends. The utilisation of paper currency is in dispute increasingly. There are two drawbacks to paper currency (Rogoff 2017). First, it facilitates the illegal economy's growth in corresponding losses of missing tax revenues. And second, it impedes the effectiveness of monetary policy's execution, as essential on a lower bound zero interest rate.

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The quality of banks’ deposits and volume of different loans may change. A widely used CBDC may replace the bank’s primary source of funds and cause a disconnect to commercial banks, leading to decreased lending volume. When CBDC is interest-bearing, it may induce more favourable contractual terms for depositors. The competitive pressure from the new currency could increase banks’ depositor base.

If CBDC offers lower than the normal deposit interest rate, there is no effect on banks’ activities. Suppose the interest amount on CBDC is more significant than on promises. The response from banks by relative deposit rates increases. If households’ deposit exchange for equivalent CBDC, there is no impact on the equilibrium allocation. If the central bank cannot honor the long-term assets in a bank run, CBDC can mitigate the probability of runs by having all depositors hold CBDC instead of a deposit.

Williamson (2019) considered CBDC as an interest-bearing asset and substitute to cash on payment, and to bank deposit, is subjected on the bank’s commitment to respect deposit payment. When households select to bank in (deposit account) or hold cash (unbanked), an introduction of CBDC pays interest is expected to be resistant from robbery, can improve, and always increases the welfare of at least unbanked households.

When there is a sudden increase of funds via digital currency into the market, the data is very useful in forming target policy in response to stressful times for effective action to protect. Picking the applicable interest rate to make prominent action in unstable times interferes with the financial system with timely monitoring.
2.1.2 Central Bank Digital Currency against Cryptocurrency

Standard Chartered Bank had announced Dec 9, 2020, where they launched for professional investors with cryptocurrency custodian service. The program has planned to support Litecoin, Bitcoin, Ethereum, etc. Standard Chartered Bank CEO Bill Winters shared his view that "there is absolutely a role for central bank digital currencies as well as non-central bank-sponsored digital currencies." Furthermore, Mr. Winters saw the most significant digital currency opportunity in a new niche segment that did not replicate existing fiat currencies. Although Standard Chartered Bank's service is for institutional investors, it is a big step for an international bank to formally accept cryptocurrency under current regulation. It is crucial to discover what CBDC is different from private cryptocurrencies, what improvement and risk it brings, and sufficient safeguards to identify the risks.

There are three crucial aspects to currencies, namely (1) money creation, (2) representation, and (3) centralization. Money can be presented in either physical or virtual. The operation can be handled under centralized or decentralized. Cash is a cartel performed in a peer-to-peer transaction. The central bank digital currency is perceived as a virtual type of cash. 13

The International Monetary Fund (IMF) categorizes CBDC as object-based, fixed value, government-back centralized currency. From a currency creation perspective, CBDCs are legally wholly possessed by the government. The actual owner of cryptocurrency is not identified. Central banks create CBDCs, whereas cryptocurrencies ‘create’ money composed by the consensus process, which involves proof of work or stake. Both CBDCs and cryptocurrencies are virtually symbolized as assets in a face-off to consumers. With respect

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to centralization, crypto transacts on peer-to-peer without a middle man, while CBDC transactions still need access to the banking system.

Cryptocurrencies’ market value fluctuates based on both demand and supply. The principles of market contributors about these currencies' up-to-date and imminent price. The value of crypto depends on its function within a particular blockchain network. With reference to Figure 4, the market price of Bitcoin started with less than ten cents and shot up to over sixty-four thousand in Apr 2021. There are many speculations on Bitcoin than use in the transaction market.

Figure 4 Bitcoin price movement (2010-2021)

CBDCs impact cryptocurrencies from different standpoints. Adoption is vital to launch any currency, and minimizing alternatives can increase customers’ take-up. There was an incident in Turkey where users of a cryptocurrency platform were having problems logging on to their assets. Two billion was lost due to the founder leaving with funds after ban. The growth of cryptocurrencies can be associated with benefits on a peer-to-peer system in real-time at low transaction costs. The incident has caused a swell in face value. For example:
a) In 2017, the Chinese authority has forced a ban on initial coin offerings and labelled crypto operations as “not legal.” The ban has triggered an immediate six percent drop in bitcoin value.

b) In 2018, the Indian authority has put cryptocurrencies as criminalized in control of crypto assets, mining, transfer, and trading.

c) In 2021 Turkey’s central bank banned goods and services payment in cryptocurrencies.

Gandal et al. (2018) has presented a summary of the critical problems associated with high-tech advances. Due to cryptocurrencies, anonymous features have been connected with different types of misconduct, including ‘corporate espionage; drugs; counterfeit currencies; child abuse; fake IDs and passports; and weapons trading’.\(^\text{14}\)

Central banks and cryptocurrency are generally "accepted" under different worlds from a general empathetic description. What is the rationale behind the central bank issuing cryptocurrency like Bitcoin. The motivations can be anonymous property or dis-intermediated party involvement and free from regulation. For Bitcoin, transactions are peer-to-peer without a party in-between. There are two parts of the value, the first one being the actual cost of the coin, the second being on a transaction. The 'actual' value is very volatile, not pinned to any country's monetary policy, and driven heavily by market speculation. The transactions are transparent among the transacted parties, although the parties are anonymous. Each block contains the trade from the previous block and cannot reverse. The price of Bitcoin fluctuates in wide magnitude from USD10,000 back in September 2019 to over

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USD50,000 in Mar 2019. Instability is the main key why Bitcoin is not considered for the central bank as a transaction currency. The price is mainly driven by supply and demand. Recent news on Tesla acquiring USD1.5m Bitcoin on plans for acceptance has further skyrocket the value.

Central Bank Digital Currency is reinforced under the country’s monetary policy. The local central bank regulates the increase or decrease in supply. The international agreement governs the exchange rate as well as value fluctuation. The great pandemic has not postponed the discussion on Central Bank Digital Currency. However, it goes the opposite in accelerating because CBDCs are technically touchless payment means replacing frequently-touched cash and credit cards by increasing the likelihood of transmission COVID-19.

Figure 5 Cryptocurrency Prices by Market Cap Jan 23, 2022

<table>
<thead>
<tr>
<th>#</th>
<th>Name</th>
<th>Price</th>
<th>24h %</th>
<th>7d %</th>
<th>Market Cap</th>
<th>Volume (24h)</th>
<th>Circulating Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bitcoin</td>
<td>$30,028.25</td>
<td>2.01%</td>
<td>16.41%</td>
<td>$682,650,776,760</td>
<td>$36,605,328,909</td>
<td>18,937,556 BTC</td>
</tr>
<tr>
<td>2</td>
<td>Ethereum</td>
<td>$2,535.15</td>
<td>3.67%</td>
<td>23.70%</td>
<td>$302,842,582,629</td>
<td>$25,760,524,608</td>
<td>119,275,901 ETH</td>
</tr>
<tr>
<td>3</td>
<td>Tether</td>
<td>$1.00</td>
<td>0.03%</td>
<td>0.04%</td>
<td>$78,364,317,405</td>
<td>$83,504,204,450</td>
<td>78,311,766,178 USDT</td>
</tr>
<tr>
<td>4</td>
<td>Binance</td>
<td>$387.30</td>
<td>10.98%</td>
<td>21.87%</td>
<td>$64,105,439,981</td>
<td>$2,680,424,842</td>
<td>116,119,781 BNB</td>
</tr>
<tr>
<td>5</td>
<td>USD Coin</td>
<td>$0.9999</td>
<td>0.01%</td>
<td>0.04%</td>
<td>$43,395,242,689</td>
<td>$3,154,515,393</td>
<td>43,380,120,913 USDC</td>
</tr>
<tr>
<td>6</td>
<td>Cardano</td>
<td>$1.16</td>
<td>13.03%</td>
<td>14.84%</td>
<td>$38,473,618,859</td>
<td>$3,851,157,342</td>
<td>33,539,885,764 ADA</td>
</tr>
</tbody>
</table>

Reference: https://coinmarketcap.com

Figure 5 shows the current active list of cryptocurrency’s prices by market cap. Bitcoin remains on top, followed by Ethereum and Tether, given its price vulnerability.
Bitcoin and other cryptocurrencies are embedded with restricted use and security risks, making them unprivileged compared to traditional currencies. Central bank digital currencies, on the other hand, can help expedite transactions, improve security and reduce cost.

Local and global regulators from banking and governments are making an effort to understand how to take the best function of cryptocurrencies, in particular payments technology behind that can turn into advantages within economic and geopolitical. This is where the connection between central bank digital currencies and crypt assets ends. Despite the differences, different country central banks are exploring to issue a government-owned, digital version of their sovereign fiat money. Although a general purpose CBDC is to have a cash alternative, the ultimate goal would have to ensure fulfillment of regulatory requirements in prevention of anti-money laundering and counter-terrorism financing.

Therefore, CBDC would ideally be treated as legal tender, private crypto as Bitcoin, and Libra would rarely advance to the status.

2.1.3 Bitcoin – Digital Gold for Central Bank Digital Currency

Bitcoin is not considered as stable cryptocurrency, and impractical to argue how Bitcoin can assemble essential functions of money. However, Bitcoin satisfies all three connotations of money as a form to store the value, exchange, and unit of account. There was an argument from Dr. John Taskinsoy on a proposal to use Bitcoin as a central bank reserve.

The adoption of the Bitcoin standard will not be at will; without any exception, every country in the world will adopt it and comply with its rules and requirements. Along with bitcoin as a global reserve cryptocurrency, each central bank (the Fed in U.S. case) will issue its digital

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coin (CBDC) that will be defined to equal some amount of bitcoin. Unlike the antecedent standards, physical fiduciary (fiat) currencies (coin and paper) will cease to exist. Unlike the gold standard, there will be no anchor central bank or Fed-issued digital coin (i.e. digital coins of every state will be defined in bitcoins as Table 1).

Table 1 shows that the combined GDPs of top 10 countries ($61.66 trillion) equals 17,264,522 bitcoins (82.2% of 21,000,000). Under the Bitcoin standard, the maximum supply of reserve bitcoins is fixed at 21 million permanently; moreover, bitcoin will be a stable reserve cryptocurrency; therefore its value will not see the type of volatility driven

<table>
<thead>
<tr>
<th>Country</th>
<th>2021 GDP ($)</th>
<th>Fiat Currency</th>
<th>Defined in Bitcoin</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>22,730,000,000,000</td>
<td>American Dollar</td>
<td>6,364,401</td>
</tr>
<tr>
<td>China</td>
<td>15,600,000,000,000</td>
<td>Chinese yuan</td>
<td>4,368,000</td>
</tr>
<tr>
<td>Japan</td>
<td>5,200,000,000,000</td>
<td>Japanese yen</td>
<td>1,456,000</td>
</tr>
<tr>
<td>Germany</td>
<td>3,960,000,000,000</td>
<td>Euro</td>
<td>1,108,800</td>
</tr>
<tr>
<td>England</td>
<td>3,120,000,000,000</td>
<td>British pound</td>
<td>873,600</td>
</tr>
<tr>
<td>India</td>
<td>2,850,000,000,000</td>
<td>Indian rupee</td>
<td>798,000</td>
</tr>
<tr>
<td>France</td>
<td>2,690,000,000,000</td>
<td>Euro</td>
<td>753,200</td>
</tr>
<tr>
<td>Italy</td>
<td>1,920,000,000,000</td>
<td>Euro</td>
<td>537,600</td>
</tr>
<tr>
<td>Canada</td>
<td>1,880,000,000,000</td>
<td>Canadian dollar</td>
<td>526,400</td>
</tr>
<tr>
<td>Russia</td>
<td>1,709,000,000,000</td>
<td>Russian ruble</td>
<td>478,520</td>
</tr>
</tbody>
</table>

Notes: The world’s total money stock is about $75 trillion; to cover the entirety of money in circulation, the value of each bitcoin will be raised to $75,000,000,000,000 divided by 21,000,000 = $3,571,428 per bitcoin.

Table 1 Fiat currencies defined in Bitcoin

The world is about $75 trillion (see Table 1); therefore, each bitcoin value will have to be raised to $3,571,428 to back 100% of the existing money in circulation (i.e. $67.8 trillion or 90.4% of $75 trillion belongs to top 12 countries); namely, 1. China: $25T (7,000,001 BTC); 2. U.S.: $14T (3,921,001 BTC); 3. Japan: $8.9T (2,492,000 BTC); 4. Germany: $3.3T (924,000 BTC); 5. U.K.: $3.1T (868,000 BTC); 6. France $2.3T (644,000 BTC); 7. South Korea: $2.2T (616,000 BTC); 8. India: $2.1T (588,000 BTC); 9. Hong Kong: $1.8T (504,000 BTC); 10. Brazil: $1.8T (504,000 BTC); 11. Italy: 1.7T (476,000 BTC); and 12. Australia: $1.6T (448,000 BTC).
Bitcoin Standard will be stable, longer-lasting, and capable of satisfying the reserve needs of central banks worldwide. Under the Bitcoin Standard is a worldwide reserve exchange currency only used by central banks. Citizens and various entities will be prohibited from ownership, trade, and other users. The fixed supply of 21 million bitcoins remains unchanged. CBDCs will be defined as bitcoin by an equivalent interchange rate if every country moves to digital coins from central banks. Hundred percent of CBDCs will be financed in a unit of bitcoins. The central bank will demand additional bitcoins to increase the digital money supply, which technically is impossible. The price of each bitcoin will then rise to an extreme level which requires covering money in total circulation. (Figure 6)
2.1.4 Central Bank Digital Currency for Commercial and Retail

The proposal of digital currency can classify into commercial and retail. There are different proposals on respective designs according to different business needs. (Table 2)

Table 2 CBDC Advanced Proposal for Retail and Commercial

<table>
<thead>
<tr>
<th>Central Bank</th>
<th>Digital Currency</th>
<th>Date Announced</th>
<th>Status</th>
<th>USE CASE</th>
<th>Core Motivations</th>
<th>Blockchain</th>
</tr>
</thead>
<tbody>
<tr>
<td>People’s Bank of China</td>
<td>e-Van</td>
<td>2017</td>
<td>Active Pilot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sberbank</td>
<td>e-Kroshen</td>
<td>2017</td>
<td>Completed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Bank of Uruguay</td>
<td>e-Mepo</td>
<td>2017</td>
<td>Completed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Bank of Ukraine</td>
<td>e-Hryvnia</td>
<td>2017</td>
<td>Completed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Bank of the Bahamas</td>
<td>Sand Dollar</td>
<td>2018</td>
<td>Active Pilot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastern Caribbean Central Bank</td>
<td>DCDCD</td>
<td>2019</td>
<td>Active Pilot</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Wholesale CBDC** is for financial institutions holding central bank reserve deposits. The reserve could mitigate counterparty credit risk and improve efficiency during payment settlement. To complement central bank reserves, CBDC can replace restricted-access digital tokens. While executing the transaction without intermediaries, the token will be the bearer’s asset and transfer to the receiver. The central bank has not shared any actual values. The CBDC for wholesale is identified as the most popular among central banks with the potential to improve the existing wholesale financial system more quickly, at a lower cost, and secure. The wholesale CBDC is more suitable for banks that hold reserve deposits with the central bank. The wholesale CBDC improves payment efficiency and security settlement. Moreover, it also mitigates the risk on liquidity and counterparty credit.
Retail CBDC is targeted for general public use based on distributed ledger technology. It is anonymous, traceable, available throughout the year, and feasible with interest rate applications. There are two main reasons for retail CBDC. First, it is the motivation for exploiting opportunities for growth in fintech. Second, it promotes economic enclosure and presents a faster shift to a cashless society (Table 3). China tops the class, followed by India and Russia. The retail application is popular among central banks, taking the lead in the rapidly digital industry in accelerating the cashless culture reducing cash note printing. Central banks in financial markets are more enthusiastic about approaching retail CBDCs. However, many central banks do not want to create conflict between private sector money and central bank currency. Therefore, it is vital to consider restrictions on the potential benefits of utilizing retail CBDC.

2.1.5 China Central Bank DCEP against WeChat Pay and Alipay

There are two online payment giants in China, WeChat Pay and Alipay. They both have controlled over ninety-six percent of all electronic money transactions in the country\(^\text{16}\). The Director of People’s Bank of China Digital Currency Research, Mr. Mu commented, "the CBDC and the payment systems as ultimately complementary." CBDC is synergy and not competing with WeChat Pay and Alipay. Beijing’s government is not looking to replace the two online payment giants with the DCEP.

\(^{16}\) What will China’s central bank digital currency mean for Alipay and WeChat Pay? South China Morning Post, Alison tudor-Ackroyd 5 Sep, 2020
On the contrary, it will likely integrate with DCEP to reinforce its digital finance space positions. WeChat and Alipay are playing the role of e-wallets where digital yuan is stored. There is no intention for PBoC to encounter 3rd party payment and commercial banks in business opportunities. The leading payment companies facilitate the government to roll out digital currency projects, which is a positive win-win. CBDC can co-exist with Central Bank to ensure integrity and stability while the private company faces consumer CBDC activity. CBDC will have the advantage over other e-wallets, convenient in remittance. Both WeChat Pay and Alipay nevertheless requires intermediary bank in transferring between systems. CBDC utilizes near field communication (NFC) from system differentiation, allowing money transfer between two users by having both phones within a very short distance. WeChat pay and Alipay are based on QR codes in between transfers. In addition, most consumers in China are expected to be seamless using renminbi or the new Central Bank Digital Currency for online payment.

Future China’s financial is in digitalization. Both Alipay and WeChat Pay will hold strong in payment system when DCEP moves to take over cash transactions. The two platforms will be the necessary instrument to accelerate the transformation towards cashless in China. Furthermore, Alipay and WeChat together could all end up being distribution points for merchants to be paid in digital Yuan to USD or Euro. The digital currency further simplifies transactions were switching to DCEP would be relatively simple in Belt and Road initiatives.
2.1.6 CBDC in Financial Crime Risk Monitoring

There are threats for some countries on the legal aspect to issue digital currencies from central banks, and issuance may challenge legislative changes. The consideration includes the definition of "legal tender" as CBDC and existing laws if value and finality are applicable to transfer. Central banks are required to evaluate the potential threats in “Counter Financing of Terrorism” (CFT) and “Anti Money Laundering” (AML) concerning CBDC issuance. Incompliance with the above and other supervisory tax regimes is not ideal. It is unclear how the mitigating requirement on AML/CFT can be fulfilled and rationally implemented in anonymous forms. Challenges are imposed on easily transferred across borders or used offshore. The reputational risk to central bank on CBDC must be considered. Central Banks are also facing the challenge of cybersecurity as one of the most critical operational confronts. Cyber threats such as fraud and malware exist as risks on nearly every transaction, from clearing to settlement. As trades open to many participants and attach points, they impose particular challenges to CBDC. The potential effect of fraud is more significant in large denominations that could quickly transfer electronically in split seconds. Issuance of CBDC must equip with forceful mitigation methods to counteract cyber-risk.

Central bank services are important to provide robust scalability, reliability, resilience, and throughput requirements. In addition, there are technologies such as distributed ledger technology (DLT) to issue and manage CBDC. However, there are still outstanding questions under operation risk management, with central government needs to be answered before practical deployment can be planned.

Electronic copy available at: https://ssrn.com/abstract=4702269
2.1.7 Perception of the senior customer on new technology

The elderly are stereotyped as moving away from innovative technology (Mostaghel, 2016). However, the marketplace is very similar to internet usage and online transaction. For this reason, I can challenge the study of the overlooked similarity among the elderly to adopt new digital currency transactions. Older people are now more digitally informed to transform and adopt new technology. The trend for seniors who own mobile phones is increasing and becomes common as a necessity. Mobile devices appear to overcome the use of computers. Over 78% of older people over 65 have a mobile device in the USA.17

I took the statistics in China and took Tencent as an example(Figure 7). The “over 41 years” old range is around 20%, doubling “36-40”. The two reasons for using are "Easy to Use" and "No need to download the app." (Figure 8) People at elder age are willing to adopt if the technology is easy to use and manage.

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By following the curve (Figure 9), for WeChat account, the average number of contacts has more than doubled last year. In addition, the statistics show 63m users aged above fifty-five years old have used their account at least once a month.\textsuperscript{18}

Reviewing the statistics above, my research will further analyze if age moderates the individual determinants and improves consumers' intention to accept Central Bank Digital Currency.

\textsuperscript{18} Daily active users for WeChat exceeds 1 billion | ZDNet. https://www.zdnet.com/article/daily-active-user-of-messaging-app-wechat-exceeds-1-billion/
2.2 Literature Review

The digital currencies concept has involved a sequence of revolutions: blockchain technology, peer-to-peer network, digital signatures, and decentralized transaction verification. These new technologies have shaped waves of innovation in digital currencies by marking a new period in financial services.

Central Bank Digital currencies constructed from prior innovative achievements in Information Technology. From a conceptual viewpoint, applying the Unified Theory of Acceptance and Use of Technology Model is justified (Figure 10) when the customer adopts CBDC on innovation technology. Venkatesh, Morris, and David (2003) develop the model, emphasizing facilitating condition, effort efficiency, social influence, and performance expectancy as the independent variable for behavioral intention.

In between September 2003 to December 2014, UTAUT was cited by 1,267 papers, with 245 in AIS Senior Scholars, 613 from other IS journals, and 409 in Association for Information System (AIS) Conference. The citation can further classify into different themes, namely general authority to the original UTAUT paper (total:1205), an application of UTAUT (total:12), integration with other theories (total: 13), and Extension of UTAUT with new attributes (total: 37). The unique attributes include trust (Carter & Schaupp 2008), perceived threats (Loose et al. 2013), risk (Martinet al 2014), etc. The original model proposed a stretch of four constructs to support information technology with acceptance. Two constructs, Effort

Electronic copy available at: https://ssrn.com/abstract=4702269
and Performance Expectancy, are measuring technology attributes. The remaining Facilitating Condition and Social Influence are counted as background factors that influence behavior individually.\textsuperscript{19}

I have added two determinants, which are external influence and perceived risk. This research's findings should bridge the literature aperture about retail consumer factors affecting intention to use Central Bank Digital Currency (CBDC) and practitioners' decision-making in use. The paper will also stress how Seniors react to the new digital currency. In addition, perceived usefulness on the advantages of CBDC where the user should fit into current practice on online transaction. The purpose of present study is three folded. Firstly, I aim to provide the impacting vision use of CBDC. Secondly, from the theoretical perspective, I examine the use of UTAUT to assess the model which predicts customers' intention on innovation technology in the form of digital currency. Third, the research integrates the predictor of technology acceptance external influence, which is considered a predictor for new payment technology adoption. There is a lack of papers regarding Central Bank Digital Currency payment adoption and usage. There are no studies on Central Bank Digital payment adoption, hence this paper's proposed research.

2.2.1 Literature review on Performance Expectancy

Performance expectancy is when one believes that exploiting new technology will attain gains to perform the tasks. Performance expectancy arises from external motivation and relative advantage (Venkatesh & Davis, 2000). Performance expectancy has been hypothesized as the utilities and benefits obtained from innovative channels regarding ease, availability, efficiency, and effort saving (Venkatesh et al., 2003). The adoption of digital currency from the central bank will depend on external motivation, supporting the government’s intervention in mandating usage and special promotion from merchants who accept CBDC. The perceived advantage in using CBDC on convenience with 7 * 24 availability and efficiency on immediate payment or transfer where customers can benefit. The critical point is the anticipated value-added using CBDC compared to fiat money transactions.

Performance expectancy is an imperative influential element altering behavioural adoption. Customers usually are involved to compare the process between the utility’s gains obtained by using new technology. User perception to improve current job performance with new technology is higher (Venkatesh et al., 2003). Past research has validated the correlation between Performance Expectancy and Behaviour Intention, such as mobile banking (Yu, 2012). Alalwan et al. (2014) claimed utility encountered on new technology under performance expectancy. Several researchers have evidence of substantial influence with improved performance from user behavioral intention (AbuShanab et al., 2010; Foon and

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Fah, 2011). If consumers discover the values from Central Bank Digital Currency, they are more willing to adopt and use it in transaction transfer.

2.2.2 Literature review on Effort Expectancy

Effort expectancy relates to ease of use under user expectation. Zhou et al. (2010) verified that "users feel that internet banking is easy to use with minimal effort, they would have high chances to adopt internet banking." The technical savvy users on mobile gadgets may find CBDC easy to use with minimal effort will have a higher chance to adopt and use more frequently.

Another dimension of customers’ attitude on difficulty perception while using AI devices. Users in a social group with a positive perception of CBDC may increase adoption as easy to use. The service of CBDC may overcome the trade-in using the new technology. If new technology as CBDC requires less effort to acquire and apprehend to use, users' adoption intention would be higher. As technology's complexity reduces, the customer’s intention to use is likely to expand.

2.2.3 Literature review on Social Influence

Social influence is the level at which a customer's social group believes using new technology applies and is coherent to group norms. People are easier to imitate essential group norms. Customers' social network conduct affects individual behaviour (Rather, 2018). If a customer within the same social group holds the same behaviour attitudes toward the new CBDC, they will follow the norm. Using Central Bank Digital Currency will value the customer's community uniqueness. The attitude refers to a perceived value that customers can receive from adoption to use. As a result, the customer will positively imitate the social group's norms toward CBDC. 24

Reference study from an online fundraising platform Blackbaud, providing non-profit online fundraising, estimated that people using online fundraising had raised six times more than offline tools. The motivation for donation is from "A friend asked me."25 Consumers are intended to use similar apps within recommendation from group influence. Individuals unfamiliar with digital currency would attempt guidance from family members or friends. Adoption of CBDC will affect the social impact on consumers within the same social group in preference to use digital currency. In addition, cities in China under pilot trials create a social norm as a benchmark to a spending culture in established cities.

2.2.4 Literature review on Facilitating Condition

From adopting innovative technology, facilitating conditions (FC) refer to resources that can be readily available in promoting adoption and use (Venkatesh et al. 2008). The resources include users' familiarity availability of guidance in markets and from close friends and colleagues (social influence). These are factors generally not under control by a person. Proper guidance on CBDC and ensuring system malfunction will increase facilitating conditions. Facilitating conditions become an issue or even at risk when access to compulsory resources is inadequate.

Venkatesh et al. (2003) discovered that facilitating conditions without a moderator is not substantial to foresee intention in using a system when the construct of same mode on effort expectancy. When age and experience are used as moderators, it strongly affects older workers with increasing experience.

To use CBDC, they need access to the mobile device, relevant apps, and abilities to correctly execute the transaction using new technology. Consumers with access to a set of favourable facilitating conditions as seminars, live-chat support, or even demonstrations will have adequate support and increase intention to use. Studies from Morosan, Defranco, and Tarhini have shown facilitating conditions have a positive relationship to behaviour intention. (Morosan & DeFranco, 2016; Tarhini et al., 2016). Hence, giving the customers' resources and support services on new technology will motivate them to utilize CBDC.

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A resource facilitating condition can imitate consumers' trust that organizational arrangement and technical resources assist using the system (Ventakesh et al., 2003). In addition, enabling conditions relate to how consumers gain access to new technology, the value of using a system, and ease of use (Pan et al., 2010).²⁹

2.2.5 Literature review on External Influence

Crag and Mills (2011) and Nguyen (2009) prescribe external influence as triggers, reason, and prerequisites for customer adoption. Gunasekaran and Ngai (2009) have reliability factors and validity as keys are highlighted as Government Support to provide the business environment with policy and regulation guidelines on online payment options and secure and trustworthy online payment policy. The regulatory rule's implementation by central authorities like governmental and regulatory influences private actors' activity and behavior within the financial market (OECD, 1997). In addition, central governance in regulating CBDC increases the level of trust by users.

The support may directly come from government authorities, provide subsidisation to purchase specific products. Similarly, the researcher has also placed "perceived external factors" next to barriers. Government support and payment options can lead to a blocker if the support is weak in execution. Government support was the first critical factor for adopting an innovative system. The important reason for government support is where the customer will look up to with trust and feels more protected (Chen and McQueen, 2008). For Central Bank Digital Currency, the same token can be further be evaluated on government and local regulatory support. Under the circumstance where the general public will not fully understand the technology behind CBDC, permission from the central government is vital for the customer to perceive trust and increase intended behaviour to adopt. As mentioned in previous chapters, China government has provided support to CBDC by offering red packets for residents in trial cities. The digital currency provided by Central Bank will further demonstrate the statement on adoption.

---


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I visualise facilitating conditions as a more internal catalyst to increase intention for adoption, whereas external influence is described as law enhancement, environment, and government perspective.

**Summary of examples differentiating between Facilitating Condition and External Influence**

<table>
<thead>
<tr>
<th>Facilitating Condition</th>
<th>External Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To accommodate low computer literacy user</td>
<td>1. Attractive spoke person in mass media</td>
</tr>
<tr>
<td>2. Immediate support to questions and answers</td>
<td>2. Government support e.g. free trial on usage /experience</td>
</tr>
<tr>
<td>3. Increase user knowledge</td>
<td>3. Political e.g. new legislation, law, stability</td>
</tr>
<tr>
<td>4. Hardware/software resource for users</td>
<td>4. Economic e.g. Inflation, unemployment, interest rates</td>
</tr>
<tr>
<td>5. Lower user’s acquisition cost e.g. free wifi</td>
<td>5. Environmental e.g. weather condition, growing interest being ‘green’, pandemic impact on “touchless” payment</td>
</tr>
<tr>
<td>6. Cater for people in disability: blindness, deafness, severe vision, hearing impairment</td>
<td>6. Competitive e.g. growth in another cryptocurrency</td>
</tr>
</tbody>
</table>
2.2.6 Literature review on Perceived Risk

Perceived risk can facilitate to identify behavior of the customer. Bauer (1960) described it as the overall perceived usage value led by influence. The perceived risk correlated to electronic delivery channels like the internet and the financial product is higher than basic consumer goods (Harrison 2000, 242). Central Bank Digital Currency will be used in financial transactions thru banks, which induce similar perceived risk concerns from the customer. In addition, the form of CBDC is invisible where it can only be shown electronically thru mobile devices.

The prerequisites for banking activity ensure the security and confidentiality of sensitive information (Jayawardhena & Foley 2000). Relative advantage from utilising the technology, and compatibility with existing online payment mechanisms, are related to adopting new technology. The remaining two, perceived risk and complexity, are negatively correlated. (Rogers 1995). Complexity conveys uncertainty and doubt, customers who face a challenge in using CBDC increase perceived risk and reduce adoption. The relative perceived advantage of using CBDC as fiat money over current banknotes or coins will revoke perceived risk.

According to Ryu (2018), there are six perceived risk measures: social factors, psychological factors, performance, opportunity or time, safety, and financial consideration.³¹

For Fintech, perceived risk is critical when consumers consider using new technology without a well-defined understanding. Instead, it is treated as one will “win” or “lose” part of the value during the transaction.

---

Financial troubles can also come from economic losses due to fraud. In addition, security exposure to potential loss of control over personal privacy data. Security risk persists as a dominant barrier to lack of assurance from new technology.

There are security concerns on digital currency, including cyber-attacks by criminal hackers, e-wallet thefts, user identity problems, and data privacy. For CBDC in China, the government had tried to mitigate perceived financial risk by providing incentive programs back in October 2020, providing training and hands-on workshop to present a more transparent view to customers. In addition, expanding the scale into major cities and show case in international event for 2022 Winter Olympics.
2.2.7 Literature review on Moderating role of Age and Experience

Digital currencies can be a challenge to an older adult with complicated processes and procedures. New phenomena and awareness usage are lower than juniors with more focus on the latest technological trends. From this respect, researchers describe that younger individuals more eager to accept new technology have more intention to adopt digital currency than seniors. The average age of Bitcoin users is young (Figure 11) from Researchgate.com, which concentrates on the age range between 20-30.

In general, senior users over 40 are less familiar with the new currencies, security risk is the primary concern that might be more severe on wealth management. Thus, seniors behave as risk-averse with limited trust in these currencies. CBDC for senior users may possess similar situations as Bitcoin. Therefore, the understanding of CBDC by seniors on security and how it works will make a difference in adoption given it is backed by the central bank and reduce perceived risk.

Users prefer technology requiring minimal effort with a low experience level (Venkatesh et al., 2003). The adoption of new complex products also depends on understanding and personal interest to explore and accept. Gender and experience levels result in different behaviour relating to the six independent variables affecting behavioural intention to use. Adopting complicated products depends on the customer’s ability to step forward and try at a


bare minimum to acquire new knowledge, engage in new technology, and build up the
customer experience.

Smith et al. (1999) argue that expertise can be a deficiency for technology-related
stimuli when interactions with inadequate information, which reduces anxiety towards
adopting in use. The cumulated experience on the reverse side from technology
possesses negative behaviour intention to accept next challenge.

Although experience can result from marketing-designed, consumers could actively
seek more information or learn the latest technology. Hence, the primarily determined
by the effort expended on experience is an internal psychological process.34

Im et al. (2008) has used UTAUT to examine regulating effect of experience towards
customers' concurrence of the technology. Samuel's (2014) comprehensive analysis of
other impacts users experience greatly influences effort expectancy to behavioral
intention.

The experience was used in many prior studies as a moderator. Carter and Yeo have
provided theoretical evidence where effort expectancy tends to have a broader impact
at the initial stages of adoption (Carter and Yeo, 2016). Social influence over time will
reduce and switch to not significant from extensive as user technology experience
increases. The result indicates that the moderating effect of more extended experience
deteriorates with time, the social influence will be less significant on the behavioral
intention with more comprehensive experience.35 The capability can be further
enhanced by knowledge gained from existing like-for-like products as online payment.

34 Mahardika, Harryadin, Thomas, Dominic, Ewing, Michael Thomas, & Japutra, Arnold, (2019).
Experience and facilitating conditions as impediments to consumers' new technology adoption. The
International Review of Retail, Distribution and Consumer Research, 29(1), 79-98.
35 Chua, Pei Ying, Rezaei, Sajad, Gu, Man-Li, Oh, YokeMoi, & Jambulingam, Manimekalai, (2018).
CBDC is only at a trial period in China, where most customers' knowledge gain is still on a small scale. Customers with more experience in online payment transactions will quickly adapt to Central Bank Digital Currency. The entire user experience is very similar in executing current online payment gadgets. In the end, CBDC is not ‘visible’ throughout the transaction via payment API. This is similar to moving funds from bank accounts to online payment account as WeChat and Alipay. The customer experience will be the same where the transaction will be on the payment account level instead of at the bank.
3. Hypotheses

Reference to Figure 12, I have listed all the hypotheses with detailed explanations on each independent variable and moderators.

![Figure 12 Hypothesis of Customer behavior intention](image)

3.1 Performance Expectancy on customer intention

Performance expectancy is an evaluation of measuring where individuals consider that new technology will help them attain advantages on daily tasks better than existing technology. Central Bank digital currency’s technology refers to performance expectancy on technology innovation as another payment option. Digital currency's expectation is a fast and secure, instant person-to-person payment via the internet without limitation on time. On the other hand, the new technology is expected to inconvenience customers.

Further, performance expectancy refers to the value-added of using technology (Alwahaishi and Snásel, 2013) includes perceived service (Technology Acceptance Model - TAM), extrinsic drive, and relative advantage (Venkatesh et al., 2003). Thus, the research hypothesis is constructed as:

**H1. Performance expectancy is positively related to customers' behavioral intention to use Central Bank Digital Currency.**
3.2 Effort Expectancy on customer intention

Effort expectancy references how easy to use the technology system. Carlsson et al. (2006) discovered effort expectancy is positively affecting behavioral intention. CBDC involve complex technology behind the scene. More importantly, the customer-facing screen should be simple and easy to use with minimal effort. The interface screen will be simpler to shadow current online payment to have a seamless adoption experience. Thus, the research hypothesis is constructed as:

**H2. Effort expectancy is positively related to customers’ behavioral intention to use Central Bank Digital Currency.**

3.3 Social Influence on customer intention

Social influence defines as measuring the level of perceives in adoption (Venkatesh et al., 2003, p. 451). The group refers to close friends, relatives, and work colleagues (Cudjoe et al., 2015). Confrontation on social norms within the social group to use new technology is a decisive determinant factor in behavioural intention. Social influence is a dominant factor for driving expectations within the group. Performance expectancy increases via a robust social group outlook and further affects behavioural intention. Effort expectancy can improve from the dominant social influence, which expects that technology is not complex and expert advice on usage can be shared among the social group. Perceived risk directly relates to social influence driving the assessment of risk. Perceived risk will relatively decrease if the norm considers the usage of CBDC as low risk. On the opposite, if the norm from a social group on the risk of using new technology is high, the perceived risk will also be driven in the same direction.

Thus, the research hypothesis is constructed as:

**H3. Social influence is positively related to customers’ behavioural intention to use Central Bank Digital Currencies.**
3.4 Facilitating Condition on customer intention

Facilitating conditions are labelled where things stimulate technology adoption (Harsono and Suryana (2014)). The unabundant support will lead customers to opt-out of adopting the technology. Facilitating conditions have positively influenced user behavior intention to adopt technology from practical evidence study. Central government providing detailed guidelines retaining strong governance stimulates customers’ confidence level to use Central Bank Digital Currency. Facilitating condition decreases on ambiguous information and direction on CBDC affecting behaviour intention to use. The degree of assistance can effectively promote use and transparent regulation on dealing with the illegal practice of CBDC. Thus, the research hypothesis is constructed as:

**H4** Facilitating condition is positively related to customers' behavioural intention to use Central Bank Digital Currency.
3.5 External Influences on customer intention

External influence may have little or no control over economic, social, financial, and competitive situations. External influence can be further classified into cultural factors or social factors. For example, in China, WeChat and Alipay are well adopted by consumers of almost all age groups, which can be treated as an external influence. The Government of China promotes digital currency usage by giving away 'Red Package' for the consumer on trial use. There were 50,000 people awarded 200 yuan in central bank digital currency. The trial was organized to encourage consumer spending via innovative technology. External influence initiates an extended outside the country. Information nowadays is shared across the globe in split seconds via the internet, online news, etc. Central Bank Digital Currency awareness is widely exposed and developed at different stages in respective countries. There is a join-up project across countries in Asia working on CBDC. For example, UAE, Hong Kong, and Thailand are joining up for cross-border payment technology.

External influence on positive or negative information input worldwide will affect customer perception of CBDC. Customers will associate with local country development whether the exposed risk are mitigated effectively. Thus, the research hypothesis is constructed as:

**H5 External influence is positively related to consumers' behavioral intention to use Central Bank Digital Currency.**
3.6 Perceived Risk on customer intention

Perceived risk is defined as "the expectation of losses associated with purchase and acts as an inhibitor to purchase behavior" (Peter and Ryan 1976). The cause of perceived risk is uncertainty and potential “loss” of the desired outcome using CBDC. CBDC being efficiency and benefit, it is still a new perception posting open inquiries and risk. Financial risk on invalid transfer, Cyber resilience challenge as CBDC is available for the world with opportunity on multiple points of attack, AML/KYC risk associated with using counter-terrorist financing sanctions. Privacy risk on exposing customer sensitive data holding digital money, and storing vast amounts of data in one centralized system is in doubt, with traceability and privacy implication making CBDC a double-bladed weapon. In addition, legal and regulatory governance on utilization of CBDC. Customers’ perception of risk in CBDC will lower on intention to use. Thus, the research hypothesis is constructed as:

**H6 The perceived risk has a negative effect on consumers' behavioral intention to use Central Bank Digital Currency.**
3.7 Moderating Role of Age and Experience on customer intention

Age and experience were propagated as the two moderating variables for this research paper. As from historical research, the age of customers leads to an essential effect on behavior intention. (Arning & Ziefle, 2007). It is valuable to check whether the research about adopting a new payment tool will also be decisive. Another critical factor is the experience factor. Findings from research studies indicate that older age individuals with more experience on payment online are more willing to adopt and consent to new technology than those with less experience. The consumer experience is another moderator where the higher the level, the higher the behavior intention on adoption. Thus, the research hypothesis is constructed as:

H7a  Performance Expectancy effect to Behavioral Intention is moderated by age and experience. The effect will be more substantial to consumers at a younger age and more online payment experience.

H7b  Effort Expectancy effect to Behavioral Intention is moderated by age and experience. The effect will be more substantial to consumers at a younger age and more online payment experience.

H7c  Social Expectancy effect on Behavioral Intention is moderated by age and experience. The effect will be more substantial to consumers at a younger age and more online payment experience.

H7d  Facilitating Condition effect on Behavior Intention is moderated by age and experience. The effect will be more substantial to consumers at a younger age and more online payment experience.

H7e  External Influence effect on Behavior Intention is moderated by age and experience. The effect will be more substantial to consumers at a younger age and more online payment experience.

H7f  Perceived Risk effect to Behavior Intention is moderated by age and experience. The effect will be more substantial to consumers at a younger age and more online payment experience.
4 Research Model, Method, and Results

4.1 Sampling and Population

The survey was designed to validate the hypothesis with a total of forty questions (Appendix A – Survey Questionnaire). There are two parts: The first part measures the determinant variables and relationships in the research. The six key variables measured included facilitating conditions, effort expectancy, performance expectancy, social influence, external influence, perceived risk. The second part covers the respondents’ demographics (age, gender, education level, area of residence, and online payment experience). Participant from the survey was completely anonymous and voluntary basis. The distribution of the survey is a self-administered online questionnaire via different social media links: Wechat, Whatapps, email, and face-to-face interviews. The survey has used both Chinese and English. The English version was used primarily for Hong Kong and overseas participants, while the Chinese version is primarily used for the mainland. The distribution shall cover consumers of different age groups across cultures. Due to the pandemic, people are more likely to stay home for dinner with other limited dine-in restaurants closing at 6 pm and shut down entertaining facilities. One of the take-aways is to send the survey request on Friday and Saturday evenings around 8 pm with more percentage rate of survey completion. I have received 448 survey replies, of which 419 are completed and can be used for statistical analysis.
Random sampling

To achieve random sampling, I have enhanced the original data collection methodology and data used in the regression.

Data Collection

Additional responses were gathered via Survey Monkey in paid response on the same questionnaire. The same treatment was used on assigning a score to each question.
Data selection

Method 1: use only one compelling question from each determinant

a) I have selected only one represented question from each determinant from the questionnaire. i.e. one question from Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Condition, External Influence, Perceived Risk, and Behavior Intention. The following questions were selected.

<table>
<thead>
<tr>
<th>Individual Determinant</th>
<th>Survey Questions</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Performance Expectancy</strong></td>
<td>Using digital currency payment would save time, so I can do other activities in my day-to-day</td>
<td>More direct to describe one of the benefits – save time if aligned with the respondent. Other questions tend to be general, presenting practical, convenient, or saving.</td>
</tr>
<tr>
<td><strong>Effort Expectancy</strong></td>
<td>I believe that it is easy to use the digital currency payment</td>
<td>Straight to point, easy to use. Other questions refer to skill sets or learning.</td>
</tr>
<tr>
<td><strong>Social Influence</strong></td>
<td>People who are important to me would think that I should use CBDC</td>
<td>Layman on the status of the person who can influence the decision.</td>
</tr>
<tr>
<td><strong>Facilitating Condition</strong></td>
<td>Central Bank Digital Currency is compatible with other online payment technology I use</td>
<td>Easy to compare with current use in online technology</td>
</tr>
<tr>
<td><strong>External Influence</strong></td>
<td>Local business and national culture of the country will affect the use of CBDC</td>
<td>More personal in particular to the country under same culture and treatment from local business</td>
</tr>
<tr>
<td><strong>Perceived Risk</strong></td>
<td>I think the system will protect my private information</td>
<td>Personal privacy is always the number one concern on new technology</td>
</tr>
<tr>
<td><strong>Behavior Intention</strong></td>
<td>I predict I will use CBDC</td>
<td>Direct to the point on perceived intention</td>
</tr>
</tbody>
</table>
Method 2: use a random selection of one question from each determinant.

Access to excel function RANDBETWEEN, I have a random number assigned for each determinant.

<table>
<thead>
<tr>
<th></th>
<th>Random BETWEEN Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE</td>
<td>1</td>
</tr>
<tr>
<td>EE</td>
<td>7</td>
</tr>
<tr>
<td>SI</td>
<td>11</td>
</tr>
<tr>
<td>FC</td>
<td>16</td>
</tr>
<tr>
<td>EI</td>
<td>21</td>
</tr>
<tr>
<td>PR</td>
<td>25</td>
</tr>
<tr>
<td>BI</td>
<td>29</td>
</tr>
</tbody>
</table>

4.2 Data preparation

On the questionnaire design, I adopt a Likert measurement hierarchy from 1 – 5. For questions under the six independent variables – External Influence, Social Influence, Effort Expectancy, Performance Expectancy, Facilitating Condition, External Influence. Each attribute is assigned a score from one – “very unlikely” to five “very likely”. Zero is given to “I do not know”. The score assignment is illustrated below (Table 3). Data collection from each question is mapped against a score value.

For questions under Perceived risk, the score is mapped (Table 4) in reverse due to the nature of questions, the higher the perceived risk, the lower the score where ‘1’ as ‘very likely’ and ‘5’ as very ‘unlikely’.

Table 4 Score Assignment - General

<table>
<thead>
<tr>
<th>Answer</th>
<th>Score</th>
<th>Answer</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>very unlikely</td>
<td>1</td>
<td>非常不可能</td>
<td>1</td>
</tr>
<tr>
<td>unlikely</td>
<td>2</td>
<td>不太可能</td>
<td>2</td>
</tr>
<tr>
<td>neutral</td>
<td>3</td>
<td>中性</td>
<td>3</td>
</tr>
<tr>
<td>likely</td>
<td>4</td>
<td>可能的</td>
<td>4</td>
</tr>
<tr>
<td>very likely</td>
<td>5</td>
<td>非常可能</td>
<td>5</td>
</tr>
<tr>
<td>I do not know</td>
<td>0</td>
<td>我不知道</td>
<td>0</td>
</tr>
</tbody>
</table>
For Perceived Risk, due to the nature of the question, the score assignment is as below.

Table 5 Score Assignment - Perceived Risk

<table>
<thead>
<tr>
<th>Perceived risk</th>
<th>Score</th>
<th>Perceived risk</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>very unlikely</td>
<td>5</td>
<td>very unlikely</td>
<td>5</td>
</tr>
<tr>
<td>unlikely</td>
<td>4</td>
<td>unlikely</td>
<td>4</td>
</tr>
<tr>
<td>neutral</td>
<td>3</td>
<td>neutral</td>
<td>3</td>
</tr>
<tr>
<td>likely</td>
<td>2</td>
<td>likely</td>
<td>2</td>
</tr>
<tr>
<td>very likely</td>
<td>1</td>
<td>very likely</td>
<td>1</td>
</tr>
<tr>
<td>I do not know</td>
<td>0</td>
<td>I do not know</td>
<td>0</td>
</tr>
</tbody>
</table>

The following score apply to demographic factors

Table 6 Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 25</td>
<td>0</td>
</tr>
<tr>
<td>26 - 35</td>
<td>1</td>
</tr>
<tr>
<td>36 - 45</td>
<td>2</td>
</tr>
<tr>
<td>46 - 55</td>
<td>3</td>
</tr>
<tr>
<td>Over 55</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 7 Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0</td>
</tr>
<tr>
<td>Female</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 8 Experience

<table>
<thead>
<tr>
<th>Experience</th>
<th>Score</th>
<th>Experience</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>0</td>
<td>從不使用</td>
<td>0</td>
</tr>
<tr>
<td>Less than 1 year</td>
<td>1</td>
<td>不到一年</td>
<td>1</td>
</tr>
<tr>
<td>1 to &lt; 2 years</td>
<td>2</td>
<td>一年 - 不到兩年</td>
<td>2</td>
</tr>
<tr>
<td>2 to &lt; 3 years</td>
<td>3</td>
<td>兩年 - 不到三年</td>
<td>3</td>
</tr>
<tr>
<td>More than 3 years</td>
<td>4</td>
<td>三年以上</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 9 Area of Residence

<table>
<thead>
<tr>
<th>Area of residence</th>
<th>Score</th>
<th>Area of residence</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beijing, Shanghai, Guangzhou, Shenzhen</td>
<td>1</td>
<td>北京, 上海, 香港, 深圳</td>
<td>1</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>2</td>
<td>香港</td>
<td>2</td>
</tr>
<tr>
<td>Other cities</td>
<td>3</td>
<td>其他城市</td>
<td>3</td>
</tr>
<tr>
<td>Rural area</td>
<td>4</td>
<td>農村</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 10 Education Level

<table>
<thead>
<tr>
<th>Education level</th>
<th>Score</th>
<th>Education level</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary school</td>
<td>0</td>
<td>小學</td>
<td>0</td>
</tr>
<tr>
<td>Junior college</td>
<td>1</td>
<td>初中</td>
<td>1</td>
</tr>
<tr>
<td>Bachelor Degree</td>
<td>2</td>
<td>大學</td>
<td>2</td>
</tr>
<tr>
<td>Post-Grad Degree or above</td>
<td>3</td>
<td>研究生或以上</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 11 Frequency of Transaction

<table>
<thead>
<tr>
<th>Frequency of Transaction</th>
<th>Score</th>
<th>Frequency of Transaction</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>0</td>
<td>沒有用過</td>
<td>0</td>
</tr>
<tr>
<td>Once a year</td>
<td>1</td>
<td>每年一次</td>
<td>1</td>
</tr>
<tr>
<td>Once a month</td>
<td>2</td>
<td>每月一次</td>
<td>2</td>
</tr>
<tr>
<td>Once a week</td>
<td>3</td>
<td>每周一次</td>
<td>3</td>
</tr>
<tr>
<td>Every day</td>
<td>4</td>
<td>每天</td>
<td>4</td>
</tr>
</tbody>
</table>
The survey in Chinese and English are combined as one file for data analysis with a total of 419 complete responses. Plus addition paid response of 241 with a random sampling size of 660.
4.3 Analysis of Results

4.3.1 Demographic of samples

Gender is more evenly distributed between Male (54%) and females (46%) (Figure 13).

![Figure 13 Distribution on Gender](image)

The age distribution is concentrated in 30-44 and 45-60, which countable for 56% of the population (Figure 14).

![Figure 14 Distribution on Age](image)
The survey is distributed predominately among participants in HK (58%) or developed cities in China (27%) (Figure 15).

Experience with Online payment is skewed to “more than three years” (66%) (Figure 16) over three hundred plus responses.

The distribution on Education level is dominant to be with a university degree or higher (57%) (Figure 17).
Online payment is well established in Hong Kong, especially in the China region (Figure 18), where the primary response shows an online payment at least once a month (92%).

![Figure 18 Distribution on Frequency of Online Payment](image)

4.3.2 Analysis of independent variable against demographic factors

**Background**

Respondent demographic information may impact behavior intention to use Central Bank Digital Currency. Particular gender, age group, living in city or rural area, experience on transacting online, and how frequency the respondent transact. A more indirect impact on Perceived risk due to the above demographic factors will further impact the final Behavior Intention. I will look at each demographic element in more detail and evaluate which set under individual determinants will impact Behavior Intention on CBDC. The definition argument for adopting includes “likely” and “very likely”. For Perceived Risk, the definition argument for adopting include “unlikely” and “very unlikely”.

Electronic copy available at: https://ssrn.com/abstract=4702269
Detail data analysis

a) Behavior Intention

In general, the distribution skew on “neutral” (29%), “likely,” and “very likely” is countable for 46%.

**Behavior Intention vs Gender**: would gender difference contribute to behavior intention to adopt CBDC.

Reference to Table 12, within the Male group, 53% is likely/very likely to adopt CBDC compared with the Female group (38%). Male tends to have a higher intention on adoption while Female is more on Neutral decision (40%).

Table 12 Pivot Behavior Intention vs Gender
Behavior Intention vs Age: different age groups to demonstrate differentiation in the level of CBDC adoption, the respondent can have a different level of experience/understanding/risk appetite, etc.

Reference to Table 13 below, respondents within the age group “18-29” (50%) have the highest adoption rate, followed by the age group “30-44” (57%). The adoption dropped from the age group “46-60” (33%) and “>60” (49%). 45-60 is still at the working-age range and close to retirement, where financial risk has dominated the decision. Age “>60” is on the ‘retiring’ group with more financial stability and take a drastic decision to adopt or not adopt (40%). I can further demonstrate the statement with the support under perceived risk.

![Table 13 Pivot Behavior Intention vs Age](image)

Electronic copy available at: https://ssrn.com/abstract=4702269
Behavior Intention vs Area of Residence: respondents living in the urban city would access more information to CBDC, from news, people around, or even an opportunity to use CBDC for China in particular with good or bad user experience (Table 14).

Table 14 Pivot Behavior vs Area of Residence

Hong Kong (38%) and major cities in China (65%) are well aware of CBDC with high behavior intention to adopt CBDC. Justification cannot be made in Rural areas due to the low sample size.

Behavior Intention vs Experience: should more online payment experiences increase behavior intention to adopt CBDC.

Referring to Table 15, 66% of the respondents have over three years of experience. By analyzing at individual group 1-2 years (30%), tops at 2-3 years (65%), and drops for >3 years (49%). It is interesting to have a more in-depth review for a reason for lower behavior intention to adopt for online payment experience greater than three years.

Table 15 Pivot Behavior Intention vs Experience of Online Payment
Behavior Intention vs Frequency of Online Transaction: the more frequent online transaction will trigger higher behavior intention to CBDC.

Reference to Table 16, Once a month (43%), Once a week (27%), and Everyday (75%). Respondents who perform transactions everyday have the highest adoption rate to Behavior Intention for CBDC.

Table 16 Pivot Behavior Intention vs Frequency of Online Payment

<table>
<thead>
<tr>
<th>Row Labels</th>
<th>Never</th>
<th>Once a year</th>
<th>Once a month</th>
<th>Once a week</th>
<th>Everyday</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do not know</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>14</td>
<td>4</td>
<td>26</td>
</tr>
<tr>
<td>very unlikely</td>
<td>6</td>
<td>6</td>
<td>17</td>
<td>21</td>
<td>1</td>
<td>51</td>
</tr>
<tr>
<td>neutral</td>
<td>1</td>
<td>3</td>
<td>31</td>
<td>44</td>
<td>6</td>
<td>85</td>
</tr>
<tr>
<td>likely</td>
<td>3</td>
<td>9</td>
<td>61</td>
<td>49</td>
<td>99</td>
<td>221</td>
</tr>
<tr>
<td>very likely</td>
<td>1</td>
<td>3</td>
<td>11</td>
<td>17</td>
<td>53</td>
<td>85</td>
</tr>
<tr>
<td>Grand Total</td>
<td>19</td>
<td>32</td>
<td>168</td>
<td>240</td>
<td>201</td>
<td>660</td>
</tr>
</tbody>
</table>

Electronic copy available at: https://ssrn.com/abstract=4702269
Perceived Risk

Due to the nature of perceived risk, I am analyzing on respond as “unlikely” and “very unlikely”. Domination on “unlikely” and “very unlikely” with 46%. Neutral countable for 25% where the respondent cannot make a clear decision.

![Perceived Risk Chart]

Perceived Risk vs Gender: would the risk be different by gender

Regarding Table 17. Male (47%) and Female (45%) make no significant difference for gender consideration under perceived risk.

![Gender Chart]

Table 17 Pivot Perceived Risk vs Gender

Electronic copy available at: https://ssrn.com/abstract=4702269
**Perceived Risk vs Age**: would perceived risk be different in the age group? The lower the age group be more risk-taking or higher age group be more risk-averse. Reference to Table 18, Age group 18-29 (54%), 30-44 (32%), 45-60 (57%), >60 (52%). Perceived risk is very even among all age groups (slight exception on Age group “30-44”. There is no major difference among age groups on perceived risk to Central Bank Digital Currency.

![Perceived Risk vs Age](image)

Table 18 Pivot Perceived Risk vs Age

<table>
<thead>
<tr>
<th>PR</th>
<th>&lt;18</th>
<th>18-29</th>
<th>30-44</th>
<th>45-60</th>
<th>&gt; 60</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do not know</td>
<td>2</td>
<td>13</td>
<td>24</td>
<td>14</td>
<td>16</td>
<td>69</td>
</tr>
<tr>
<td>very unlikely</td>
<td>3</td>
<td>20</td>
<td>22</td>
<td>18</td>
<td>12</td>
<td>75</td>
</tr>
<tr>
<td>unlikely</td>
<td>5</td>
<td>15</td>
<td>105</td>
<td>73</td>
<td>49</td>
<td>229</td>
</tr>
<tr>
<td>neutral</td>
<td>3</td>
<td>14</td>
<td>11</td>
<td>18</td>
<td>19</td>
<td>65</td>
</tr>
<tr>
<td>likely</td>
<td>15</td>
<td>11</td>
<td>5</td>
<td>13</td>
<td>11</td>
<td>55</td>
</tr>
<tr>
<td>very likely</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>37</td>
<td>132</td>
<td>213</td>
<td>161</td>
<td>117</td>
<td>660</td>
</tr>
</tbody>
</table>

**Perceived Risk vs Area of Residence**: would risk perception be different in the respondent’s area of residence between rural areas, Hong Kong, and major cities in China. Reference to Table 19, there is no significant difference between Hong Kong(50%) and major China cities (42%) on perceived risk.

![Perceived Risk vs Area of Residence](image)

Table 19 Pivot Perceived Risk and Area of Residence

<table>
<thead>
<tr>
<th>PR</th>
<th>Rural area</th>
<th>Other cities</th>
<th>Hong Kong</th>
<th>Beijing, Shanghai, Guangzhou, Shenzhen</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do not know</td>
<td>1</td>
<td>4</td>
<td>43</td>
<td>21</td>
<td>69</td>
</tr>
<tr>
<td>very unlikely</td>
<td>12</td>
<td>40</td>
<td>23</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>unlikely</td>
<td>1</td>
<td>27</td>
<td>150</td>
<td>51</td>
<td>229</td>
</tr>
<tr>
<td>neutral</td>
<td>1</td>
<td>48</td>
<td>55</td>
<td>63</td>
<td>167</td>
</tr>
<tr>
<td>likely</td>
<td>1</td>
<td>3</td>
<td>13</td>
<td>8</td>
<td>65</td>
</tr>
<tr>
<td>very likely</td>
<td>3</td>
<td>1</td>
<td>39</td>
<td>12</td>
<td>55</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td>6</td>
<td>96</td>
<td>380</td>
<td>178</td>
<td>660</td>
</tr>
</tbody>
</table>
**Perceived Risk vs Experience**: The more online experience has an adverse effect on the perceived risk as the respondent is proficient in the area.

Reference to Table 20, Less than one year (25%), 1-2 years (54%), 2-3 years (83%), >3 years (39%). Respondents have a low perceived risk to CBDC between 0 – 3 years, while a significant drop from those with more than three years’ experience.

**Table 20 Pivot Perceived Risk vs Online Experience**

**Perceived Risk vs Frequency of Online Transaction**: would more frequent transactions lower the perceived risk than less frequent transactions.

Reference to Table 21, Once a year (40%), Once a month (58%), Once a week (40%), Everyday (45%). There is no significant difference in perceived risk regarding the frequency of online transactions.

**Table 21 Pivot Perceived Risk vs Frequency of Online Transaction**
4.3.3 Quartile distribution on independent variables

The data collection on independent variables is presented on Quartile distribution (Table 9).

The mean score of Performance Expectancy, Effort Expectancy, and External Influence is high (4 – ‘likely’), where general response tends to believe Central Bank Digital Currency is bringing inconvenience and efficiency on immediate payment transfer and observes as value-added. Effort Expectancy from the customer is very easy to use and requires less effort to learn and understand. Direct or indirect External Influence like merchant promotion and government support is observed on the high side of adoption. Social Influence Facilitating Condition is viewed between ‘neutral’ and ‘likely’.

Table 22 Quartile Distribution of Independent Variables (Select question - 660 responses)

<table>
<thead>
<tr>
<th>Quartile</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>EE</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>5.000</td>
</tr>
<tr>
<td>SI</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>FC</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>EI</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>PR</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>Age</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>Exp</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>Area</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>Free</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
</tbody>
</table>

Box Plot - Select Question

Table 23 Quartile Distribution of Independent Variables (Random question - 660 responses)

<table>
<thead>
<tr>
<th>Quartile</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>EE</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>SI</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>FC</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>EI</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>PR</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>Age</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>Exp</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>Area</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
<tr>
<td>Free</td>
<td>0.000</td>
<td>3.000</td>
<td>4.000</td>
<td>5.000</td>
<td>660</td>
</tr>
</tbody>
</table>

Box Plot - Random Question

I have used both Select Question (Table 22) and Random Question (Table 23) for Quartile Distribution. There is no significant difference on each quartile distribution except Facilitating Condition (4th from left) and Perceived Risk (6th from left). Overall the Select Question group is more presentable. On Facilitating Condition, the response is dominant between 3 (“neutral”) and 4 (“likely”) and tends to have a higher intention for CBDC. On
Perceived Risk, the select question group shows a more concentrated decision to low (between 2 & 3) and tends to have a higher intention for CBDC.
4.3.4 Correlation Analysis from the survey questionnaire

The Correlation analysis ( Table 24 ), illustrates the relationship power between two independent variables. The higher the absolute correlation value, the stronger the relationship, while a low correlation value indicates that the variables are loosely related.

**Table 24 Correlation Analysis between all individual determinants with Behavior Intention**

<table>
<thead>
<tr>
<th>PE</th>
<th>EE</th>
<th>SI</th>
<th>FC</th>
<th>Ei</th>
<th>PR</th>
<th>Age</th>
<th>Exp</th>
<th>BI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EE</td>
<td>0.864</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SI</td>
<td>0.466</td>
<td>0.470</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FC</td>
<td>0.558</td>
<td>0.527</td>
<td>0.483</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ei</td>
<td>0.435</td>
<td>0.511</td>
<td>0.476</td>
<td>0.499</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PR</td>
<td>-0.171</td>
<td>-0.139</td>
<td>-0.150</td>
<td>-0.046</td>
<td>-0.143</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.200</td>
<td>-0.229</td>
<td>-0.059</td>
<td>-0.221</td>
<td>-0.053</td>
<td>-0.078</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Exp</td>
<td>0.231</td>
<td>0.248</td>
<td>0.173</td>
<td>0.253</td>
<td>0.257</td>
<td>-0.036</td>
<td>-0.092</td>
<td>1.000</td>
</tr>
<tr>
<td>BI</td>
<td>0.484</td>
<td>0.515</td>
<td>0.466</td>
<td>0.479</td>
<td>0.561</td>
<td>-0.297</td>
<td>-0.086</td>
<td>0.233</td>
</tr>
</tbody>
</table>

The inter-variable correlation is quite strong at 0.864 between performance and effort expectations. Collinearity exist when two independent variables $X_1X_2$ are highly correlated. The impact undermines the statistical of an independent variable, each X-variable contains a unique piece of information about Y. Collinearity can be detected with the help of tolerance and its reciprocal, called variance inflation factor (VIF).
VIF is a more rigorous check for collinearity than correlation coefficient.

\[
VIF = \frac{1}{1-R^2}
\]

The benchmark for VIF exists if greater than 5, which is close in either case as shown in Table 25.

Table 25 Variance Inflation Factor for PE and EE

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Perceived Risk is negatively correlated to Behaviour Intention. The higher the expectation on perceived risk against CBDC, the lower the intention to adopt. For customers with lower perceived risk, the higher the intention to adopt CBDC.
4.3.5 Regression Analysis from the survey questionnaire

Regression analysis on a factor will predict a dependent variable with an independent variable from the hypothesis. The research for behavioral intention can further be tested for significance from regression statistics.

Table 26 Regression on Independent Variables with Moderating variables Age and Experience

<table>
<thead>
<tr>
<th>SUMMARY OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression Statistics</td>
</tr>
<tr>
<td>Multiple R</td>
</tr>
<tr>
<td>R Square</td>
</tr>
<tr>
<td>Adjusted R Sq.</td>
</tr>
<tr>
<td>Standard Error</td>
</tr>
<tr>
<td>Observations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>df</td>
</tr>
<tr>
<td>Regression</td>
</tr>
<tr>
<td>Residual</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUMMARY OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercepts</td>
</tr>
<tr>
<td>Intercept</td>
</tr>
<tr>
<td>PE</td>
</tr>
<tr>
<td>SI</td>
</tr>
<tr>
<td>FC</td>
</tr>
<tr>
<td>EI</td>
</tr>
<tr>
<td>PR</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Exp</td>
</tr>
</tbody>
</table>

\[
p-value \quad *** < 0.1, \quad ** < 0.05, \quad *** < 0.01
\]

\[R^2 = 0.477\]

The R^2 value (Table 26) equals 0.477, or 47% of the data fit the regression model with moderator Age and Experience at 99% significant level (p-value = 0.000). All independent variable coefficients except Age are substantial at 99% a with a p-value less than 0.01%.

The regression model will be:

\[
BI = 0.977 + 0.201 PE + 0.117 SI + 0.089 FC + 0.296 EI – 0.185 PR - 0.010 Age + 0.068 Exp
\]

The coefficient of Age is positive -0.010, and it is not a very high value, but negative means the higher the Age group, the lower the behavior intention. I include Age^2 as a dummy into the model to examine if the statement holds for all ages as it moves from younger to seniors (Age 45-55 and Age Over 55). I am testing the quadratic relationship between age and behaviour intention. Behaviour intention to use CBDC increase on age as people become
more experienced, but at a higher age, the effect on behaviour intention starts to grow at a decreasing rate, and at some point, the behaviour intention does not increase but then start to drop.

The correlation between Age and Behaviour Intention is an inverted U-shape (life cycle effect) with a non-linear increase, and the relationship wears off at a certain point. In general, I believe the behaviour intention to CBDC is higher in the younger age group.

The results shown in Table 27 reflect a better R-square value of 0.487 at a 99% significant level. All the coefficients are at 99% confidence level except Experience (p-value: 0.071) at 90%.

<table>
<thead>
<tr>
<th>Table 27 Regression with Age-Square as Dummy – Select Questions - 660 responses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUMMARY OUTPUT</strong></td>
</tr>
<tr>
<td><strong>Regression Statistics</strong></td>
</tr>
<tr>
<td>Multiple R</td>
</tr>
<tr>
<td>R Square</td>
</tr>
<tr>
<td>Adjusted R Square</td>
</tr>
<tr>
<td>Standard Error</td>
</tr>
<tr>
<td>Observations</td>
</tr>
<tr>
<td><strong>ANOVA</strong></td>
</tr>
<tr>
<td>df</td>
</tr>
<tr>
<td>Regression</td>
</tr>
<tr>
<td>Residual</td>
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<tr>
<td>Total</td>
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<tr>
<td><strong>Coefficients</strong></td>
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<td>Intercept</td>
</tr>
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<td>PE</td>
</tr>
<tr>
<td>SI</td>
</tr>
<tr>
<td>FC</td>
</tr>
<tr>
<td>EI</td>
</tr>
<tr>
<td>PR</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Age^2</td>
</tr>
<tr>
<td>Exp</td>
</tr>
</tbody>
</table>

The regression model will be:

\[
BI = 0.656 + 0.203 \text{ PE} + 0.089 \text{ SI} + 0.094 \text{ FC} + 0.308 \text{ EI} - 0.177 \text{ PR} + 0.405 \text{ Age} - 0.093 \text{ Age}^2 + 0.060 \text{ Exp}
\]
Treatment of Age² and maximum

I plot the non-linear graph base on BI = 0.405x – 0.093 x². (Figure 20) The maximum point reaches

x = 2.177. Take the lower bound age group. The maximum point reaches Age 36-45 and decreases from Age 46 and higher.

![Graph of BI = 0.405x – 0.093 x²](image)

**Figure 20 Parabola Geometric Figure with Age Square**

I use the adjusted R² to compare the model with and without moderator Age and Experience, the adjusted R² value without moderator Age and Experience (Table 28) equal 0.470 with the significant level at 99% as compared to the model with the moderator of adjusted R² value 0.481 at 99% significant level. Age and Experience are moderating the independent determinant variables.

**Table 28 Regression on Independent Variables without Moderating variables Age and Experience**

<table>
<thead>
<tr>
<th>SUMMARY OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regression Statistics</strong></td>
</tr>
<tr>
<td>Multiple R</td>
</tr>
<tr>
<td>R Square</td>
</tr>
<tr>
<td>Adjusted R Square</td>
</tr>
<tr>
<td>Standard Error</td>
</tr>
<tr>
<td>Observations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>df</td>
</tr>
<tr>
<td>Regression</td>
</tr>
<tr>
<td>Residual</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Standard Error</th>
<th>t Stat</th>
<th>P-value</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.116</td>
<td>0.150</td>
<td>7.445</td>
<td>0.000</td>
<td>0.822</td>
<td>1.411</td>
<td>0.822</td>
<td>1.411</td>
<td></td>
</tr>
<tr>
<td>PE</td>
<td>0.201</td>
<td>0.030</td>
<td>6.705</td>
<td>0.000</td>
<td>0.142</td>
<td>0.260</td>
<td>0.142</td>
<td>0.260</td>
<td></td>
</tr>
<tr>
<td>SI</td>
<td>0.117</td>
<td>0.031</td>
<td>3.726</td>
<td>0.000</td>
<td>0.055</td>
<td>0.179</td>
<td>0.055</td>
<td>0.179</td>
<td></td>
</tr>
<tr>
<td>FC</td>
<td>0.099</td>
<td>0.028</td>
<td>3.470</td>
<td>0.001</td>
<td>0.043</td>
<td>0.154</td>
<td>0.043</td>
<td>0.154</td>
<td></td>
</tr>
<tr>
<td>EI</td>
<td>0.305</td>
<td>0.033</td>
<td>9.245</td>
<td>0.000</td>
<td>0.241</td>
<td>0.370</td>
<td>0.241</td>
<td>0.370</td>
<td></td>
</tr>
<tr>
<td>PR</td>
<td>-0.184</td>
<td>0.027</td>
<td>-6.707</td>
<td>0.000</td>
<td>-0.238</td>
<td>-0.130</td>
<td>-0.238</td>
<td>-0.130</td>
<td></td>
</tr>
</tbody>
</table>

**R² = 0.474**

Electronic copy available at: https://ssrn.com/abstract=4702269
4.4 Hypothesis Validation

Table 29 Hypothesis Validation

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Correlation Coefficient</th>
<th>t value</th>
<th>p-value</th>
<th>Hypothesis Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1: Performance expectancy → Behavior Intention</td>
<td>0.203 ***</td>
<td>6.809</td>
<td>0.002</td>
<td>Support</td>
</tr>
<tr>
<td>H2: Effort expectancy → Behavior Intention</td>
<td></td>
<td></td>
<td></td>
<td>Remove due to collinearity with PE</td>
</tr>
<tr>
<td>H3: Social influence → Behavior Intention</td>
<td>0.089 ***</td>
<td>2.766</td>
<td>0.006</td>
<td>Support</td>
</tr>
<tr>
<td>H4: Facilitating condition → Behavior Intention</td>
<td>0.094 ***</td>
<td>3.272</td>
<td>0.001</td>
<td>Support</td>
</tr>
<tr>
<td>H5: External Influence → Behavior Intention</td>
<td>0.308 ***</td>
<td>9.268</td>
<td>0.000</td>
<td>Support</td>
</tr>
<tr>
<td>H6: Perceived risk → Behavior Intention</td>
<td>-0.177 ***</td>
<td>-6.458</td>
<td>0.000</td>
<td>Support</td>
</tr>
<tr>
<td><strong>With moderator Age and Experience</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H7: Age → Behavior Intention</td>
<td>0.405 ***</td>
<td>3.316</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>H7: Age² → Behavior Intention</td>
<td>-0.093 ***</td>
<td>-3.521</td>
<td>0.000</td>
<td>Support with higher adjusted R² value 0.481 against without Age and Experience R² 0.470</td>
</tr>
<tr>
<td>H7: Experience → Behavior Intention</td>
<td>0.060 *</td>
<td>1.808</td>
<td>0.071</td>
<td></td>
</tr>
</tbody>
</table>

The structure model (Table 29) explains the relationship between the independent variables. The p-value is significant at a 99% confidence level for Performance Expectancy, Social Influence, Facilitating Condition, External Influence, and Perceived Risk. The p-value is substantial at 90% confidence level for Experience. The coefficient on Social Influence, Performance Expectancy, External Influence, and Facilitating Condition is positive. The relationship between these variables is positive. If the independent variable increase, the dependent inconsistent Behavior Intention will increase and vice versa. The coefficient on Perceived Risk is negative, the relationship joining Perceived Risk and Behaviour Intention is negative. If the perceived risk increase, the behavior intention decrease.
H1 Performance Expectancy (PE) positively affects behavioral intention, supported with a 99% confidence level (\( p = 0.000 \)). The CBDC on Performance Expectancy to Behavior Intention path coefficient (\( \beta = 0.203 \)) (Figure 21) reflects the magnitude of the change if Performance Expectancy changes. The magnitude is the second-highest in absolute value among other individual determinant variables. The higher the performance expectancy on CBDC, the higher the intention to adopt CBDC. The results support previous research from the literature review on Performance Expectancy. Customers expect CBDC to bring in additional benefits regarding more efficiency in payment capabilities, greater convenience, and cost-saving from traditional currency for the survey questions. **Hypothesis H1 is supported.**

H2 Effort Expectancy is cancelled due to collinearity with H1. The inter-variable correlation is strong at 0.622 between Performance Expectancy and Effort Expectancy. **Hypothesis H2 is cancelled.**
H3 Social Influence has imposed positive strength to Behavioural Intention is support with 99% confidence level (p = 0.006). The CBDC on Social Influence to Behavior Intention path coefficient is 0.089 (Figure 21). Influence from friends and peers to use central bank digital currency has an encouraging effect on customers’ adoption. The magnitude is mild as compared to other individual determinant variables. **Hypothesis H3 is supported.**

H4 Facilitating Condition has enforced positive strength to Behavioural Intention is support with 99% confidence level (p = 0.001). The CBDC on Facilitating Condition to Behavior Intention path coefficient is 0.094 (Figure 21). The result support research from the literature review on Facilitating Condition where consumer are observed to have adequate support from the issuer – Central Bank and readily available. The usage of CBDC is apparent to be similar to online payment where customers are used to. **Hypothesis H4 is supported.**

H5 External Influence has imposed positive strength to Behavioural Intention is support with 99% confidence level (p = 0.000). The CBDC on External Influence to Behavior Intention path coefficient is 0.308 (Figure 21). The magnitude is the highest among other individual determinant variables. The result supports the literature review from external influences like pandemics where customers prefer to use CBDC instead of fiat money or coins. Local government and merchant support will act as a catalyst in promoting the use of CBDC. The national culture plays a part where it is a norm in China to use online transactions ion via digital wallets like WeChat and Alipay. **Hypothesis H5 is supported.**

H6 Perceived Risk has imposed negative strength to Behavioural Intention is support with 99% confidence level (p = 0.000). The CBDC on Perceived Risk to Behavior Intention path
coefficient is -0.117(Figure 21). The consequence has reassurance from literature review on risk perception to CBDC on data security if the system will have appropriate protection. The risk-on CBDC to perform ‘invalid’ transaction transfer. Due to any of the above reasons, as perceived risk increases, the adoption of CBDC decreases. **Hypothesis H6 is supported.**

Hypothesis H7 with moderators are supported. The adjusted $R^2$ value (0.481) with moderator Age and Experience is higher than $R^2$ without moderator (R = 0.470). Age and Experience can enhance the model with better fitness. The findings align with the previous research literature on Age and Experience. The more experience with online payment, the higher the adoption to Central Bank Digital Currency. For Age, I segregate the analysis by age group. The relationship of Age on Behaviour Intention is non-linear. It can be plotted as inverted U. As age increases, the moderating effect increases for behavior intention to a point where Age turns 45 and above the behaviour intention moves down. **Hypothesis H7 is supported.**
4.5 Validity Check

**Internal Validity**

The data collection is a random selection applicable to all potential Central Bank Digital Currency consumers. The survey is presented in dual languages (Chinese and English) and distributed among colleagues, friends, and relatives via social networks, Whatapps, WeChat, Facebook, and email. The survey was further disseminated from one to another. The distribution covers a variety of age groups, geographic locations, and backgrounds from sophomore university students, classmates of DFintech, Alumni from EMBA and DBA, colleagues from the company in different Asia Pacific countries. I have further acquired pay responses via Survey Monkey with an additional 241 survey returns to increase the randomness.

**Statistical Validity**

I received a total of 208 (in Chinese version), of which 191 can be used (17 incomplete responses) and 240 (in English version), of which 228 can be used (12 incomplete responses), plus 241 from Survey Monkey. In total, a sample size of 660 can be used for statistical analysis out of 689. Correlation and regression analysis is used to measure statistical validity. From the regression analysis, $R^2$ is 0.474, with all independent variables at a significant level of 90% to 99%.
Construct Validity

The construct is a direct correlation measurement on different expectancies on behavior intention. Multicollinearity is checked from correlation analysis against each pair of independent variables. Variance Inflation Factor (VIF) is used to measure multicollinearity in the set of multiple regression variables. Effort Expectancy is taken out of the regression due to the analysis. Age and Education are selected as the moderator of all independent variables. The initial regression shows Age as positive relation to Behavior Intention. Further research with dummy Age$^2$ shows the positive effect is maximum at Age 36-45 and turns negative from Age 46 onwards.

External Validity

The hypothesis can be applied across geographical boundaries with the establishment of Central Bank Digital Currency. Countries with sound regulatory control/government support can further demonstrate the argument on external influences for consumers. As mentioned in an earlier chapter, central bank around the world has already kick-started CBDC and reached different stages, research papers mentioned on such topic have had a five-time increase since 2015. Despite the cultural difference, the World is suffering from the pandemic of external influences to track the development stage fast. More importantly, the government needs to understand how consumers adopt and actively use central bank digital currency in daily transactions. I can utilize the same research support with the central bank digital currency offering plan to other countries.
5 Conclusion and Discussion

5.1 Proposed Thesis

The collected data statistically support the proposed thesis. Performance Expectancy, Social Influence, Facilitating Condition, External Influence, and Perceive affect intention to adopt Central Bank Digital Currency. Age and Experience are moderators to intensify the relationship on Behavior Intention. On Age, we have further examined and refined the effect as non-linear. Age on Behavior Intention increases up to the Age Group between 36-45 and turns negative on the Age Group > 46 – 55 and over.

Central Bank Digital Currency is new to the market in most countries. The level of adoption depends on various aspects. The pandemic has accelerated the digital cash revolution around the world. Consumers are taking a new way of working (from home), a new means of communication online without physical engagement in the office. Central Bank Digital Currency can lower the barrier for consumer adoption. The research paper will demonstrate how consumers' intention to use CBDC depends on performance and effort expectancy, social and external influence, and facilitating conditions. The significance of the hypothesis can further improve how CBDC should rollout out to consumers. The research on Central Bank Digital Currency is still in the theoretical phase for most countries, further attempts to analyze its monetary policy and payment systems will be significant upon maturity. This paper's complexity has been apparent, and predicting the future impacts of this new concept is extremely difficult. There are advantages to implementing CBDC, but not without potential concerns from consumers. The cross-country CBDC will further complicate the argument on foreign exchange. The economies are moving towards a cashless future even without CBDC. The discussion on CBDC will be an essential part of central bank research in years to come. In the longer term, central bank digital currencies will replace cash. The other aspect is definitely on
the general public reacting to CBDC. Convenience can be addressed from CBDC by not obtaining physical money from an ATM. Without additional incentives on CBDC, it is only as good as a bank debit card. When CBDC is no better than the existing cash payments, low demand will always inhibit adoption, regardless of its supply. Furthermore, if the central bank decides to implement CBDC, the demand should be relatively strong given head competition from bank credit cards. There are many other cash alternates to race with CBDC. Without a doubt, CBDC and its potential implication for central banks, the economy, and people are ready to TANGO.
5.2 Potential limitation

There are several limitations to this research. First, on the sample participants, the education level is tended to be with a university degree and above living in an urban county. Central Bank Digital currency is targeted across the whole population and not limited to high education level and area of residence. Second, online payment transactions' average experience and frequency are high for over three years, with once a week or even daily transactions. There will be inadequate statistical data reflecting the behaviour intention for low usage and “inexperience” customers. The above factors may obscure the actual use of CBDC upon launch. China is leading the rest of the world in digital payment, which may drive the adoption of Central Bank Digital Currency. If the same research is conducted for participants in another country region, the regression result may not be strong as the country is just on the starting point to have proof of concept on CBDC. The survey was conducted back in December 2021, within the last six months, there was an active uproar in Central Bank Digital Currency development. Customers, in general, can comprehend added information to CBDC, the perceived underlying risks reduce with clarity. The challenge in conducting the same research questionnaire cannot guarantee a response from the same person as it was anonymous. There is no like-for-like comparison in a time series.
5.3 Possible future research

Future research can focus on different aspects across the other regions with more diverse sample populations. The study can be extended and subdivided into country groups at different maturity stages in offering CBDC and measuring how customers perceive value to use. Possible research can spread to the macro impact on non-bank finance institutes, banks, and regulators in the finance world. In conclusion, research on actual customer adoption is to be continued upon the actual implementation of Central Bank Digital Bank via Central government in the future of banking, particularly to a tentative pilot launch during Winter Olympics in 2022. With more extensive functions provided by different banks, more sophisticated customer research can be conducted on end-to-end user experience. The study results can outline the future development on providing innovative processes in Central bank's digital currency.
CHAPTER II

1. Introduction

The Hong Kong Monetary Authority (HKMA) announced on June 8, 2021 - the "FinTech 2025" strategy to promote the advancement of Hong Kong's financial technology. HKMA Chief Executive Officer Mr. Eddie Yu Weiwen briefly described the "Fintech 2025" strategy. The strategy positions to inspire at commercial industry to apply financial technology by 2025 fully in providing affordable and efficient financial services to the overall economy and benefit the people of Hong Kong. HKMA will conduct comprehensive reviews to strengthen arrangements for issuing CBDC at the retail and wholesale levels in Hong Kong. To discuss its use cases, advantages, and related risks.

2. Problem Statement

In this chapter, I present a problem statement on the issuance of Central Bank Digital Currency in Hong Kong. Hong Kong is part of China where Central Bank Digital Currency is supposed to be issued at the country level. However, the Hong Kong dollar is commonly used, and we have two currencies, or even three if Macau is moving to digital currency in a future stage. There are further arguments on the issuance and governance of the CBDC. The positioning of CBDC is under debate because it exists in the form of cryptocurrency but being used as physical cash. In addition, cash in a savings account accumulates interest, while ‘cash’ in Octopus (in Hong Kong) and Wechat / Alipay (in China) does not. This chapter aims to address the above discussion points.

The problem statement: How digital e-HKD can be issued and used in HK.
2.1 Issuance of e-HKD

HKMA continues working closely with the People's Bank of China in conducting technical tests on the digital renminbi in Hong Kong to provide accessible, efficient cross-border payment services for Hong Kong and residents from the mainland. The digital currency, if launched, will not have any implications on the Hong Kong currency’s US dollar peg. “The e-Hong Kong dollar will turn into an electronic version of a physical banknote. The process of issuing e-Hong Kong dollars will be the same as the issuance of physical banknotes under the peg. HKMA will keep the current system, where HSBC, Standard Chartered, and Bank of China (Hong Kong) are allowed to issue banknotes when administering the digital currency or giving Hong Kong dollars itself. The dilemma is Central Bank Digital Currency should be issued at country level. The government has long set a precedent for distributing cash. On the contrary, electronic consumer coupons are the first to be launched. In addition to driving the local consumption atmosphere and helping industries affected by the epidemic, such as retail and catering, the greater purpose may be to promote small merchants actively using electronic payments to lay a concrete groundwork for the application of digital renminbi and digital Hong Kong dollars in future.
2.2 e-HKD to challenge local banking sector

The initiation of e-HKD has faced multiple challenges—for example, cybersecurity in a retail CBDC world and new for central banks. The system is relatively open for retail, and not all participants are entirely trustworthy. The further encounter to FX between e-CNY and among all e-currencies from other countries.

The HKMA had been researching Central Bank Digital Currency on Project LionRock since 2017 and actively joined with other Asian countries in broadening knowledge in CBDC. The objective is to pick up on key pain points, including elevated cost, low speed, and operational complexities with new design, with appropriate integration with regulatory compliance and privacy.

Under the joined project, HKMA had adopted some core principles. Firstly, there will be no harm done to disrupt other sovereignty of central bank and protect consumers rights in data privacy and cybersecurity. Secondly, there will be a sound legal and stable system for cross-border payment on CBDC, complying with regulatory law jurisdictions. Thirdly, CBDC fully integrates with current infrastructures, leveraging Fintech and interoperability with traditional payment systems.

These guiding principles form the basic design of HKMA multi-platform Bridge (mBridge). The design is compliant with participating jurisdictions of monetary sovereignty, accommodates each participating jurisdiction’s regulatory requirements and legal regimes, enables participating influence to create its own “LEGO brick” building blocks, and empowers jurisdiction to join the bridge at its own pace.

HKMA has identified seven challenges regarding operational robustness, resilience, cybersecurity, privacy, interoperability, performance and scalability, and compliance.
With the learning and build-up experience from wholesale, HKMA commenced Project e-HKD in June 2021. This is a feasibility study on retail CBDC and digitization of Hong Kong Dollar (named e-HKD) in exploring potential benefits and risks. This project aligned with global CBDC trend research contributing to central bank discussions on retail CBDC. There is no decision made from HKMA on any deployment timeline. However, principles are guiding the idealization solution on the above challenges. Figure 19 illustrates the desirable characteristics of a CBDC system to fulfil the above principles.

The safety consideration is to ensure CBDC as a payment system to achieve reliability at all times building up user confidence. A CBDC system should ideally provide 24/7 payment services. CBDC system should remain resilient to unknown disruption and robust to identify operational issues. The system should comply with anti-money laundering, sanction and fraud detection. Efficiency refers to operational cost optimization with fast, scalable and energy-efficient. The application interfaces in CBDC should be intuitive to layman customers, requiring the lowest level of technical savvy and user-friendly, especially for those facing physically challenged access to

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36 Technical Whitepaper on Retail Central Bank Digital Currency, 4th Oct 2021, Hong Kong Monetary Authority
hardware or data networks. The openness refers to being open to change, competition and innovation. The CBDC infrastructure would need to be flexible, interoperable and extensible.

2.3 Facilitation of Cross Border Foreign Exchange

Correspondent banks act as bridges in current cross-border payment, transferring payments between jurisdictions. HSBC is one major player in corresponding banking facilitating cross-border transactions in the non-bank financial institute (NBFI). The set-up increases operational complexity and possible blockage for delay from stringent compliance policy. For example, know-your-customer (KYC) processes are required by all banks in the correspondent process flow (Figure 20).

Reference: Inthanon-LionRock to mBridge BIS Sep 2021

Figure 20 X-Border w/ Correspondent Bank

Figure 21 CBDC mBridge

Electronic copy available at: https://ssrn.com/abstract=4702269
In September 2021, HKMA announced a multi CBDC platform for international payments – mCBDC Bridge (Figure 21). This is a joint project with Digital Currency Institute People’s Bank of China, Bank of Thailand, and Central Bank of UAE. The project creates a generic platform that enables instantaneous cross-border money transfer on peer-to-peer transfer between participating banks. With continuous effort on wholesale CBDCs, HKMA also establishes to adopt CBDCs at the retail level. The theoretical technology research is setting up internal cross-departmental teams to explore the outlook of issuing e-HKD. For the time being, HKMA prolongs to support People Bank of China on the technical testing of e-CNY in Hong Kong for enabling cross-border payments between Mainland China and Hong Kong.
3. Expertise Consultation

This session covers discussion with Financial Institute technical subject matter experts in CBDC and HKSAR Innovation Bureau. Information is gathered via formal exchange sessions, personal interviews and indirect group discussions.

Group CEO of HSBC Noel Quinn has addressed Central Bank Digital Currency in an exchange sharing session. Mr. Quinn has remarked about CBDC payment which is designed to optimize the cost of trading and issuing bonds. Central bank digital currency may support the execution of efficient monetary policy with direct means of consumers payment transfers. There are obvious challenges in innovation especially for risk mitigation with new technology and room to enhance. CBDC as a new service must certify on efficiency, transformative and genuinely safe. Central bank on the governance edge to evaluate impact on credit supply and financial market stability. The offering of CBDC will assemble on customer expectations for data and privacy protection, with further encounters to tackle financial crime risk and cyber-attacks. HSBC is inclined on a hybrid model or a two-tiered model given CBDC is a claim against central bank. It is appropriate for commercial banks to continue supporting account management and payment service activity. The approach can eliminate the need for a new account management setup from central bank.

In a separate interview with Kathy Cheung, Chief Credit Officer of HSBC, Kathy’s view on Central Bank Digital Currency is convenient with payment and should be easy to use. The main concern is on trust, would the deposit be unintentionally transferred or simply disappear without any formal notice. Additional governance requires on customer data privacy where the law is addressed. The involuntary account freeze has attended heat discussion on where customers can acquire adequate support. HKMA as the central government should lead the CBDC development to strike a win-win among banks and
the public. HKMA will take full responsibility in issuing e-HKD taking references from current coins and ten dollar notes for HK. It provides confidence to the public on security and mitigates risk on a single / group of banks being issuer holding the liability. The e-wallet can still reside among banks that face-off to public consumers. HKMA can take proactive mitigation on risk and overall governance in retail CBDC. With the segregation of work, financial institutions will bring a similar role by maintaining customers’ accounts, providing personal loans, overdraft, etc., service in business as usual. The customers’ confidence in CBDC will significantly increase regarding the security of deposits. The potential concern from customers will be forced closure/freeze of funds from Central Bank due to non-compliance against the law.

From the implementation perspective, there are apparent challenges from IT. I interviewed Duncan Wong – Founder and CEO of CryptoBlk. CryptoBlk is the company which involves in the mBridge feasibility study with HKMA. Duncan recalled challenges from the technical aspect. The connection to the rest of the world, particularly offline, where CBDC can be facilitated between two mobile devices without going through the system. The mBridge is initially designed for wholesale. Including a country requires a prerequisite in setting up a centralized currency bureau. The country will then be able to join mBridge. The FX can be executed in different options. The country can agree on the cross-border rate, or a bank can also offer. The last option is between bank to bank agreement, with no disclosure mandate. The advice to HKMA will be to mitigate customer perception and mimic how cash (as notes and coins) are used in M0. For banks, the focus will be simplifying the usage of customer experience, for example, the e-wallet should operate as an API in facilitating easy transfer and transaction.
The actual issuance of digital currency is a desirable topic. In Hong Kong, we have three banknotes issuing banks, namely Bank of China, Hong Kong Shanghai Bank and Standard Charter. As per discussion with Duncan, HKMA can take the responsibility in defining the issuance policy and governance of which they are in excellence. The issuance will have a similar practice where the three issuing banks can takeover. The essential criteria are to synchronize with M0 between cash and CBDC. The impose of cross border limitation will apply as per current governance. The authorized ownership comes to another discussion. This works like an e-wallet where customers can access it. The e-wallet can hold multiple currencies digitally with issuance from a local country. There should be no differentiation in nationality on ownership. The governance on max dollar hold is subject to country regulation issuing CBDC.

Further restrictions will subject to the cross-country agreement, but nothing concrete is established. It always possesses complications for a customer moving to another country. Current regulation is more on funds transfer between countries instead of customers holding a specific amount of e-currency from different nations. The mechanic will issue $1 of CBDC and have $1 reserve back in Central Bank. There is still discussion between regular and financial institutes if CBDC can be treated as a typical saving with interest. My initial setup will have no interest and work similar to a cheque account or simply an Octopus card. The physical dollar is transferred from an interest-bearing account.

Customers can top-up their e-wallet from other standard accounts.

Duncan refers to a paper from Visa International where a TEE Model is introduced concerning an offline transaction. The authenticated transfer from online account to

offline onto mobile device. Once the two devices are connected, the offline transaction kicks in by moving the funds from one device to another. This is similar to a WeChat account that can store value from transferring funds from a bank’s account or transferring from another WeChat account.

Summary on key points:

<table>
<thead>
<tr>
<th>Entity</th>
<th>Feature in CBDC</th>
<th>Viewpoints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noel Quinn, Group CEO, HSBC</td>
<td>• Design</td>
<td>• 2-tiers model: with central bank and financial institute</td>
</tr>
<tr>
<td></td>
<td>• Usability</td>
<td>• Efficiency, transformative, safe</td>
</tr>
<tr>
<td></td>
<td>• Risk proof</td>
<td>• Safeguard against financial crime risk and cyber-attacks</td>
</tr>
<tr>
<td>Kathy Cheung, Chief Credit Officer, HSBC</td>
<td>• Usability</td>
<td>• Convenient and easy to use</td>
</tr>
<tr>
<td></td>
<td>• Perceived Risk</td>
<td>• Trust against new technology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Involuntarily move of fund money</td>
</tr>
<tr>
<td>Duncan Wong, Founder and CEO, CryptoBlk</td>
<td>• Authentic issuance of CBDC</td>
<td>• Current three notes issuing banks</td>
</tr>
<tr>
<td></td>
<td>• Feasibility setup</td>
<td>• mBridge with FX for cross border payment</td>
</tr>
<tr>
<td></td>
<td>• Offline transaction</td>
<td>• TEE model online account to offline on mobile device</td>
</tr>
</tbody>
</table>

The fluctuation of CBDC dollar is yet to confirm upon maturity in transactional market. Therefore, the central government will skew to control the FX rate and minimize local CBDC. With the exception of pilot sites like the Bahamas, actual value of SAND dollar fluctuated which most central governments would like to avoid.

In Hong Kong, we have Innovation and Technology Bureau responsible for defining policy on innovation and information technology development. In speaking with senior executives from the bureau, their role in CBDC will mainly provide sponsorship funding for start-ups to develop CBDC. HKMA will provide the central governance in defining control policy. Third-party companies with subject matter experts will provide the technical details for implementation.
4. The Solution

**Execution of e-HKD**

The issuance of Central Bank Digital Currency in Hong Kong is recommended under the current three banknotes issuing bank. Hong Kong Monetary Authority takes the governance role in ensuring all risk controls are well established to mitigate financial crime risk and fraud prevention. Cross-border transactions will use mBridge to apply foreign exchange across countries. In different timelines, country adoption on central bank digital currency can also be catered in mBridge building blocks. In considering interest rate, given cheque account, Octopus or Wechat/Alipay account does not carry any interest, the same applies to CBDC. The customer has the option to auto-reload CBDC into an e-wallet below a threshold or manual transfer can be accomplished.

**Extend use in Green Charity**

The world is in a debate on Global warming, effects on Climate change, green technology, low carbon emission. The usage of CBDC can be extended beyond peer-to-peer transfer to “green” charity. In Hong Kong, charity organizations raise funding via placement of stickers to the public on weekends. Production of stickers incurs non-environmental friendly material. The sticker is one-off and people tense to dump into garbage within the day. The unsold ones which will not be reused create additional wastage. With the new technology under CBDC, money can be transferred without a telecom network. Doners can use mobile devices for charity programs to make transfer with another mobile device from charity organizations. The doner will reward with a digital sticker/ emoji used in chat messages like Whatapps, WeChat, and Instagram. The digital-sticker works like the concept of non-fungible token (NFT) blockchain. The traditional sticker production can be eliminated, and no wastage will ever be made from unused.
When the e-sticker is transferred to another person, it can trigger a fix or variable
donation. With the use of blockchain, the doner contributes to the digital-sticker can be
tracked for the most valuable doner (MVD). The green charity eliminates all traditional
sticker production with zero wastage. The concept satisfies the expectation of energy-
saving, environment-friendly and innovative ideas for charity donation. I envisage the
initiative can attract the younger generation to engage and donate with digital-sticker as
it can be widely used on different instant message platforms with state-of-the-art
technology. We use innovation to keep traditions alive in the modern world.
5. The Future of CBDCs

Over the past few years, there have been challenges with mass fast payment methodologies and technologies with competition among banking services to people’s ever-changing demands. However, financial institutions continue developing innovative technologies and real-time solutions to survive or lead the market. CBDC will come to a reality with the ongoing pilots and considerable effort dedicated to central banks. With the progression of private and public “regulated” digital currency proposals, CBDCs will be deployed to the economy with a prospect of two to three years where countries like China are already ahead of the rivalry.

The initiation of CBDCs has promoted payment efficiency from an operational technology perspective and provided an additional alternative to the currency money mode. There is currently no prominent intention in current payment model. The application of a successful CBDC model should be seamless ideally and not disrupt current customer’s experience. The best customer experience is customer does not feel any change to recent experience. The back-end technology can be as complex as it should be where majority of the customers are not interested. The front-end user experience should be more straightforward, especially for non-bank customers.

CBDC may have major diplomatic implications with a significant portion of cross-border trade denominated only under the US dollar. The situation between China and US has been tense recently. If the US makes a relentless move to ban SWIFT against China, DCEP can become China’s backup plan. To enhance quick and efficient payment across the borders, many countries will be keen to grow and develop another payment mechanism based on CBDCs. In parallel, central banks are doing their research projects to reserve their national authority which I have mentioned at the start of this paper. The real competition and actual requisite are concerning cross-border payments.
The design of China’s CBDC and potential impacts upon the U.S. and international status quo. First, e-CNY may reduce the value of U.S. economic consents administration, especially if a Chinese-led ‘system’ becomes a widely adopted alternative to SWIFT. Second, e-CNY may displace the U.S. dollar as the dominant global currency. Third, E-CNY may prove to be a revolutionary tool for macro-economic policy management that alters the global balance of economic power and further accelerates U.S dollar displacement. Lastly, e-CNY may represent a dangerous new tool for an increasingly in-demand organization that could damage American values. China hopes to reduce its reliance on the U.S.-led international financial system, where e-CNY only marginally contributes to this goal. These policy moves to exhibit a desire to break down on financial crime and illegal gambling to reassert control over outbound capital flows. The Chinese-led international system of CBDCs may challenge the U.S. if thoroughly integrated into the global system.

CBDC will power the financial economy of tomorrow, it is just a matter of “time”. The “when” will emphasize the issuance of dedicated regulatory and legal structure to enable the issuance, transparency and digital currencies circulation. Referring to the hypothesis result, facilitating condition and perceived risk have visible impact on customer intention to use. Customer is keen to acquire more understanding of CBDC regarding legal status anonymity with a readily support framework. To mitigate perceived risk under money laundering, fraud and data privacy must be distinctly defined in the regulatory framework as issuance of CBDCs could have a key consequence for bank’s current business model in financial system. The concrete work is already in progress taken towards this direction.

This is a clear sign that regulators and central banks will embrace the digital and crypto

topic in a coherent approach. The People’s Bank of China will continue to prudently advance the pilot e-CNY R&D in a prudent and orderly manner. Furthermore, PBOC will improve appropriate institutional arrangements and rules to enhance password security, financial information security, data security, and business continuity protection.

Reference


• Daily active users for WeChat exceeds 1 billion | ZDNet. https://www.zdnet.com/article/daily-active-user-of-messaging-appwechat-exceeds-1-billion/

• Digital Bahamian Dollar Sand Dollar. https://www.sanddollar.bs/


• Hong Kong Institute for Monetary and Financial Research HKIMR Applied Research Report No. 1/2020 May


• Iwamura, Mitsuru, and Kitamura, Yukinobu and Matsumoto, Tsutomu and Saito, Kenji, Can We Stabilize the Price of a Cryptocurrency?: Understanding the Design of Bitcoin and Its Potential to Compete with Central Bank Money October 25, 2014.


• Laband, Jake, Existential Threat or Digital Yawn: Evaluating China's Central Bank Digital Currency (December 20, 2021).


Electronic copy available at: https://ssrn.com/abstract=4702269


• Mahardika, Harryadin, Thomas, Dominic, Ewing, Michael Thomas, & Japutra, Arnold. (2019). Experience and facilitating conditions as impediments to consumers' new technology adoption. The International Review of Retail, Distribution and Consumer Research, 29(1), 79-98.


• Ward, Rochemont March 2019, Understanding Central Bank Digital Currencies (CBDC), Institute and Faculty of Actuaries.


Electronic copy available at: https://ssrn.com/abstract=4702269
Appendix A – Survey Questionnaire
Section A Individual Determinants

1. Performance Expectancy (PE)

PE1 – Digital currency payment would be a useful service in my day to day activities.
在我的日常活动中，数字货币支付将是一项有用的服务。

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

PE2 – Using digital currency payment would make me perform my financial transactions more quickly.
使用数字货币付款将使我更快地执行金融交易

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

PE3 – Using digital currency payment would save time, so I can do other activities in my day to day.
使用数字货币付款可以节省时间，因此我可以有时间进行其他活动

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

PE4 – Digital currency payment would bring me greater convenience than traditional currency does.
数字货币支付比传统的货币支付能够给我带来更多的方便性

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

PE5 – Digital currency payment would provide more cost saving than traditional currency does.
数字货币支付将比传统货币节省更多成本。

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道
1. PE6 – Digital currency payment would be more efficient with new technology than traditional currency does.

使用新技术，数字货币支付将比传统货币更有效率。

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

2. Effort Expectancy (EE)

EE1 – My interaction with digital currency payment service would be clear and easy to understand.

我与数字货币支付服务的互动将清晰易懂。

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

EE2 – It would be easy for me to develop the skills to use the digital currency payment service.

对我来说，开发使用数字货币支付服务的技能很容易。

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

EE3 – I believe that it is easy to use the digital currency payment.

我相信使用数字货币付款很容易。

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

EE4 – Learning to use the digital currency payment system would be easy for me.

学习使用数字货币支付系统对我来说很容易。

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道
3. Social Influence (SI)

SI1 – People who influence my behavior would think that I should use the Central Bank Digital Currency (CBDC).
影响我行为的人会认为我应该使用中央银行数字货币

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

SI2 – People who are important to me would think that I should use CBDC.
对我很重要的人会认为我应该使用中央银行数字货币

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

SI3 – People whose opinions I value prefer that I use CBDC.
我重视其观点的人更喜欢使用中央银行数字货币

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

SI4 – Using CBDC indicates that I have a higher status than those who do not.
使用 CBDC 表示我比那些没有的人具有更高的地位

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

SI5 – I am willing to use it if everyone use CBDC
如果每个人都使用 CBDC，我愿意使用它

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道
4. Facilitating Condition (FC)

FC1 – I can get help from others when I have difficulties using Central Bank Digital Currency.
如果我在使用中央银行数字货币时遇到困难，可以从他人那里获得帮助

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

FC2 – I have the knowledge necessary to use Central Bank Digital Currency.
我掌握使用中央银行数字货币的必要知识

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

FC3 – Central Bank Digital Currency is compatible with other online payment technology I use.
中央银行数字货币与我使用的其他在线支付技术兼容

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

FC4 – I have the resource necessary to use Central Bank Digital Currency.
我有使用中央银行数字货币所需的资源

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

FC5 – I am used to online payment.
我习惯网上付款

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道
5. **External Influence (EI)**

**EI1 – Current pandemic had increased the perceived adoption to use CBDC in transaction.**
当前的疫情增加了人们在交易中使用CBDC的接受程度

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

**EI2 – Local government promotion and support towards the use of the CBDC will increase adoption**
地方政府对CBDC的使用进行了推广和支持将影响采用

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

**EI3 – Local merchants promotion and support on the use of CBDC will increase adoption**
本地商人在推广和支持使用CBDC将影响采用

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

**EI4 – Local business and national culture of the country will affect the use of CBDC.**
该国的当地商业和民族文化将影响CBDC的使用

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道
6. Perceived Risk (PR)

PR1 – I think the system will protect my private information.
我认为系统将保护我的私人信息

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

PR2 - The system will not mistakenly transfer funds to the wrong person.
系统不会错误地将资金转给错误的人

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

PR3 - I think CBDC is not subject to hacking, which will cause financial loss to consumers.
我认为 CBDC 不会因为遭受黑客攻击而给消费者带来经济损失

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

PR4 - I don’t think mistakes will happen during CBDC online transactions.
我认为在 CBDC 在线交易期间不会犯错

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道
7. Behavior Intention (BI)

BI1 – I intend to use CBDC
我有意使用 CBDC

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

BI2 – I predict I will use CBDC
我预计我会使用 CBDC

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

BI3 – I plan to use CBDC
我打算使用 CBDC

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

BI4 – I intend to use CBDC for peer-to-peer transfer
我打算使用 CBDC 进行点对点转帐

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道

BI5 – I intend to pay utilities via CBDC
我打算通过 CBDC 支付水电费

1. Very unlikely / 非常不可能
2. Unlikely / 不太可能
3. Neutral / 中性
4. Likely / 可能的
5. Very likely / 非常可能
6. I do not know / 我不知道
Section B Customer Demographics

CD1 What is your age range?
你屬於哪個年齡範圍
1. 18 – 25
2. 26 – 35
3. 36 - 45
4. 46 - 55
5. Over 55

CD2 What is your gender?
你的性別
1. Male / 男
2. Female / 女

CD3 Experience with online payment
在线支付经验
1. Never / 從不使用
2. Less than 1 year 不到一年
3. 1 to < 2 years 一年 - 不到兩年
4. 2 to < 3 years 兩年 - 不到三年
5. More than 3 years 三年以上

CD4 – Area of Residence
居住地区
1. Beijing, Shanghai, Guangzhou, Shenzhen 北京, 上海, 廣州, 深圳
2. Hong Kong 香港
3. Other cities / 其他城市
4. Rural area / 農村

CD5 – Education level
教育程度
1. Secondary school / 小學
2. Junior college / 中專
3. Bachelor Degree / 大學
4. Post-Grad Degree or above / 研究生或以上

CD6 – How often do you make online transaction?
您多久進行一次在線交易
1. Never 沒有用過
2. Once a year 每年一次
3. Once a month 每月一次
4. Once a week 每周一次
5. Every day 每天