

Central Bank Digital Currency: Prospects and Applicability for E-Manat in  
Azerbaijan

*Consulting Project for the Central Bank of Azerbaijan Republic*

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MBA Finance Final Project – Business Consultancy Project

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## Executive Summary

The CBDCs have become one of the most talked about issues in the modern monetary policy circles. Standing for Central Bank Digital Currencies, CBDCs are the digital version of the fiat currency that is the collateral of the central banks and can be used to make transfers as well as the payments. The purpose of this paper is to look at the CBDC practices and come up with concrete and actionable recommendations for Azerbaijan to implement its own CBDC. The paper consists of the following parts:

In the introduction, the major research aims and objectives as well as the research methodologies and the limitations of the research will be outlined to be followed by the literature review in which the existing literature will be dissected into several parts with the major arguments and opinions outlined. This will be followed by a comprehensive analysis of the CBDC and what it is and what it is not, in addition to its functional, technical, and operational aspects. A comprehensive analysis of the advantages and the disadvantages of the CBDCs will also be outlined to make a better case for the adoption of the CBDCs. In order to better illustrate the practical implications of the CBDCs and the success factors that determine the success of the project, the paper will provide a comparative cases study between Ecuador and the Bahamas, the countries that have experiences with the CBDC.

The significant part of the paper will be dedicated to Azerbaijan and the financial digitalization in the country. This is important because the level of cash usage, the financial literacy and the adoption play some of the most important role in the determination of the success or the failure of the CBDCs projects. On the other hand, the paper will also assess the potential benefits of the CBDC for Azerbaijan including the efficiency in the payment systems, the financial inclusion and the possible monetary policy uses. On the other hand, the paper will also analyse and assess whether the country is ready to embrace the CBDC.

Towards the end of the paper, there will be several recommendations for the country on how to prepare and roll out the CBDC. The paper will provide recommendations on five different and the related aspects of the CBDC including the conceptual recommendations, the design and the technical recommendations, the operational recommendations, the implementation recommendations, and the finally legal recommendations and will conclude with a concise and well-recapped conclusion.

## 1. Introduction

### *1.1. Central Bank Digital Currencies- So What?*

The Central Bank Digital Currencies, which are also known as the CBDC have been theoretically explored and practically tested in 2010. The concern that the development and the expansion of the private cryptocurrencies will damage the monetary sovereignty of the central banks have led them to come up with their own digital currencies, which are backed, issued, and redeemed by the central banks around the world. According to the Atlantic Council, 87 countries are exploring the possibility of rolling out digital currencies and 9 countries including Sweden, Bahamas, Nigeria have already rolled out their digital currencies for public circulation and use.

On the other hand, the rationale for the CBDC differ from country to country. While the developed countries are implementing digital currencies in order to dive deeper into the opportunities offered by blockchain technologies, the developing countries are aiming it in order to enhance the efficiency of the payments and include more people in the financial system. As a developing country, Azerbaijan is one of the countries that have not released any official statement or concept with regards to whether it intends or not to develop a digital currency. The purpose of this paper is to assess and analyse the viability of the digital currency in Azerbaijan and offer clear and actionable comments to the Central Bank of Azerbaijan on how it can develop and roll out a digital currency. There are several reasons in terms of why the exploration of digital currency is vital in Azerbaijan. First and foremost, central banks around the world are exploring the idea of digital currency in one way or another. What is even more important is that they are also testing the viability of the cross-border digital payments. As a country that is heavily integrated into the world trade, it is extremely important and critical for Azerbaijan to pay close attention to what is going on in the international financial domain and be prepared for any contingency. Secondly, the development of the private cryptocurrencies threatens to damage the monetary sovereignty of the central banks. There seems to be a widespread consensus that unless central banks develop their own digital currencies, the private cryptocurrencies will lead to the monetary and financial system that is not totally under the control of the central banks. Thirdly, in spite of widespread research on the topic, there is not a single paper that explores the viability of the digital currency in Azerbaijan, which this paper aims to do. The paper is composed of several chapters. The first chapter will be dedicated to the existing literature review, which will be followed by the second chapter on CBDC concept and its operational and technical features. The third chapter will explore the advantages and the disadvantages of the CBDC to allow the policymakers to weigh risks and benefits of digital currency and the next chapter will assess two case studies including Ecuador's failure and the Bahamas's success in the digital currency to shed light on factors that determine

the success of the digital currency. The next chapter will be dedicated to the analysis of the digitalization in Azerbaijan followed by a chapter on the analysis of the feasibility of e-manat in Azerbaijan. The fifth chapter will make a case for the introduction of e-manat in Azerbaijan by laying out the potential benefits of CBDC. The sixth chapter, on the other hand, will be composed of five distinct recommendations with regards to the development and the rollout of the digital currency in Azerbaijan including the conceptual, operational, technical, implementational as well as the legal recommendations. The paper will finish with well-recapped and concise conclusion.

### ***1.2. Theoretical Framework***

The theoretical framework is the perspective that a researcher looks at the topic. Due to the novelty of this topic, it is important to take a comprehensive theoretical framework to look at this issue. On the other hand, since the research paper aims to come up with specific as well as comprehensive recommendations, it will be useful to approach this issue from multiple perspectives. As such, the research paper will look at the issue from three broader perspectives. The first one is the conceptual perspective. With this, the paper will explore the conceptual aspects of the digital currencies, their advantages, and disadvantages as well as country experiences. On the other hand, the conceptual perspective will help us to see the possible contribution of introducing digital currency in the country and how it can, in theory, lead to the financial inclusion as well as the monetary policy objectives.

Furthermore, the issue of digital currency also requires a technical perspective. It is impossible to look at the feasibility of the digital currency without assessing and analysing the technical infrastructure that is needed to roll out digital currencies. The technical perspective will be used to look at the working of the digital currencies, the possible digital currency design choices and how it can be implemented in Azerbaijan. Finally, the paper will also use a legal perspective to assess the legal implications of the introduction of digital currency. In particular, the paper will look at the existing Law of the Republic of Azerbaijan on Central Bank to assess whether or not it has the right to issue a digital currency and offer recommendations on how the law needs to be changed or modified to allow the CBAR to manage digital currency without a violation of the law. With all those theoretical frameworks and perspectives combined, the paper will assess the feasibility and the possibility of digital currency in Azerbaijan and come up with concrete and the actionable recommendations on digital currency in Azerbaijan.

### ***1.3. Research Objectives and Research Questions***

Research is done in order to obtain perspective research objectives. The purpose of this paper is to offer recommendations that can be acted upon. In that sense, this paper is different and distinct

from other papers written on the digital currency in Azerbaijan. Overall, the purpose and the objective of the paper can be broken down into several aspects. First and foremost, it aims to elucidate the relevant stakeholders and the policymakers on what the CBDC are and how they can contribute to the fulfilment of the monetary and non-monetary objectives. This will allow the policymakers to see the merits of the digital currency in Azerbaijan and whether there is a need for the adoption of the digital currency. The second aim of the research paper is to assess the feasibility of the digital currency in Azerbaijan. As will be explained in the paper below, the adoption of the CBDC by any country must be based upon certain conditions such as the cash use, popular reception, credibility of the central bank, the need for it as well as the necessary technical and the legal infrastructure in place. The paper aims to provide a comprehensive assessment of whether or not Azerbaijan is ready to embrace the digital currency at this very moment. The feasibility analysis and the pilot projects were common practices in countries that have already adopted the digital currencies such as the Bahamas and Sweden. In addition to those research aims, the overall objective of the paper is to come up with certain actionable recommendations that can be acted upon. To that end, the paper aims to produce recommendations in five distinct domains including the conceptual recommendations, the design recommendations, the operational recommendations, the implementation recommendations and finally, the legal recommendations. The paper will try to answer the question of whether or not the e-manat is currently feasible in Azerbaijan. In the broader context, the paper has the potential to stir up discussions on the e-manat in the country and contribute to the emerging of further discussion.

#### ***1.4. Methodology and Sources***

In order to fulfil the research aims and objectives, the paper will use several methods and delve into several sources. In terms of the content of the research paper, it will be qualitative research paper complemented with important research data. In terms of the sources, the paper will use both the primary and the secondary sources. The primary sources for the paper will include the official documents pertaining to the law on CBAR as well as other countries. The secondary sources will include the articles and the books that have already been published on this topic. It is worth noting that due to the widespread popularity and the relevance of the topic, numerous central banks and the international financial institutions have published concept and technical papers. In order to provide a comprehensive analysis for the paper as well as come up with tested and proven recommendations, the paper will also analyse those concept and position paper. The CBDC is as much conceptual work as it is a technical work. In order to better illustrate the working of the CBDC and where it stands with regards to the cash and the bank accounts, the paper will use graphs and pictures. This will also help the reader to better understand the concept and see its inner

workings. Due to the time limitations and the nature of the work, the researchers did not find it useful or particularly beneficial to do group surveys and the consultation with other researchers. Therefore, in analysis and the recommendation, the research paper will rely on the published work and the recommendation papers that are proposed by the financial institutions and the central banks.

### ***1.5. Limitations and Need for Further Research***

In spite of the fact that the paper has several important aims and seeks to provide a comprehensive overview of the CBDC as well as its application in Azerbaijan, there are also certain caveats that need to be taken into consideration. First and foremost, it should be mentioned that the concept of digital currency is ever evolving. The technical choices and the design that were lauded at the beginning were no longer applicable. Thanks to the changing nature of the technologies, the central banks can better explore the digital currencies and can add and subtract certain elements from the CBDC. Therefore, any finding of this research paper must be assessed in the context of the changing technological, operational, and legal domains. Taking this into account, the paper should not be judged as a final word on whether or not the CBDC should be applied in Azerbaijan and how it should be applied in the country. Rather than that, the paper should be viewed as an effort to put the CBDC concept in Azerbaijani context and outline several recommendations as to how this concept may be realized. Secondly, the experience of the Bahamas has already brought about successful results. However, it is also worth noting that the country has rolled out its digital currency two years ago and is still assessing the full implications of it. Therefore, for any actual work to be done on the digital currency in Azerbaijan, it is also important to look at the experiences of other countries that have rolled out digital currencies or are planning to roll them out in the near future. Thirdly, the technical design of the CBDC is much more complex than the one presented in this paper. Although adequate number of technical details have been provided in this paper, it should also be mentioned that it is important to delve deeper and employ the people with technical expertise in better understanding how the technical aspects of the currency work in practice. Finally, the legal and the operational recommendations of the paper must be viewed in the context of the current economic, political, and legal climate in the country and be applied accordingly.

## 2. Literature Review

Although the discussions around the central bank digital currency goes back to the 90s, a serious work on the concept and its application only began around 2016 when a raft of central banks began various pilot projects. Due to the novelty of the concept and its practice, the existing literature does not provide extensive analysis in terms of its long-term benefits and risks. However, there have been various studies that explore the technical considerations and design choices as well as its potential impact upon the monetary policy, financial stability, and financial inclusion as well as its risks and benefits (IMF, 2020). Overall, the existing literature on the CBDC can be divided into several themes including the policy considerations, risks, and motivations for the CBDC issuance, the technical considerations and the policy choices, its effects upon the commercial banks, its effects upon the monetary policy and the financial stability and finally legal considerations.

### *2.1. Motivations, Risks and Policy Considerations*

Digital currency is often defined as the digital representation of the national currency that is the liability of the central bank and can be used with same functions as the conventional money (Auer et al, 2021). As noted earlier, the serious work on the central bank digital currencies and their application began around 2016. Despite of this brevity, central banks seem to have significantly accelerated the work on the digital currencies. According to the website Central Bank Digital Currency Tracker, 2 countries has already rolled out their digital currencies, 8 countries are engaged in pilot projects, 7 countries are doing proof of concepts and over 60 countries are doing research and exploration works. On the other hand, there seems to be various motivations for the introduction of the central bank digital currencies. One of the most frequently used rationale for the adoption of the digital currencies is to spur innovation and increase efficiency within the payments systems (Mersch, 2020). In order to prevent the emergence of alternative crypto currencies and prevent the concentration of payments systems in the hands of few large corporations, central banks are aiming CBDC as a viable alternative (Barontini and Holden 2019). Furthermore, the adoption of the central bank digital currencies would also help with the management of the physical cash in that the certain segment of the money base would be digitized in the records of the central banks (Alvez et al, 2019). One of the primary motivations is to increase the effectiveness of the monetary policy instruments. In particular, the interest-bearing CBDC would allow for negative interest rates and solve the problem of zero lower bound (Bordo and Levin, 2018). However, it is also very much likely that such formulation of the digital currency would lead to the public resentment and anger, therefore tarnishing the reputation of the central banks. Furthermore, the CBDC is also seen as effective medium to increase the financial inclusion



and bank the unbanked (Rutkowski and others, 2020). Alongside its benefits and advantages, the existing literature has also focused on the risks of adopting a central bank digital currency with the most common focus being on the role of the commercial banks in the light of the introduction of the central bank digital currencies. Many scholars have argued that adoption of the digital currencies must also take into account tools to preserve the role that is conventionally played by the central banks, otherwise it might lead to the bank run and transfer of deposits from the commercial banks to the central bank (Carstens, 2019)

## ***2.2. Technical Considerations and Design Choices***

Also explored and considered in the existing literature is the technical and design issues. There seems to be a uniform agreement in the existing literature that the adoption of the digital currency by the central banks is directly linked to the usage and trend of digital payments in the country (Sveriges Riksbank, 2020). In the absence of interest on CBDC, it will only be widely adapted if it offers convenience and the ease of use. For instance, Huynh (2020) and Sun (2020) argue that the ease of use, the minimal transaction costs, the security, and affordability should be some of the most important features of the CBDC. In order to factor in best practices and improve the user satisfaction and operability, central banks are doing surveys and focus group studies to glean insights (Bank of Canada, 2020). In its assessment of the technical considerations of the CBDC, the Bank of England has stated that CBDC should be able to provide 24/7 seamless and efficient payments with no disruption or downtime or inability to manage the increased demands. On the other hand, the financial security, cyber-security, and the financial integrity should also be factored in in the technical design of the CBDC (Ozili, 2022). With regards to the technical and design choices, three issues have been particular focus of the existing literature. The first one is the operating model whereby central banks can choose tiered approach. In the single tier approach, the customers open their account with the central banks whereas in the multi-tiered approach, central banks issues and redeems the digital money through the intermediation of the commercial banks. Given the fact that multi-tiered approach allows for conventional intermediary role of the commercial banks, it is often recommended as more viable approach in terms of financial and monetary stability (Shah and others, 2020). In terms of the platform for the CBDC, there are several choices in terms of the centralization. While most of the central banks have proposed or explored the centralized authority, there is also a decentralized or hybrid structures. On the other hand, the ledger can also be based upon the Distributed Ledger Technology or the Non-DLT (Sun, 2020). Central banks are also striving to strike the right balance between the innovation, efficiency, and the need to provide secure payment mechanisms. Given the fact that direct payments to the

individuals requires their identity to be revealed, central banks are also working to ensure that their privacy and autonomy will be upheld and protected.

### **2.3. *CBDC's Impact on Commercial Banks***

The third strand of the existing literature covers the impact of the CBDC on the commercial banks. In principle, the CBDC could be an interest-bearing instrument. This has the potential to draw out the deposits held in the commercial banks and cause them to flock to the central bank, inflating its balance sheet. A possible response by the commercial banks by increasing the deposit rates might lead to the increased interests for the loans (Lowe, 2017). Andolfatto (2018) argues that since the CBDC has better contractual terms, it can lead to the increase for deposits through intensive and extensive margins. The net outcome is that the deposit base of the commercial banks will increase through increased demand for deposits. A similar proposition is echoed by Chiu et al (2020) However, in marked contrast to Andolfatto, they also factor in the ability of central banks to hold CBDC as reserve requirements. Their overall argument is that the introduction of CBDC can lead to 3.35 percent increase in loans. If the interests on CBDC is below that on checkable bank deposits, it will not impact bank's deposit. However, if that is above than bank's rate, banks may respond to the possible bank run by increasing the deposit and lending rates, thus leading to the increase in the deposit base of the banks. However, Brunnermeier and Niepelt (2019) argue that the introduction of the CBDC will not affect household's financial situation and will leave zero impact upon the deposits of the commercial banks. The authors argue that the people can change their deposits to the CBDC without any impact upon the commercial banks provided that the central banks provide loans to the commercial banks. Building their model within the framework of Diamond and Dybvig (1983), Fernandez-Villaverde et al. (2020) also share similar opinions with Brunnermeier and Niepelt in arguing that the introduction of the CBDC will not affect the lending rate because the central bank can assume the role that is played by the commercial banks because it has the same investment strategy and tools. Keister and Sanches (2019) state that if the CBDC come into wide circulation, it will lead to more exchange and trade among the economic actors. However, this will also lead to the lower investment because people will deposit less of their money and save more than they used to do.

### **2.4. *CBDC'S Impact on Monetary Policy and Financial Stability***

The fourth strand of the literature concerns the impact of the CBDC upon the monetary policy and the financial stability. The introduction of the CBDC has the potential and ability to affect the monetary policy decisions and objectives, primarily through CBDC being a monetary tool as well as exerting an influence upon the choices that households make with regards to their finance.

Crucial here is the ability of the CBDC to respond flexibly to the shocks in the macroeconomic context. Using a DSGE (Dynamic Stochastic General Equilibrium) model, Barrdear and Kumhof (2016) has come to the conclusion that the introduction of the CBDC can lead to the decrease in the interest rate and prevent the distorting taxes. Used as a counter-cyclical tool, it will lead to the small decrease in the GDP by forcing households to demand more CBDC from the central banks. Similarly, Fernandez-Villaverde et al. (2020) has argued that if the run on the CBDC does indeed happen, central banks can prevent this from happening by increasing the real prices and affecting the consumption. Since it needs to liquidate its assets to pay depositors, it will increase the prices and decrease the real value of the withdrawal. However, this is highly controversial policy action considering the fact that the mandate of most central banks is inflation targeting and foregoing that will damage its reputation and viability as an inflation-focused institution. In his assessment of the effects of the CBDC, Williamson (2019) offers two possible courses of action. He argues that, as an interest-bearing medium, which can also be used as means of payment, the introduction of the CBDC will work to the benefit of the unbanked because their deposits will be underpinned by the open market operations of the central bank. The open market operations by the central bank will limit the ability of the commercial banks to gather collateral assets to support their deposits, leaving the banked households at a significant disadvantage unless they also join the CBDC. Finally, Keister and Monnet (2020) argue that if the financial condition information of the banks is private and only known to their depositors, the introduction of the CBDC will lead to the withdrawal of the deposits from the banks to the central banks to be digitized in times of financial distress and crisis. In observing this, the central banks can glean information about the financial situation of the commercial banks, which can help the central banks to design a better policy to manage the financial and macroeconomic crisis.

### ***2.5. Legal and Regulatory Considerations***

Final strand of the existing literature has focused on the legal and the regulatory considerations regarding the issuance of the CBDC and the ability of the central banks to issue digital money. Lönnberg (2013) has argued that in order for the successful rollout and the operations of the CBDC, it is important to strengthen the institutional capacities of the central banks. The law pertaining to the CBDC should cover the main rights and the responsibilities of the parties in the system as well as will be affected by the laws pertaining to the general payment systems in the country, as well as the laws pertaining to the specific characteristics of the CBDC. First and foremost, the central banks will need to assess whether their existing institutional mandates allow them to issue CBDC (Bindseil, 2020). On the other hand, whether the CBDC can be issued as a legal tender in the country will also be an issue of great academic and policy discussions in the

coming years. That is primarily due to the fact that the definition of the legal tender, at the present moment, only includes banknotes and coins as well as other monetary instruments such as assets and deposits that are easily convertible to the money. Therefore, states and governments will need to expand and modify the definition of the legal tender to incorporate digital currency in it.

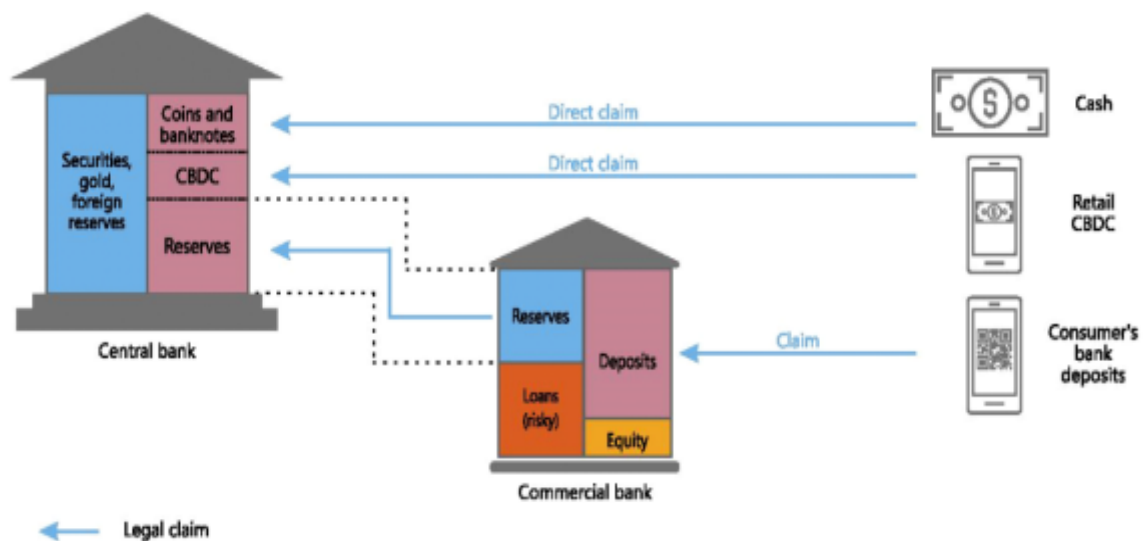
### 3. What is Central Bank Digital Currency?

As noted in the literature review, the work on the introduction of the CBDC has already started in full swing, albeit central banks have expressed different opinions on when they are planning to introduce the digital currency. In order for this thesis to provide balanced and comprehensive recommendations, it will be pertinent and useful to briefly talk about what the central bank digital currency is and how it has evolved significantly during a short span of time.

#### *3.1. Central Bank Digital Currency*

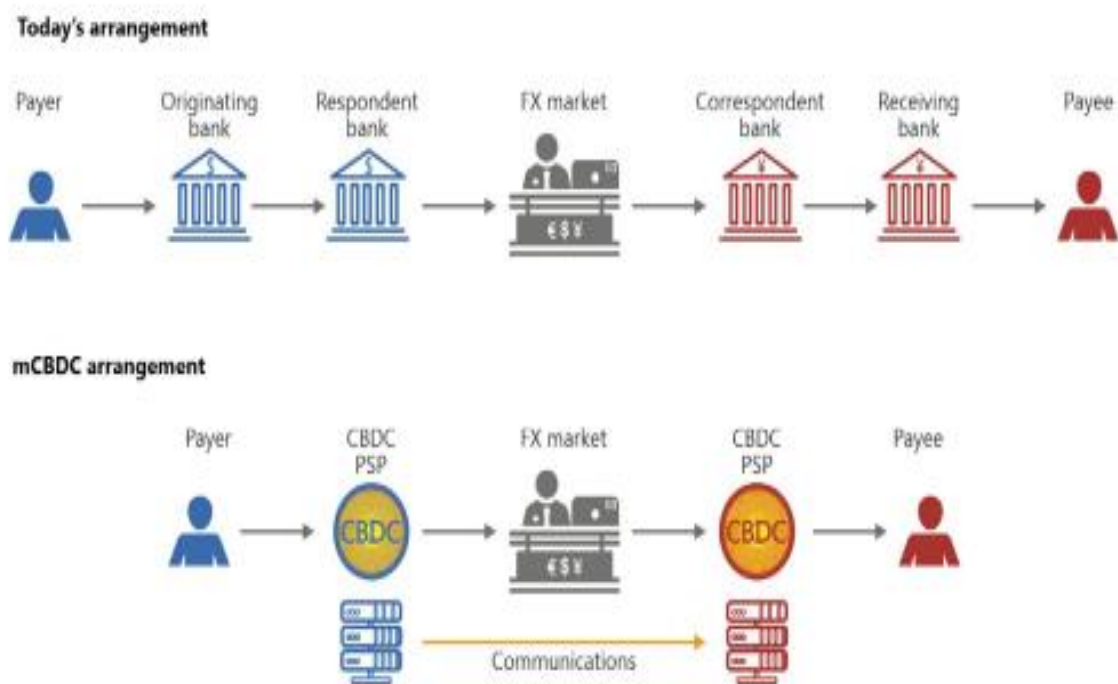
Central banks of the different countries are the only bodies that are authorized to issue coins and banknotes. They are the liabilities of the central bank and their utility in settling debt are guaranteed by the government. By that same logic, digital money also has same properties in that they can be used to settle accounts and pay for services and goods. Taken together, we can argue that the digital currency is the digital form of the national currency (Bank of England, 2022). To give it a stretch, the digital currency is the record or the token of the official currency. The same with the cash and the deposits, they are officially the liability of the central banks. They can be used to make payments as well as to receive payments. Considering the fact that there is already a digital money provided by the central bank, it begs the question: what is there a need for a digital currency? The answer boils down to the fact that the digital money by the central bank is only issued to the commercial banks of the country. An individual person cannot access those electronic money, but only the select financial institutions and mainly the commercial banks can access to them. In marked contrast, all households and individuals will have access to the digital currency through their accounts in the central bank ledger (Auer and Bohme, 2020). To better demonstrate the monetary architecture to be established upon the introduction of the central bank digital currency, it is useful to take a look at the following picture.

## Cash, electronic payment instruments, and retail CBDC



Source: Auer and Bohme (2020)

As can be seen from the picture above, the CBDC will be the same in terms of being liability of the central banks, but different from the existing electronic money that is issued to the commercial bank, it will be a direct claim upon the central bank by all economic actors including households and the individuals. As demonstrated above, there are various motivating factors and drivers behind the introduction of the CBDC. In particular, the poor and underdeveloped countries are more willing to introduce it in order to prevent private actors taking over the powers of the central bank with the major payment medium in the country (Didenko and Buckley, 2021). At the moment, there are two types of digital currencies both of which are quite unique. In the wholesale digital currencies, the issuance, and the redeeming are done by the central bank through the commercial banks and commercial banks continue their conventional intermediary roles. However, in the retail CBDC, the individuals and households open their own account with the central bank, eliminating any role for the commercial banks. Although the retail CBDC has been praised for allowing for efficiency and traceability, wholesale CBDC has been underlined for its non-disruptive character in terms of monetary and financial stability (BIS, 2021). Another important feature of the CBDC is that it is also aimed for the cross-border payment. Thanks to the ease of use as well as the low transaction costs, it is often considered to be much more optimal method of cross-border financial transactions. If implemented, the multi-CBDC should allow for the simplification of the cross-border payments as shown below.



Source: Auer et al (2021)

Even though central banks have recently become delved into the digital currency, it is not the first time that countries float the idea of introducing digital currencies. In the section below, we will provide a short overview of the history of the digital currencies issued and redeemed by central banks.

### 3.2. History and Current State of Affairs of the CBDC

Although central banks have recently began to experiment with the digital currencies, their experience with the digital currencies and digital money is nothing new. Doer et al (2021) argue that there is a triple imperative for the central banks, meaning providing efficient payment solutions by fostering competition, ensuring privacy as well as providing the integrity of the financial system. The development of the technology has the potential and the ability to make a huge change upon those imperatives of the central banks. In order to understand the current digitalization of the money, it is important to take a look at three important historical transformation. First and foremost, in the 18<sup>th</sup> century, a development of technology led to the emergence of fiduciary money. In the 19-20<sup>th</sup> century, the central banks began to regulate and control the commercial banks and finally, in the 70s and 80s, the central banks assumed new roles of controlling inflation and providing efficient payment systems (Bordo, 2021). Although the central banks have used the electronic money for the commercial banks, the first electronic money issued by the central banks directly to the citizens was the Czech Q virtual currency implemented as a part of I LIKE Q project. Q was a virtual currency whose value was tied to the Czech koruna,

and which could be used for the micropayment on the internet. The project came to a halt in 2003. Previously, the Finnish experiment with the Avant e-money was similar to the current digital currencies.

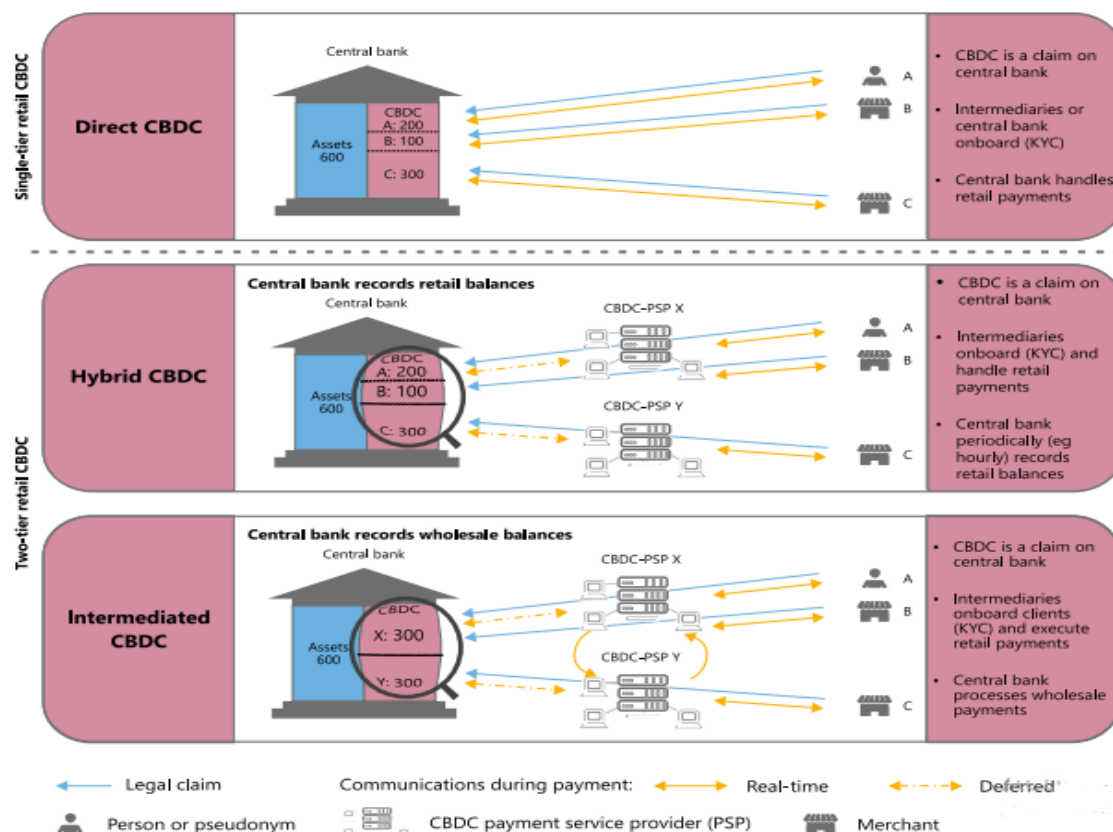
What has played a pivotal role in the rejuvenation of central bank interest in the digital currencies was the development of the bitcoin and stablecoins, all supported by the blockchain technology. The central banks have been keenly interested in using blockchain technology to improve their functions and meet their mandates since 2013 (PwC, 2019). The idea of CBDC was given a new life in 2014 when Ecuador announced that it will be the first country to roll out a digital cash called electronic dinero (DE). Running for three years, the program was halted in 2018 due to the low adoption among the general population (White, 2018). In 2017, the IMF encouraged countries to experiment with the central bank digital currencies. The Swedish Riksbank, in 2017, announced that it is exploring the digital currencies, albeit set no definite date as to when the digital e-krona will be issued. In 2018, the sovereign nation of Marshall Republic adopted a new law called Sovereign Currency Act of 2018, which basically legalized the digital currencies and paved the way for the similar legislation in other countries. The history of the digital currency shows that small and underdeveloped countries have been much more likely to enact and pilot the digital currencies for wide range of reasons. Therefore, it comes as no surprise that the Bahamas became the first country on Earth to officially release a digital currency known as the Sand Dollars in 2020, widely available on the island (Wyss, 2021). Furthermore, Facebook's announcement of Libra sent shock waves across the financial institutions and central banks and convinced the latter in the necessity of spreading the digital currency development lest it lose the control over money printing and monetary sovereignty. In addition to the Bahamas, China also begun experimentation with the digital currency called e-CNY, which is the liability of the central bank and will be issued to the general public through account-based interfaces. At the present moment, numerous countries are exploring the introduction of digital currencies in their respective jurisdictions. The numbers pertaining to the digital currencies are further testament to the growing popularity of the CBDC. According to the Atlantic Council Digital Currency Tracker, 87 countries are exploring the digital currencies, 14 countries are in pilot stage and in preparation for full launch. 9 countries have officially rolled out their digital currencies with Nigeria being the latest one and there are several multi-CBDC such as Project Jura, Project Inthanon-LionRock, Project Dunbar and several others.

### ***3.3. Technological Considerations and Design Choices***

As stated above, central banks have begun to explore the idea of digital currencies for some time. In addition to other considerations such as motivation, necessity and the legality of introducing, the technical considerations and the design choices have also been an issue of great academic and



policy discussions. With regards to the technical considerations, the first issue is the identity of the individuals using the digital currencies. The need to strike a balance between securing the privacy and anonymity of the individuals and provide a safe and secure payment methods have led central banks to mull over two options (Armantier et al, 2021). The first one is the token-based access. In this access type, individuals will need a password to access their accounts without revealing their true identity. In this case, the accounts will not be linked to any specific individuals and everybody who knows the password can access the account. The second type is the account-based access. This type of access is based upon the verification of the identity of the user in line with what is known as the digital identity. At the moment, most central banks prefer the account-based access because it helps to prevent illicit payments and allows central banks monitor the activity on the platforms. The second issue is the involvement of the commercial banks and the private sector participants. Every transaction done with the digital currency requires a record-keeping. The issue is who will control those records. In this regard, there are several options. In its assessment of the possible designs for the digital currencies, Bank for International Settlements (BIS) has proposed the three major alternatives as follows.



Source: BIS (2021)

Basically, there are three types of CBDC. In the single-tier retail CBDC, the central bank takes all the responsibilities of onboarding the clients and handling and monitoring all the payments, in

addition to its conventional duties of issuing and redeeming the currencies. In the hybrid case of CBDC, the central bank involves the intermediaries, mainly the commercial banks for the onboarding of the clients, but periodically records the retail balances. In the final type of CBDC, which is known as the intermediated CBDC, a full functionality for the commercial banks is guaranteed in that they are in charge of onboarding clients and executing retail payments with the central bank only handling the wholesale payments to those banks. Not to exclude the commercial banks from the concept and delegate some of its responsibilities to the commercial banks, most central banks are envisaging either hybrid or the intermediated form of CBDC (Frost et al, 2021).

The third important consideration is the technology that will be used in the application of the CBDC. Thanks to the proliferation of the distributed ledger technology, many banks are exploring different ways for the decentralization. In the distributed ledger technology (DLT), the CBDC can be run on two designs, permissionless or permissioned. The permissionless design resembles Bitcoin and other crypto currencies in that they unauthorized and unidentified validators update the transactions, but this is not efficient and environmental harmful. The second is the permissioned DLT in which a select number of entities monitor and update the transactions and the operations. Although many banks are currently looking at the permissioned DLT for the CBDC, there is not a silver bullet for it, which makes it fair to argue that it will be prone to flaws and problems from time to time (Agur, Ari and Giovanni, 2019). The fourth important issue is the data and privacy. The need to prevent the illicit payments or terrorism financing has led CBDC designs to answer the question of how they will ensure the data privacy and security. In theory, central banks could strive for maximum degree of privacy, but this will come at significant costs for the integrity of the financial system. At the moment, several central banks are working to ensure that the data privacy is protected while the system works secure and safely. For instance, the Bank of Jamaica, at the moment, works on a legislation that will require court order for the authorities to look into the account of the individuals. Whether the central banks will forgo privacy and data over need to secure the integrity of the financial system remains to be seen.

## 4. CBDC Benefits and Drawbacks

In the broader sense, the introduction of the CBDC is conceptually regarded as the natural progression of money. With the advent of new technologies, governments have upgraded and improved the existing payment systems and monetary architecture. However, in a monetary system as unstable and unpredictable as the current one, central governments need more argument than theoretical underpinnings. Luckily, there are already a quite significant number of literatures detailing various advantages and benefits that come along with the adoption of the CBDC. Often included among the potential benefits of the financial inclusion, innovation, the efficiency in the payment systems as well as certain fulfilment of the monetary policy objectives. On the flip side, there are also various disadvantages to CBDC with the most important one being the elimination of the commercial bank deposits and facilitation of the illicit funding. The purpose of this section is to clearly lay out the advantages and disadvantages of the CBDC in order to allow the policymakers weigh different considerations.

### 4.1. Advantages

One of the most often touted advantages of the CBDC is the financial inclusion. The conventional method of accessing finance is through the bank accounts in the form of saving and checking accounts (Lis and Gouveia, 2019). However, it is also worth noting that not everybody has an ability to open a bank account. According to the information provided by the World Bank, there are around 1.7 billion unbanked and underbanked individuals in the world as of 2020.

The proponents of the CBDC argue that the introduction of the CBDC would expand the access to the people in large, in particular the low-income households will be able to access finance for the first time. People who did not use to have bank accounts will be able to

*Distribution of Unbanked Individuals: World Bank*



open accounts with the central banks and conduct payments using efficient and effective systems. The adoption and the application of the CBDC does not require going through conventional account opening process in commercial banks. Individuals will have their digital wallet, connected to the CBDC account through API. On the other hand, the direct government payments to the

individuals will further involve them in the financial system and lead to the expansion of credit and loan activity. In particular, Raghuveera (2020) states that the CBDC can provide financial inclusion in two ways: by creating more inclusive and user-friendly payment systems and secondly, by establishing the individual financial data identity. In addition to the financial inclusion, another often talked about benefit of the CBDC is the increased efficiency. At the moment, the payment systems are handled by the central banks of various countries. However, it is also worth noting that the private institutions play an important role. In particular, the customers and households need a bank account in order to become part of the existing payment systems. On the other hand, there is a special difficulty with holding and managing cash as the extreme amount of cash makes it difficult to be managed by the central banks. This is where the CBDC come into play. In terms of increasing efficiency in the payment systems, it will improve the existing payment systems through several areas (Piazzesi and Schneider, 2022). First and foremost, it will ensure that the central banks have the total control over the payment systems in the country. As noted earlier, the central banks in the developing countries are worried that the development of the private sector payment systems will tarnish their reputation and wrest away their monetary sovereignty. However, if the CBDC come into full circulation, the central banks, once again, can ensure that they have the total control over the money flow in the country. The third important way through which the CBDC can contribute to the efficiency of the payment systems is through the fostering of the competition between different private payment providers as well as between fintech companies and central banks (Gnan and Masciandaro, 2018). At the moment, all payment systems require an account and the bank card. However, if the CBDC is implemented, people will have a mobile money without having to open a bank account. This will not only provide an interoperability between the different payment providers and the fintech companies, but also foster innovation and competition in the payments industry. Considering the fact that the central banks are overwhelmingly in favour of including commercial banks in the new payment architecture, it is fair to argue that the CBDC will have a significant innovative and spill-over effects. Finally, the CBDC will also decrease the costs that is associated with the management of the physical cash. As noted earlier, the development in 18-19<sup>th</sup> century led to the emergence of the fiduciary money. However, there are costs that comes with the printing, distribution and managing of the physical cash. The CBDC will eliminate the need for such costs since people will have their money digitized in the records of the central banks.

In addition to its positive contributions towards payment and financial inclusion, CBDC will also help the central banks with their monetary and inflation objectives. The core mandates of the central banks are to keep inflation under control through interest rates. A constant lowering of

interests' rates has led to what is known as the lower zero bound, meaning that there is a point beyond which central banks are unable to stimulate monetary expansion. This is where the use of the CBDC is often deemed useful with regards to its monetary use. However, the use of the CBDC as a monetary policy instrument is only valid as long as it is interest-bearing asset (BIS, 2021). The process through which central banks can use the CBDC for the monetary purposes is as follows. In times of economic crisis and depression, the central banks will put a negative interest rate on the CBDC, stimulating economic spending and activity. When the opposite occurs, the central banks can increase the interest rate on the CBDC, encouraging people to save more. Considering that the cash base of the economy will decrease with the rollout of the CBDC, the central banks' interest rate policy tool will become much more effective. However, there is a catch in terms of the popularity of such policies being implemented. It remains untested and to be seen to what extent economic actors will be receptive to the idea of having their money chipped away by the central banks. Furthermore, the CBDC is often argued to be a useful asset in terms of ensuring financial stability. In a recent report, the Bank of Canada noted that the CBDC will allow the central bank of the country to transfer fiscal stimulus to the select number of institutions. The direct payment by the governments or the central banks can also be extended to the government payments to the individuals. This will not only ensure that more people are involved in the financial system, but also prevent illicit or unintended use of government payments solely intended for the use by certain individuals (Lis and Gouveia, 2019). Finally, the use of the CBDC can also help with the cross-border payments. International remittances are some of the most important sources of funding in some countries. According to the World Bank data, around 529 billion US\$ worth of remittances were sent in 2018. However, there are many bureaucratic hurdles and red tape at the moment. If implemented, the CBDC will allow for faster and more efficient international transfers and cross-border payments (Raghuveera, 2020). As a case in point, several countries are already working on a multi-CBDC to test the practical application of the CBDC in an international context.

The benefits and the advantages of the introduction of the CBDC must be assessed in the context of several disadvantages that it has a potential to bring about. In the section below, several disadvantages of the CBDC will be assessed and analysed.

#### ***4.2. Disadvantages***

In addition to the various advantages of the CBDC, there are also several disadvantages and that is likely to pop up during and after the implementation of the CBDC. At the moment, central banks are carefully assessing the benefits and risks and exploring different ways to mitigate them. The decision to adopt the CBDC will eventually rest on the careful cost-benefit analysis of the central

banks and whether the benefits outweigh the costs or not. One of the most often talked about risks and disadvantages of the CBDC is the impact that it will have on the commercial banks and their intermediary roles. In the existing monetary system, the conventional banks play an important role as intermediaries in that they take deposits from the individuals who do not need them and lend them to people who need them. However, in the context of the CBDC, the process will be different. Since people can deposit their money with the central banks, they will have an alternative now. Considering the fact that central banks do not go bankrupt and the commercial banks have a known history of defaulting and going bankrupt, it is fair to argue that the ordinary people will have more confidence in the ability of the central bank to save and protect their money (Beniak, 2019). This has a huge implication for the entire banking sector. What it can lead to is the bank run in which millions of people are suddenly withdrawing their deposits from the commercial banks and converting them to the digital currency to be kept at the ledger of the central bank. This can happen regardless of whether there is an interest on the digital currency or not (Piazzesi and Schneider, 2022). Banks will not only find it hard to attract deposits but will have to increase the deposit rates in order to encourage more people to save their money with them. This, in turn, will lead to the reduced lending and credit activity because the banks will pass their cost of borrowing expenses on to the customers in the form of increased interest rates. At the moment, central banks are exploring different solutions in order not to create this kind of bank run such as distribution of digital currencies to the banks and lending to the commercial banks by the central bank, which would make the central banks “the lender of first resort”. The second important risk concerns the security and the privacy. In the cash-based economy, people are entitled to the certain degree of privacy because of the fact that governments and central bank cannot access their cash spending. However, once the digital currencies are rolled out, government control and monitoring of the spending of the people will become much easier. As noted earlier, there are two types of digital currency access. If the central banks choose the tokenized access-type, it will be difficult to prevent illicit transfer of money because one account can be accessed and used by anyone who knows the password (Agur, Ari and Giovanni, 2019). In particular, the tokenized access can lead to the terrorist and illegal funding and stifle the ability of the government to fight against the illicit money transfers or the fraud. However, if the central banks prefer the account-based access, privacy and the data security issues come up. Therefore, central banks are in difficult position to strike a balance between ensuring privacy and security and making sure that the digital currencies are not used for the purposes they are not intended to do. The third important risk is the possibility of the cyber-attacks against the central bank. In this day and age, cyberattacks have become all the more common. Whether it originates from the state or the private actors, it can lead to the immense disruption in the monetary architecture and the payment systems of the country. Furthermore, the

digital currency rollout will overwhelm the duties and the responsibilities of the central banks. Considering the fact that central banks are already tasked with several important duties, the addition of digital currency management will add further burden and might conflict with other responsibilities of the central banks.

## 5. Case Study: Ecuador and Bahamas

As demonstrated, there are various theoretical advantages and the disadvantages of using digital currencies. However, when it comes to assessing the real implication of the introduction of the CBDC for the Azerbaijani economy, there is nothing more useful than looking at concrete examples and experience. So far, there are several countries that have officially launched their digital currencies. However, in terms of the lessons to be learned and insights to be gleaned, Ecuador and Bahamas experience with the CBDC provide most useful case studies. Additionally, their economies share certain similarities with that of Azerbaijan in that both of them are commodity-exporting countries and dollar plays an important role in the macroeconomic stability and inflation dynamics.

### *5.1. Ecuador's Experience with CBDC and Subsequent Failure*

Ecuador is often considered to be the first country to issue a central bank digital currency. Considering the fact that the Ecuadorian digital currency also known as the Dinero Electronico (DE) was issued and backed up by the central bank on a digital platform, it is reasonable to argue that this was the first experiment with the CBDC, which ran from 2014 till 2018 when the government abandoned the currency.

Before looking at the actual implementation and results, it will be useful to provide a brief context and situation of the Ecuadorian monetary system in the lead up to the introduction of the DE. In 2000, Ecuador was dollarized, and money supply was composed of surpluses and the remittances sent from abroad. However, as the economic crisis worsened around 2008, its foreign earnings fell dramatically, which exerted a significant pressure upon the thin foreign reserves of the country (White, 2018). In order to prevent the situation from getting worse, the government took three important measures. First was the issuance of the T-bills to be used for payments and settlements, but not for the taxation. The second was the FactoRepo, which was the B2B receivable account to be used among the small producers and entrepreneurs. The last measure taken by the government was the introduction of the digital currency named Mobile Payment Systems. Although the legislation for the digital currency was enacted in 2011, only in 2012, the government rolled out the first digital currency (Spurrier, 2012). It should also be noted that the initial version of the digital currency saw the heavy involvement of the private sector and as a matter of fact, two largest

private banks in the country were authorized to issue digital money. In terms of the specific motivation in the introduction of the DE, Arauz et al (2021) states that there were three motivations. First and foremost, the government wanted to decrease the pressure on its foreign reserves, increase and expand the financial inclusion and make it easy for the migrants to send back remittances. On the other hand, there were several important characteristics of the DE that made it, initially, appealing to the general public with the most important factor being the ease of use. To access the system, a person only needed a mobile phone and the identity card. Individuals were not required to have a bank account to access and use the system. There was no need for any intermediary and the DE was to be backed by the USD denominated assets. Furthermore, the DE was denominated in the US dollars and was based on Unstructured Supplementary Service Data (USSD) protocol that would allow the citizens to send money to each other in real time. On the other hand, the process to access the system was quite straightforward. Citizens needed to dial in the protocol, enrol their national identity and answer several questions and upon the successful completion, they would be registered in the system. The simplicity of the system was also apparent in the depositing and the withdrawal which could be done at the designated transaction centres as well as at the offices of the Central Bank of Ecuador (Dyson and Hodgson, 2016). The system first went online in February 2015 with the number of active users reaching 9285. However, in a matter of merely 2 years, the number of users on the platform reach to the high of almost 4 million. The process to set up and operate the system was also very simple in that the users only needed a phone to activate and use their accounts and they were around 200 transaction stations where people could deposit or withdraw the money. Furthermore, the fees on the transactions were very low and people could make instant payments. In addition to its major function of money transfer, the DE was also supposed to be used for the payment of the transport fares as well as for the payment of the government services. However, the problems with the system soon came to the surface and in 2017, the parliament of the country decided that the central bank would not manage the DE. In the end of the year, with the Presidential Directive, the country put a definite end to the DE.

The failures of the program offer important insights for the countries and governments who want to adopt the digital currencies. In spite of the initial success of the program, it came crushing down in a matter of three years. There were several reasons for the failure of the DE. First and foremost, the currency was not 100 percent backed by the US dollar even though it was 100 percent backed up by the dollar-denominated assets of the central bank. The fact that the digital currency was not 100 percent backed up by the cash led the critics argue that the DE was a parallel currency created to tackle with the fiscal shortfall (Arauz et al, 2021). The second problem of the digital currency was that it could not be used for the international payments. Considering the fact that only the



mobile operators in Ecuador were the participants in the system, the inability to make international payments was the result of the design flaw, not policy or operational flaw. Furthermore, there were low adoption of the currency among the population. At its peak, the subscription to the system did not go beyond 4 million in a country of 17 million people. The lack of interest in the currency was further reinforced by the popular misperception that the DE is a government surveillance mechanism, and the digital currency is used to make illicit payments (ibid). Arauz et al (2021) also states that the perception that the DE was not a real money also factored in the eventual failure of the program. Finally, there was also a fierce opposition from the commercial banks who saw the DE as a significant threat to their conventional mode of working and worked to undermine it.

## ***5.2. Sand Dollars and Its Success Factors***

As has been discussed, small and poor countries are much more incentivized to adopt the digital currencies in order to increase the financial inclusion and make it easy for the citizens to send back remittances. The Bahamas is the first country in the world that has officially rolled out its digital currency known as the Sand Dollars. In marked contrast to DE, the Sand Dollar is lauded as being the first successful case of CBDC. Analysis of its history, design features as well as the success factors will provide important lessons and insights for the countries that are on path to releasing their own digital currencies.

The need to modernize the payment systems in the country goes back to the 90s when the country began to explore how to improve the payment systems in the country (CBB, 2022). What followed was the establishment of the Bahamian Payments Systems Modernization Initiative, managed by the National Payment Council. On the other hand, the government created Bahamas Interbank Settlement System, which was the real time gross settlement process with the overall purpose of automating the large value transactions between the financial institution. In 2016, the newly appointed chairman of the Bahamas Central Bank, John Rolle began the work on the introduction of the CBDC in full speed (Wyss, 2021). In the lead up to that, the government had already abolished the stamp tax on the transfer of electronic dollars. One final impetus for the introduction of the CBDC was the Hurricane Dorian. Given that it is logistically difficult and financially expensive to move money around the scattered island, the hurricane brought the problem to the surface. In 2019, the Central Bank of the Bahamas began the pilot project for the digital currency in two select areas where less than 25,000 people live, namely Exuma and Abaco. In order to facilitate its work in the digital currency, the central bank chose the NZIA Limited as its key technology partner. In October 2020, the country officially launched the Sand Dollar and in its 2020 report, the fast adoption of the currency was lauded in the report (CBB, 2022). In order to fully appreciate the digital currency, it is important to look at its original objectives. There are

several objectives in launching the digital currency the first of which is to increase the efficiency of the existing payment systems with faster transaction and lower fees. The second objective is to increase the financial inclusion in the country and help the unbanked and underbanked people integrate into the financial system. Another important objective was to prevent the use of illicit money and prevent country from becoming a safe haven for the money laundering (CBB, 2022). In terms of the registration and the set-up, the program is also quite straightforward and easy, although involves more private participation and security factors. Individuals and the companies wishing to open a digital currency account must first contact their choice of authorized financial institutions (AFI) in which they determine the characteristics of the digital wallet. In the third stage, the customers must provide Know Your Customer (KYC) information and upon the completion of this step, the individuals could download the e-wallet and work with the digital currency. Although the subscription to the system has reached an adequate level, the government aims to provide 100 percent access to all inhabitants of the island.

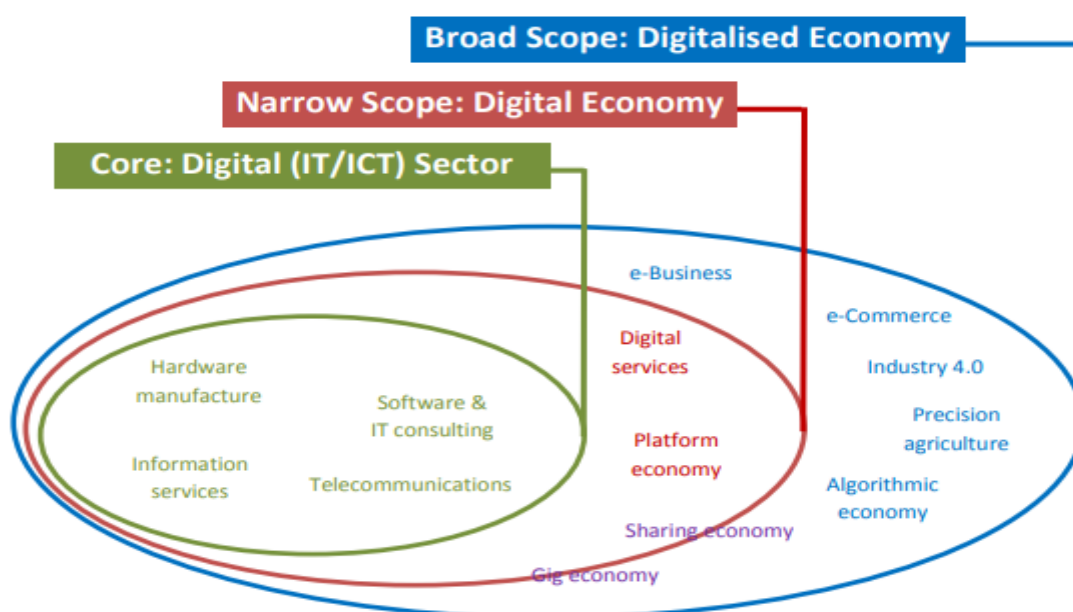
As can be seen from the case, the Bahama's experience with the digital currency has proven to be much more successful and there are very specific reasons for it. The first important success factor is the heavy involvement of the private sector. In his interview with the Bloomberg, the head of the Central Bank of Bahamas said that there was an opposition to the Sand Dollar from the commercial banks who saw it as a threat to their business practices. Therefore, the central bank sought to allay the fears by active communication and marketing efforts. As a result, the private companies became an integral part of the process. The central bank has a multi-purpose role in the process including the issuance of the currency as well as the monitoring. However, it is the authorized financial institutions including the banks, money transaction companies, the clearing houses, and the payment service providers. However, the Central Bank of Ecuador did not involve the private sector to that extent. The central bank of the country does not have a digital wallet and it is the financial service providers that provide digital wallets. The central bank has established cooperation with wide range of financial, strategic as well as technical partners to ensure smooth and successful implementation of the project. The second important success factor is the strong security measures put in place. There is a two-factor authentication whereby customers must provide KYC information as well as two passwords. The wallet security is adequate. While all the transactions can be audited, each wallet has a unique encryption mechanism. Finally, all the institutions in the system must have a rigorous security assessment on a regular basis in order to be part of the system.

## 6. Analysis of Financial Digitalization in Azerbaijan

The most basic condition for the adoption of the digital currency is the level of digitalization and the cash use in the country. One of the primary reasons why Sweden has been at the forefront of the digital currency development is because of the low use of cash and the high level of digitalization in the country (Riksbank, 2021). Therefore, the analysis of the digitalization of the country is important in determination of whether or not the country is ready to embrace the digital currency. In this section, the financial digitalization, the cashless and digital payments as well as the work of the CBAR will be assessed.

### 6.1. Digitalization in Azerbaijan

The digitalization refers to a process where millions of online connections between the different economic actors result in fundamentally new economic reality (Deloitte, 2022). There are different methods of measuring of how country fares in digitalization with the most important one being the DIODE (Development Implications of Digital Economies) method used by the Economic and Social Research Council as described in the following picture



Source: Bukht and Heeks (2017)

“Digital Evolution” index published by Tufts University compares 90 countries in terms of digital situation and the digital dynamisms. According to the list, Azerbaijan ranks 2 in terms of digital dynamism and 53 in terms of digital environment, which puts the country ahead of its regional neighbours. One of the most often used dimensions in the assessment of the digitalization in the country is the IT infrastructure. According to the information provided by the State Statistical Committee of Azerbaijan, there were 16 landlines per every 100 persons in the country in 2019.

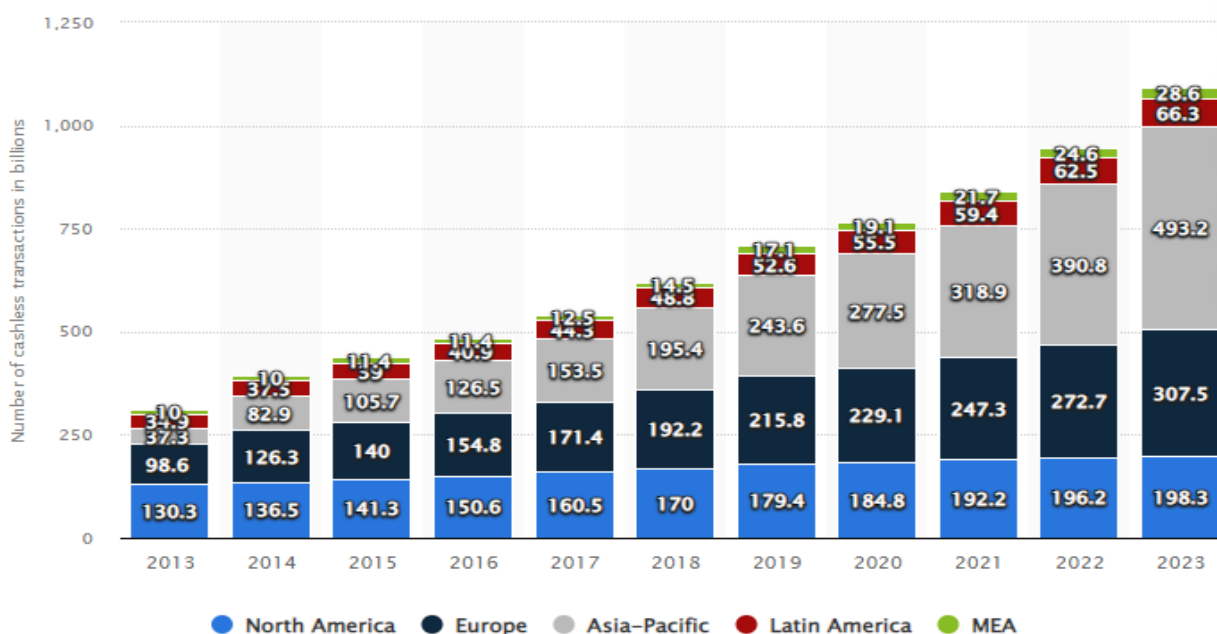
The same figure for the mobile phone users was 106. The percentage of the individuals having an internet access was 81 percent and the number of families having a computer stood at 65 percent. The number of social media users stood at around 4.5 million people. While the country fares better in certain areas, Azerbaijan fits in the category of average digitalization in the region. There are several reasons in terms of why Azerbaijan has fared average with regards to digitalization with the most important one being the limited and scattered market. The finance is the most digitized part of the Azerbaijani economy and shows the greatest potential. However, due to the limited economy of the country, digitalization cannot develop at a full speed. The second important reason is the weak public and business adoption of the digital tools and mechanisms (ADB, 2018). There are also problems with the infrastructure in the country with state still playing a huge role and the private corporations charging high prices for the telecommunication services. Furthermore, there are also a very scattered digital ecosystem and the regulative loopholes that the government is planning to fill in.

## ***6.2. Payment Systems in the Country***

Payment is one of the most often talked about aspects of the digital currencies. The proponents of the digital currencies argue that the use of the digital currencies will make it easier for the consumers and individuals to conduct transactions in more efficient and less costly manner. Therefore, it is important and useful to look at the existing payment systems in the country. According to the information provided by the Central Bank of Azerbaijan, the number of transfers from the current accounts stood at 95.7 billion Azerbaijani Manat (AZN) and the amount of domestic card payments were at a historic high of 6.4 billion AZN. At the moment, there are two major payment systems in the country: AZIPS (The National Interbank Real Time Settlement System) and XÖHKS (The Low Value Payment and Clearing Settlement System). In 2021, the number of transactions conducted through the AZIPS system stood at 183.756,0 million AZN, which was a decrease from the previous years. However, the transactions increased in the XÖHKS system and reached a new record of 33.906,0 million AZN, which was an increase of 21.8 percent in comparison to the year 2020 (CBAR, 2021). It is also worth noting that these two payment portals are mainly used for the transactions between the banks. In addition to these platforms, there is also a Government Payment Portal (HOP), which is used to make payments in various areas as well as to transfer money between the individuals. In order to stimulate the domestic cashless payments, the central bank rolled out Instant Payment System (Ani Ödəniş Sistemi). IPS is a mobile application maintained by the central bank in order to facilitate the cashless payments. According to the information provided by the central bank, the system has gained an immense

popularity. It was officially launched in 2020 October 1 and within a span of 1 year, the amount of transaction through the platform has reached a record level of 280 million AZN.

Another important indicator of the financial digitalization in the country is the number of credit and debit cards in the country. In 2021, there were 11 million cards in circulation of which only 1.3 million was a credit card. However, it should also be mentioned that the majority of the population uses the credit card for the withdrawal of the money rather than use it for digital payment purposes. The amount of transactions done by the credit cards stood at 37434 million AZN, which was a significant improvement of 29.3 percent increase compared to the year 2020. In 2021, while the cashless payments through the ATMs have incrementally decreased, the payments through the POS terminals and in the e-commerce platforms have increased significantly to the tune of 3226 and 7208 million AZN, respectively. The statistics as detailed above shows that there has been a significant increase in the number of the people using cashless payment types. However, in the global context, Azerbaijan is still behind other countries when it comes to the use of the cashless payment methods. For instance, in Sweden, the use of cash in the society was around 9 percent in 2021, which was one of the key factors when the country has officially rolled out a digital currency.



Cashless use by regions: Source: Statista

### 6.3. Public and Private Initiatives

The development of the digital economy has taken a central place in the economic development program of the country. To that extent, the government has adopted several programs and policy measures to increase the digitalization of the financial sector in the country. Now that we have

already mentioned the payment systems above, it is much more conducive to talk about the public and private sector initiatives towards the development of the digitalization in the financial sector. The government has begun to implement ‘e-government’ plans, which seeks to transform the delivery of the government services in a digital format. On the other hand, the President of the country has signed several decrees that seeks to stimulate the development of the digital economy and the digitalization. The financial digitalization figures prominently in the digitalization plans of the country. In 2017, the government has adopted what came to be known as the “State program on the expansion of the digital payments in Azerbaijan from 2018 till 2020”. The fact that the increased amount of transaction done via various online mediums owes to this program now that the state has thrown its full support behind the financial digitalization. As the major financial authority in the country, the central bank has also put in place several programs in order to stimulate the cashless payments in the country with the most prominent example of that being the Instant Payment Systems. The major purpose of the system is to facilitate the digital transaction between the banking and non-banking institutions as well as their legal and physical customers in a fast, efficient, and smooth environment (CBAR, 2021). The system works for 24 hours a day, and all the transactions are completed in a real time. On the other hand, the Central Bank has also adopted a new program, in line with that of government, with the purpose of further stimulating the cashless payments in the country. Called “Strategy of the Central Bank of Azerbaijan for the Digital Payments in 2021-2023”, the program has several strategic directions. The first one is the strengthening the legal basis for the digital payments in the country, the second objective is the expansion of the digital and standard payments systems in the country, the third is the development of the digital ecosystem in the country, the fourth objective is the expansion of the financial inclusion with the final direction being the communication and promotion of the digital payment in the country. In addition to the public sector, there are also thriving private sector digital payment systems in the country. Most of the banks in the country have their mobile applications through which the customers can manage their current accounts and make transfers and payments. Thanks to the AZIPS and XÖHKS, these transactions are completed in a real time and hassle free. The most recent example of the financial digitalization in the country is the introduction of Apple Pay. In 2021, the Apple Pay announced that it is beginning to operate in the country. At the time of writing of this research paper, five banks had already signed up to the Apple Pay, which allows customers to make contactless payments through their smartphones. Considering the growing popularity of the payment system, it is very much likely that more banks will soon join the program. Furthermore, the country is currently implementing a VAT Refund program. It should be noted that the program is implemented entirely online, and customers can get their VAT refunds through the participating programs. Overall, it is fair to argue that both the public sector and the

private sector are making certain inroads in the domain of digital financialization, and it is very likely that there will be further digitalization of the financial sector in the country.

#### ***6.4. CBAR's Position on CBDC***

As noted earlier, there is an explosion of interests in the digital currencies on the part of various central banks around the world. Countries such as Nigeria and Sweden have already rolled out their currencies and are assessing the initial results of how the program will unfold. In comparison to those advanced countries, the work on the CBDC in Azerbaijan remains somewhat limited and unpublished. Although the central bank has initially denied reports that it is working on the CBDC, it seems to have changed its view on the topic following the growing interest in the CBDC. According to the information provided by Vusal Qasimli (Azerbaijani economist, Doctor of Economics, professor, statesman - executive director of the Centre for Analysis of Economic Reforms and Communication of Azerbaijan Republic) at the International Banking Conference, at the moment, the Central Bank is working on the digital infrastructure of the digital currency and is in negotiation process with the government over the currency. In parallel, the Central Bank is also assessing the viability of introducing digital currency and whether or not there is a pressing need. In his interview with APA (Azerbaijan Press Agency), Alim Guliyev, the deputy chairman of the Central Bank, stated that they are currently in cooperation with the central bank of Turkey, which is doing its own experiment with digital lira, to see how and when the digital currency can be implemented. Given the fact that the Central Bank has not released any paper or strategy on whether or not it will introduce the digital currency, it is difficult to see where the Central Bank stands with regards to digital currency. However, what seems certain is that the Central Bank is motivated by the proliferation of the digital currencies all around the world and does not wish to fall behind. On the other hand, the introduction of the CBDC will lead to the greater financial digitalization in the country and the Central Bank seems eager to join the cohorts of the Central Banks exploring the concept.

As noted earlier, the introduction and the development of the CBDC is partly a reaction on the part of the central banks to the fast proliferation of the private cryptocurrencies. However, there are stark differences between these two. While the CBDCs are issued and maintained by the central banks, there are no central body or institution responsible for the private cryptocurrencies. Partly emanating from this, the value of the private cryptocurrencies tends to fluctuate and change very frequently. Although the CBAR has expressed a statement in the CBDC, its position on the private cryptocurrencies remains ambiguous. While CBAR has not banned the use of the cryptocurrencies, it has also not endorsed its use and circulation. Back in 2018, Head of CBAR at that time, Mr. Elman Rustamov issued a statement warning that cryptocurrency is a volatile instrument and urged

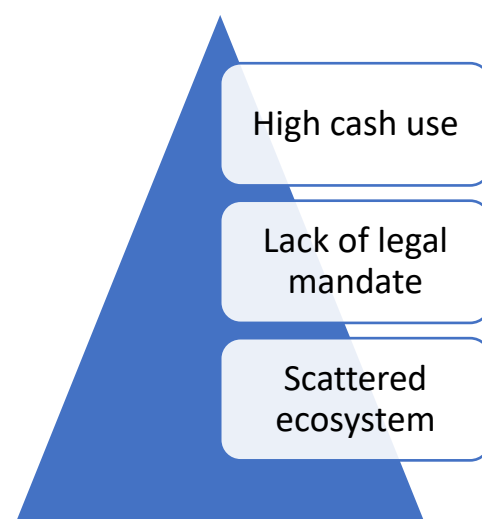
the population of Azerbaijan to exercise caution in dealing with cryptocurrencies. In general, the CBAR has refrained from expressing any position on the private cryptocurrencies.

Moreover, in accordance with statements of Azerbaijani crypto-investor Elnur Guliyev, at the beginning of 2022 there were no company in Azerbaijan which was engaged in the sale of cryptocurrencies due to the lack of legislation in this area. Crypto expert also stated that notwithstanding that interest in cryptocurrency is growing all over the world, it is believed in Azerbaijan that it is not profitable to invest in cryptocurrency. Expert justified its statement with regards to the lack of interest in this area in Azerbaijan with a low level of technical knowledge and expertise as well as high taxes: “Since a commission of 10% and a value-added tax of 18% are provided for the purchase of cryptocurrency in Azerbaijan, buyers are not very interested in this. There are interest rates in many countries around the world, they are not that high.”

## 7. Feasibility of CBDC in Azerbaijan and its characteristics

### *7.1. Is E-manat Possible at The Moment?*

Now that the degree of the financial digitalization has been covered, it is useful to answer the question of whether or not the introduction of the Central Bank digital currency is feasible in Azerbaijan. The world experience shows that the Central Banks not only look at the utility and the relevance of the central bank, but also whether they have the necessary legal means, infrastructure as well as the popular reception of the CBDC (Foster et al, 2021). Although the introduction of the CBDC will bring about certain benefits for the country, a close assessment of the financial situation in the country reveals that the Central Bank of Republic of Azerbaijan is not fully ready to embrace the digital currency. There are three particular reasons. First and foremost, the level of cash usage in the country is extremely high despite of the fact that the country has more cards and online payments than ever in its history. As noted earlier, the declining cash use is one of the reasons why certain countries have been more willing to embrace the digital currency than others. What the high levels of cash usage means is that the people will be slow to embrace the digital currency due to the lack of familiarity as well as lack of trust in the digital currency, as in case of Ecuador (Aaruz, 2021). The second impediment to the adoption of the CBDC by the Central Bank of Azerbaijan is the lack of the legal mandate. According to the Article 36 of “Law of the Republic of Azerbaijan on Central Bank”, manat is the only legal tender in the country and





the central bank can issue paper money and coins. This is the primary legal impediment to the issuance of the CBDC in Azerbaijan because the law does not allow the Central Bank to print or issue anything other than banknotes and the coins. Therefore, it is extremely important the law on the Central Bank be changed and new provision allowing the bank to issue electronic money be added. The third important impediment to the adoption of the CBDC in Azerbaijan is that it can lead to the loss of Central Bank authority over the monetary policy. Azerbaijan, at the moment, uses the exchange rate as the main anchor of the price stability. However, the adoption of the CBDC can impair the ability of the CBAR to control inflation through exchange rate. When the national CBDC is connected to the foreign CBDC, it can lead to the currency substitution in which local citizens prefer to use foreign CBDC (Zhang, 2020). In practice, this is no different from the conventional dollarization, something that has always been a problem for Azerbaijan in its efforts to safeguard its currency. However, there is a real possibility that if the CBDC is introduced, it can lead to Central Bank finding it more difficult to control the monetary dynamics and can possibly lead to the devaluation of the currency through the erosion of the foreign reserves of the country. The erosion of the foreign reserves under the CBDC can take place in two manners. First and foremost, the residents may prefer to use foreign CBDC, which is pegged to the domestic currency. There is major difference from the conventional dollarization, but with CBDC it can happen much faster and smoother. The second manner is more international linkages and currency transaction. In their research, Ferrari and Mehl (2020) have come to the conclusion that used internationally, the CBDC will create hyper-charged interest parity conditions, exerting strong pressures on the fixed exchange rate systems. Unless the CBAR fully transitions to the inflation targeting regime through the policy rate and other mechanisms, there is always a possibility of e-manat disrupting the conventional price stability strategy of the CBAR. The final impediment to the adoption of the CBDC in Azerbaijan is the fact that there is not a strong ecosystem in the country. As the experience with the CBDC so far demonstrates, the Central Banks often work at concert with the private companies including the payment companies, the banks, and other companies to develop CBDC solutions. However, the current ecosystem of Azerbaijan is scattered and weak, complicated by the fact that there is a limited domestic market and the human capital in the country is not up to the task of creating healthy and competitive IT ecosystem. The experience of the Bahamas with the CBDC and that of Ecuador shows that one of the secrets in successful implementation of the CBDC is the active participation of the private sector and not only the banks. As long as the country does not have a healthy IT ecosystem, the plans to roll out CBDC in Azerbaijan will always face technical and infrastructure hurdles.

## ***7.2. Success Factors***

As can be gleaned from the analysis above, the introduction of the CBDC in Azerbaijan does not seem to be feasible due to the multitude of factors. That should not lead to the assumption that the country will not be able to roll out currency in the future. Therefore, it is important to look at the factors and preconditions that will ensure the successful implementation of the e-manat in the future. In 2021, the officials from central banks of seven countries did a joint study in which they laid out three foundational principles for the CBDC with the first one being “do no harm”. The implication here is that the introduction of the CBDC should not conflict with the monetary mandates of the central banks (BIS, 2021). The second core principle is that the CBDC should exist in co-existence with other forms of money including cash and finally, innovation and efficiency are key factors to driving the successful rollout and the improvement of the CBDC. On the other hand, the Federal Reserve Bank highlights several necessary success factors including the communication, the broad stakeholder support as well as the financial inclusion. Bringing all of those factors together, it can be argued that the overall success factors for the implementation of e-manat boils down to three broad factors. First and foremost, there should be a widespread merchant acceptance for the e-manat. It should be similar to cash in scope in that it is accepted by all merchants in the country without exception. The European Central Bank states that the digital currency should be based on two inseparable features the first of which is that it is the most stable and the safest form of payment and the central bank money is the only legal tender in the country. E-manat with those characteristics can lead to the widespread merchant acceptance and the overall success of the project. The second important success factor is the efficient distribution. The European Central Bank argues that the most efficient distribution of the CBDC is through the supervised intermediaries. The CBAR should also pursue this strategy in that it should only be dealing with the emission of the CBDC and should delegate the responsibility to distribute to the financial institutions. The financial institution could include the banks and other financial corporations including payment providers and insurance companies. This will allow the CBDC not only to take advantage of the expertise and the experience of the financial institutions but also avail itself for other important CBDC works and escape from being overwhelmed. The third condition is that the consumers should be interested in making payments with the e-manat. What the governments can do is to provide a CBDC that provides payment services beyond the reach of the existing payment infrastructure such as offline payments. On the other hand, the private and the public incentives, excellent security features, convenience as well as the ability to make international payments are other factors that could boost consumer interest in the e-manat.

### ***7.3. Potential Risks***

In addition to the various success factor, it is also important to highlight the risks that comes with the adoption of the e-manat and can severely and detrimentally impact the success of the digital currency. In the existing literature, one of the most often talked about risks of the CBDC is the financial disintermediation. It is argued that if the retail currency does not include the banks and the CBDC has an interest rate that is more attractive to the depositors than the deposit rates, it will lead to the bank run in which people would deposit their money with the central banks (Balz, 2021). Even if the CBDC is not interest-bearing, people can still withdraw their money at the commercial banks and deposit them with the CBDC. The case is also applicable to Azerbaijan where there is a little confidence in the banking institutions. A couple of years ago, several commercial banks went bankrupt, and depositors lost their money with them albeit the CBAR is currently refunding the depositors at a certain amount. If the e-manat comes to being, there is a high possibility that there will be a certain bank run in the country. There are several options that commercial banks can pursue to avert the bank run with the most suitable and likely one being the raising of the deposit rates. However, in order to compensate for their losses, the commercial banks will likely increase the loan rates, which will lead to the reduction in lending and impede with the ability of the CBAR to manage the monetary policy. Therefore, a careful consideration must be taken into account to ensure that the financial institutions continue to play an important role in the economy. The second important risks to the e-manat comes from the possible dollarization through the CBDC. As noted earlier, if the e-manat is pegged to foreign digital currencies, other currencies can substitute manat, which is known as the currency substitution. This can, de facto, lead to the dollarization process in the country, which can lead to the depletion of the foreign exchange reserves of the country. The CBAR must ensure that the e-manat does not lead to the currency substitution and does not deplete the foreign reserves of the country. Additionally, another important risk to the e-manat is the security. Many central banks around the world are putting immense emphasis on the safety and the security of the digital currencies in order to galvanize popular interest and trust in it (Banescu, 2021). The security in the case of digital currency takes many dimensions. In terms of the national security and the macroeconomic stability, the cyberattacks against the digital currency infrastructure is the most important security threat. Unless the CBAR takes extensive measures to protect the e-manat infrastructure against any kind of cyberattack, it will allow the foreign malicious actors to attack the system and bring the entire payment systems in the country to a standstill. The second threat pertains to the privacy and the data breach. The access to the digital currency system is facilitated through the user credentials. If the hackers can leak into the system and steal the data on users, this can not only damage the

reputation of the e-manat, but also can lead to the money theft and fraud. Finally, the e-manat system can also be abused. Cash is an untraceable form of money, meaning that the governments cannot monitor what the consumers are doing with the cash they have. However, the digital currency allows for the monitoring of the consumer activity with the CBDC (Kahn and Rivadeneyra, 2021). Malicious state actors with the ability to watch the consumer activity on the platform can abuse the system for various purposes. Furthermore, another risk for the e-manat is the possibility of popular interests. As can be seen in the Ecuador experience, the popular interests, and the demand in the CBDC can be a make-or-break moment. After all, the viability and useability of any currency is determined by the amount of trust that people have towards that particular currency. The Central Bank of Europe also suggests that the central banks must “create a demand” in digital currencies through various means. If the popular interest in e-manat is not sufficient, any prospect for the e-manat success is very meagre. What is important to note is that the risk of lack of popular interest in e-manat is directly related to the other factors such as security and the safety. The CBAR must ensure that the e-manat will receive a popular reception and people are comfortable with using the digital currency in a country where the large number of transactions is still done in cash.

## 8. Case for E-Manat

In the chapter above, the analysis of the feasibility of the e-manat as well as the success and the risks factors demonstrate that, the country is not prepared to embrace a digital currency, which is also evidenced by the lack of any meaningful work on the part of the CBAR. However, considering the fact that many countries are already either implementing pilots and/or preparing proof of concept, it is fair to argue that there is a convincing case for the introduction of the CBDC in the Republic of Azerbaijan. In this section, the major benefits of the e-manat will be outlined. In particular, the four broad advantages of the e-manat including the payment systems, the monetary policy, the financial inclusion as well as the government payments benefits will be assessed and analysed in this section in order to demonstrate the possible utility of the e-manat.

### *8.1. Payment Efficiency*

In addition to price stability, another important functions of the CBAR are to ensure and facilitate stable payment systems. Through various mediums, the CBAR facilitates transactions between financial institutions, the financial institutions, and the people as well as between different

individuals. The first advantage of e-manat is that it will allow the CBAR to organize much more efficient payment system. The payment system based on the digital currency will have several important characteristics that the existing payment systems do not have entirely or partially. The first one is the accessibility. Manat is available to everyone in the country, however the RTGS (real-time gross settlement) system and other payment mechanisms in Azerbaijan is only restricted to the authorized financial institutions. The e-manat will ensure that everybody who has a smartphone has the access the digital money. The second important advantage of the e-manat is that it can be used as a bearer instrument. Usually, the cash or the bank deposits have been used as the bearer instrument that allowed the owner of the instrument to claim the money. What is useful is the fact that the CBDC, through either the ownership of the object or the passcode, can also be used as a bearer instrument that would facilitate much more efficient transactions. Another important benefit of the e-manat in terms of facilitating more efficient payments in the country is the improvement in the operational efficiency. The cash is not only difficult but also very expensive to manage. CBAR spends a lot on the management of cash. However, the e-manat would immensely decrease the need for money to be spent on cash management as the physical money will be turned into a digital record held at the ledger of the CBAR. Another important aspect of the CBDC is the fact that it allows for 24/7 transactions, which is not possible with the conventional payment systems including the RTGS which has certain operating hours. However, the e-manat would eliminate this limitation and allow the users to make payments and other operations 24/7. On the other hand, in theory, the e-manat should not require an internet connection in order to function. This will allow people, especially from the regions who has slow internet connections, to make payments and transfer as well as to receive government payments. Azerbaijan is deeply integrated to the world economy and the oil export revenues are significant source of the government budget. In that context, the cross-border monetary transfers take an important place in the macroeconomic policy of the country. In the last decade, there has been a massive growth of the various digital currencies, which has the potential to affect the foreign reserves of the country through outflow of the foreign currency. Therefore, it is in the best interest of CBAR to start a digital currency as well as sign an agreement with other important trade partners on how the transfers in the CBDC will be managed. Finally, the rollout of the e-manat will also stimulate the competition in the private sector. At the moment, the banks play an important role in the payment system of the country with few payment service providers (PSP). However, the introduction of the e-manat will lead to the development of the various PSPs as well as the overall development of the IT sector in the country, further contributing to the successful implementation of the e-manat.

## ***8.2. Monetary Policy Objectives***

In the context of the CBDC implications for the monetary system, there seems to be much confusion and worry. Not counting the benefits of the CBDC, one of the major disadvantages of the CBDC, as stipulated by the central banks around the world, is that it can lead to the macroeconomic destabilizing through the disintermediation of the commercial banks as well as the large reductions in the balance sheets of the central banks (Baer, 2021). However, among this general and rather negative picture for the monetary policy, there are also certain benefits of the CBDC for the monetary policy. The first advantage pertains to the interest rates. This is particularly important for Azerbaijan considering the fact that the country is planning to switch to the inflation targeting regime. The e-manat can be an interest-bearing instrument, which would allow the CBAR to manipulate the interest rate to control the monetary policy. If there is an economic recession, the CBAR can decrease the interest rate on the e-manat in order to stimulate the spending. This will also allow the CBAR to break the barrier of zero lower bound. That is because there is no interest on cash, but the CBAR can implement negative interest rates on the e-manat, which will lead to the increased spending. Considering the fact that there is hardly a deflation in Azerbaijan, the manipulation of the interest rates on e-manat can be much handier in the context of the contractionary monetary policy. In times of inflation, the CBAR can increase the interest rate on the e-manat, which will stimulate people to save more of their money in order to benefit from the higher interest rates. The second important benefit of the e-manat is in terms of the better monetary policy transmission. The country is in the process of providing funds for the certain industries in the country including the agriculture with the overall aim of improving the GDP of the nation. Barrdear and Kumhof (2016) has argued that the introduction of the CBDC would lead to 3 percent increase in the gross domestic product of the country through a better allocation of the resources including the subsidies. If the e-manat is introduced, it will allow the government to better allocate the financial resources that are reserved for the specific economic and social purposes. Thanks to the traceability of the CBDC, the government will be able to see where and how the money is spent. The final advantage of the e-manat for the monetary policy is that it will prevent the domination of the private cryptocurrencies, which are threatening the monetary sovereignty of the central banks. As noted earlier, there is a fast expansion of the cryptocurrencies all around the world and particularly in case of Azerbaijan, the cross border crypto transactions pose a direct threat to the monetary sovereignty of the country. Therefore, if the CBAR adopts e-manat, it will prevent private form of cryptocurrencies from destabilizing the financial and macroeconomic situation in the country.

### ***8.3. Financial Inclusion***

The motivations for the rollout of the CBDC differ among countries. While the developed countries do it in order to enhance the monetary and financial stability, the developing countries do it for financial inclusion, digitalization, and other important reasons (Didenko and Buckley, 2021). As a developing country, one of the primary benefits of the e-manat for Azerbaijan is the financial inclusion. As assessed in the sections above, the financial inclusion remains a thorny issue in the country as the certain portion of the people do not have a bank account or can benefit from the financial services. There are various factors at play including the lack of branches in the regions, lack of current accounts and other factors. While it is true that the CBAR has taken certain measures, such as the insurance scheme for the deposits, to increase the financial inclusion in the country, it has not risen to the desired level. Given all of those factors, the case for the adoption of the e-manat becomes even all the stronger. The existing literature lists several possible mechanisms of how the CBDC will contribute to the financial inclusion including the lowering of the cash, accessibility of the digital currency as well as the government payments to the individuals (Ozili, 2022).

In the specific context and case of Azerbaijan, it can be argued that the e-manat will contribute to the financial inclusion in the country through six means. First and foremost, it will lead to the digitalization of the value chain in the country. As the e-manat becomes the legal tender in the country, along with cash, the enterprises will be encouraged to use it for production, marketing, administrative and other purposes. This will create a spiralling effect and the citizens will also be able to use the e-manat. The second contribution is the access to the different financial services. In marked contrast to the traditional payment systems and the cash, the access to the e-manat will not require citizens to have a bank account. This is particularly important for Azerbaijan given the fact that getting a bank account, or a card can be quite cumbersome for people who do not have permanent and formal jobs. However, the universality of the CBDCs eliminates this problem. All the customers need is the working smartphone which does not need to be even connected to the internet. With this smartphone, the individuals in Azerbaijan can use the e-manat to pay for services, to send and receive money transfers and engage in other digital activities that they are not able to do at the moment. The third important contribution is the fact that the rollout of the e-manat is that it will lead to the enlargement of the digital sector in the country. With the introduction of e-manat, many companies in the country will develop their API to integrate with the system, which will further contribute to the development of the digital economy, which has been defined as one of the key targeted sectors for development in the country. Furthermore, the e-manat will lead to better and more efficient payment systems. Being a social market economy,

the country transfers money to its most vulnerable citizens. However, it is also a fact that sometimes embezzlement and misdirection of those funds also occur, leading to a deterioration of the situation for the vulnerable part of the population. What the e-manat can do is to help government directly pay those who are in most needs of those money. On the other hand, many vulnerable people do not have bank accounts or can access to the financial services in the country because they do not have a permanent job or collateral. However, the rollout of the e-manat will ensure that the vulnerable population have a collateral in the form of e-manat that originates from the government assistance that can be used as a collateral to access the financial services. What is equally important in terms of the financial inclusion is that e-manat can function without internet connection. Considering the fact that internet connection remains a problem in the country, the provision of the payment service without internet connection will provide a great boost to the country. Finally, the e-manat will cost much less for the consumers. The experience of both Bahamas and Ecuador shows that the transaction fees can be one of the decisive factors in the ultimate success of the digital currencies or the lack thereof. Since the e-manat will cost less than the existing digital payment systems, the CBAR can put very low transaction costs on the transactions made with e-manat. The low transaction costs will induce more people to embrace the system and will lead to greater financial inclusion.

## 9. Recommendations

One of the primary purposes of this thesis is to provide a set of recommendations for e-manat and how it can be designed and implemented. As noted earlier, the feasibility of e-manat is very meagre at the moment considering the high cash use and lack of necessary infrastructure. However, in the next section, a strong case has also been laid out with potential benefits and advantages of the introduction of e-manat for the country. In this section, five recommendations will be outlined for the country follow with the first recommendation being dedicated to the overall conceptual matters. The next three recommendations will be dedicated to the technical and the operational aspects of the e-manat and the final recommendation will shed light on what kind of changes are required for the CBAR to start issuing e-manat.

### *9.1. Conceptual Recommendations*

Although the central banks are currently issuing digital currencies, the work on the CBDC traces its origin back to the beginning of the 2010s. As noted above, the central banks in different countries have different objectives as to what they aim to achieve with the rollout of the CBDC. The first recommendation for the CBAR is also to set out a clear strategy and define the clear objectives that it seeks to achieve. Whether it is about increasing efficiencies of the existing



payment systems or facilitating more financial inclusion, the CBAR must be very careful in not pursuing the CBDC for its own sake, but rather for achievable purposes. The biggest difference between the developed and the developing countries with regards to the CBDC is that while the developed countries are seeking to harness from the potential of the block chain technology, the developing countries are planning to use CBDC for specific purposes (Cheng, Lawson, and Wong, 2021). As a developing country, Azerbaijan needs to design specific purposes for the possible e-manat rollout with the most optimal focus being on the use of e-manat for payment purposes as well as to increase the financial inclusion. An analysis of the successful experiences of the CBDC also suggests that central banks usually do tests and pilots in secluded parts of the country before the official and country-wide rollout. For instance, the Bahamas started experimenting with the Sand Dollars in two islands and China restricted to the trial experiments to the four large cities. It is the assessment and the recommendation of this paper that Azerbaijan and CBAR also follow in their footsteps and do local trials before the official and the widespread launch. On the other hand, there are various benefits to having localized CBDC experiments. First and foremost, it will allow the CBAR to gather a useful experience with the design and the operations of the e-manat and make necessary changes as warranted by the working of the system and the popular reaction to it. On the other hand, it will allow the CBAR to see how people and the business community are reacting to it. This brings up another issue, which must be seriously considered by the CBAR before the official rollout of the e-manat, which is how the people will reach to it. The failed experience of Ecuador is a stark reminder that the eventual success or the lack thereof depends on the merchant and the popular reception of the CBDC. If the people are not comfortable with using the e-manat, they will always switch to the cash, which will also be available along with CBDC (Browne, 2021). Therefore, it is in the best interest of the CBAR to ensure that people are quite familiar with using the digital currency. Before taking any step towards the promotion of the e-manat, the CBAR must undertake a rigorous study of digital currency in the country through research, surveys, and expert discussions. On the other hand, the CBAR must work with other governmental bodies as well as the private institutions to encourage the use of the e-manat.

In the modern monetary policy, the central banks are using wide range of unconventional monetary policy one of which is the forward guidance. Forward guidance refers to the policy tool of the central banks to shape the expectation of the economic actors towards its future foreign policy directions (Hagedorn et al, 2018). The CBAR must also formulate a forward guidance strategy with regards to the e-manat through efficient and clear communication strategies. The rollout of the digital currency is not a petty task for central banks. As a matter of fact, many economic actors are anxious or worried about the potential implications of the digital currency on their liquidity

and business profitability with the financial institutions being the most important ones. The Central Bank of Bahamas has understood this very clearly. In his interview with Bloomberg, the Chairman of the bank stated that, the economic actors and in particular, the financial institutions had qualms about how the experiment will affect them. However, the company had devised an excellent communication strategy to allay the fears that the digital currency will negatively impact them. In its communication and marketing strategy, the central bank of Bahamas made it extremely and crystal clear that the private institutions will become a part of the experiment. The CBAR should also devise such a communication roadmap and conduct effective communication and marketing strategy in order to get support from wide range of stakeholders in the society.

## ***9.2. Design and Technology Choices***

As noted earlier, there are mainly two design choices for the CBDC including the retail CBDC and the wholesale CBDC. So far, most of the pilot experiments have been done in the retail CBDC as the countries try to develop innovative payment solutions (Allen et al, 2021). It has also been mentioned that there is a difference between the developed and developing countries when it comes to the introduction of the CBDC. Azerbaijan is a developing country and the major possible motivation behind the introduction of the CBDC is to enhance the efficiency of the payment systems and increase the financial inclusion in the country. The practice so far demonstrated that the most optimal way to achieve those end goals is the retail CBDC. Therefore, it is also recommended for Azerbaijan to implement a retail e-manat, as opposed to the wholesale e-manat for the following reasons. First and foremost, it will be equal to the cash although with more added benefits. The consumers will be able to use it as cash and more importantly to make transfer and payments online. Secondly, it comes at no cost to the consumers who do not have the traditional banking accounts or the adequate amount of cash. Finally, the retail e-manat would allow the government to make direct payments to the citizens, especially those who need it the most.

In the context of the CBDC discussions, one of the most often talked about issue is the impact it will have on the monetary policy. The theory is that if the CBDC carries an interest, it will allow the central banks to manage the monetary policy much more effectively. However, the assessment of this paper and the recommendation for the e-manat is that there should not be any interest on the e-manat, at least initially. First and foremost, no country in the world, has so far experimented with the interest-bearing CBDC (Garratt and Zhu, 2021). The CBAR applying interest rates to the e-manat has the potential to cause consequences that it is not prepared for. Secondly, the application of the interest rates to e-manat can heavily impact the financial and the monetary stability in the country. That is because the commercial banks will have to offer higher interest rates than the one offered by the e-manat. To compensate their losses, the commercial banks will

have to increase their lending rates, which will lead to the credit crunch in the country. Furthermore, in order to better use the interest rates on e-manat for monetary purposes, the CBAR might be forced to decrease the interest rate on lending, to the point of zero or negative interest rates. Having the value of their money dwindled by the CBAR might not bode well among the population in the country. Therefore, it is the assessment and the recommendation of this paper that the CBAR not be applying any interest on the e-manat, at least initially. Another important issue in the context of the CBDC is the worry that the rollout of the CBDC will lead to the financial disintermediation in which the commercial banks will find it much harder to gather deposits. The central banks and the international organizations offer several solutions in order to prevent that from happening all of which involves the active participation of the financial institutions in the rollout of the CBDC. The CBAR can also follow in their example and engage the private sector in the development and the introduction of the e-manat because of the fact that it will not cast aside the financial institutions as well as allow the CBAR to tap into the rich experiences of the commercial banks in handling payments. In terms of the specific examples of how the central banks aim to prevent the financial run from happening, the most relevant and recent example is that of the Bahamas. In an effort to prevent people from accumulating too much CBDC to the detriment of the commercial banks, the central bank of the country has imposed limits and restrictions on the CBDC holdings of the citizens and the companies. The CBAR can also follow in their example and impose e-manat holding restrictions in order to prevent the financial disintermediation from happening. In a likely case of bank run, the CBAR can also become the primary lender to the commercial banks and provide them with the deposits, which would make the CBAR the “the lender of first resort”. In the context of the design process, another important issue is the digital wallet, i.e., how it will be operated and maintained and how will have the access to the data. The experience and the theoretical arguments show that the two-tier system is the most optimal option. In this system, the commercial banks and the other financial institutions would have custodian accounts at the CBAR which will be inter-operable. On the user-end, the major responsibility will be delegated to the financial institutions themselves. To give one example, the Bank of England has announced plans on Payment Interface Providers (Allen et al, 2021). The CBAR can also follow this direction and delegate the account management to the authorized financial institution. By doing so, the CBAR will not have to bother itself with the unfamiliar account management procedures, tap into the rich expertise and the experience of the private institutions. The Digital Yuan also has a similar operating model. One final issue is the ledger. In other words, where the ledger will be held and who will have the control over the management. The ledger structure for the e-manat should meet the conventional criteria for information security including the confidentiality, the availability, and the security. The practice shows that the

distributed ledger technology is the best and most optimal options for the CBDC (ibid). The major component of the distributed ledger technology with regards to the CBDC is the state-machine replication, which is the process by which the devices constituting the ledger copies and maintains the transaction history. There are three types of state-machine replication. It is the assessment of this paper that the CBAR follows the semi-centralized or the permissioned state-machine replication infrastructure. In marked contrast to the other types of the centralization including the centralized and decentralized, in the semi-centralized system, a consortium runs the system, and the data is shared and maintained by different devices albeit all under the control of the central bank. This type of centralization would allow the CBAR to run the system much more effectively while engaging the private sector and tapping into their expertise.

### ***9.3. Operational Issues***

Another important issue with the CBDC is the operational aspects of the digital currencies because this will heavily factor in the eventual success of the e-manat or the lack thereof. Now that the infrastructure aspects of the proposed e-manat have been covered, it is important to look at the other aspects of the operations including the account management, the digital wallets, privacy, and the transparency. The overwhelming consensus with regards to the operational structure of the CBDC is that the two-tier system is the most optimal way of going about the CBDC (CBDC WG, 2021). If the CBAR follows that system, it will be responsible for the minting as well as the redeeming of the e-manats whereas the onboarding, the marketing, distribution, and the clearing will be undertaken by the commercial banks and other authorized financial institutions. In terms of the account management, the existing practice and the theoretical argument favours the decentralized account management. It would be the most optimal course of action for the CBAR to delegate the account management to the financial institutions which has rich experience in individual and business account management and to manage the custodian accounts itself, which will be the e-manat accounts of the banks and financial institutions in the CBAR.

Equally important issue in the operation of the CBDC is the security. Unless the infrastructure and the system are secure enough for the e-manat, there will be popular resistance and lack of interest in the e-manat. The first important issue that needs considering is the user identity. The CBAR will have to put in robust technology to ensure that people are not signing up for the e-manat on behalf of others. There are various methods for identity check including in-person checking, the online checking, the biometric verification, the social media networks, and others. The final choice will largely depend on the accuracy and the cost-effectiveness of the user verification procedures. Equally important issues in this context are the user and the transaction authentication. The CBAR must ensure that the transactions being conducted on the platform are done by the real people for

the real purposes. The existing practice usually follows the following procedure. If the user A wants to send money to the user B, the A must authenticate himself or herself to the wallet and upon the identification of the user A, the instruction is sent to the wallet of user A who uses a secret key to digitally sign a transaction and send it to the CBDC central bank ledger for recording. This is the common practice so far and in order to secure the certain level of security to the system, the CBAR should also follow a similar or the same procedure. The privacy and the transparency are other important issues that the CBAR must take into account. Unlike the private digital currencies, it is not possible, nor it is desirable to achieve a full anonymity for the e-manat because the full anonymity has the potential to lead to the fraud and other illegal activities (Bindseil, 2020). The central banks often suggest using a pseudonym instead of the other identifiers, but such approach is still not immune to the cyber-attacks. The other suggested solution is to relay the network dynamics through the third person proxies. Other critical issue in the context of the security is the privacy. The academic consensus is that the central banks will try to strike a balance between the confidentiality and the security. In particular, the imperative for the CBAR is to maintain privacy while making sure that the individuals are not able to spend more than what they have. The common practice is the use of the zero-knowledge proofs, which would allow the CBAR to prevent the overspending by the consumers while ensuring that the transactions done on the system are confidential to the greatest extent possible.

#### ***9.4. Implementation of E-Manat***

Another equally important matter is the implementation of the e-manat. Regardless of how impeccable the design and the technicalities of the system are, e-manat will face significant hurdles if the implementation does not go well. The existing world practices reveal that there are four particularly important issues that the central banks should consider. The first one is the pilot and the experiment stage. Before a country-wide rollout, almost all the currently available digital currencies have gone through the pilot stage. Therefore, it is also recommended for the CBAR to conduct an experiment on the viability and the feasibility of the e-manat in a limited environment. China has conducted the experiment in four large cities and Bahamas had restricted it to two islands. Azerbaijan can conduct a pilot experiment in Alat Free Economic Zone. This will allow the CBAR to learn how the people will react to the e-manat as well as allow the CBAR to gather useful experience in the future rollout of the digital currency. The second important recommendation for the CBAR pertains to the role of the big payment providers in the future rollout of the e-manat. The experience of the successful digital currencies so far suggests that in those countries, the central banks usually choose to work with the biggest payment providers in the country (CBDC WG, 2021). That is due to the fact that those financial institutions have already

gathered rich and the necessary experience in the payment systems and the central banks do not wish to crowd them out from the payment systems. Therefore, it is recommended for the CBAR to collaborate with the large financial corporations and the payment service providers as well as the banks in the country. If we look at the existing payment systems in the country, it is easy to see that the banks and other payment providers play a significant role in it. The CBAR should strive to build effective cooperation with them in order not to bother itself with something that the private institutions have already gathered experience in. In the context of the implementation of the e-manat, another important issue is the popular reception by the people. Unless there is an adequate interest in the e-manat, there is always a possibility of failure. Communication and the promotion by the central banks are some of the most efficient ways to enhance the popular interests in the e-manat. However, the practice has also demonstrated that digital currencies tend to gather much more interests if there are certain economic incentives. For instance, in Sweden, private companies and the financial institutions are offering certain benefits for the people to join the system. El Salvador, a country which has adopted bitcoin as the legal tender, offers 20 dollar signing bonus for people who download and use the bitcoin wallet. If CBAR wants to increase popular reception to e-manat, it is important that CBAR, in cooperation with the private sector also undertakes same or similar promotional measures to incentivize people to join the system. On the other hand, the education and the financial literacy is heavily important in the eventual success of the e-manat. As noted earlier, the aversion to the adoption of digital currency in Ecuador played a significant role in the eventual demise of the currency. The CBAR must avoid creating confusion among the people as the purpose and the functions of the e-manat. Considering the fact that a cash still plays a huge and important role in the society and not everybody has a smartphone or the internet access, it is important to underline that the e-manat will be used along with cash and the bank accounts. In other words, the CBAR must convey to the e-manat will be equal to cash and the government is guarantor of its usability and viability. Only under those circumstances, the CBAR must be able to instil a popular reception to it by increasing the trust of the people towards the currency and cementing its credibility among the general population.

#### ***9.5. Legal and Regulatory Issues***

The central banks including the CBAR are natural institutions with certain degree of independence and the laws governing their mandate, functions, and the responsibilities as well as their relationship with the state and state bodies. The rollout of the CBDC also creates important legal implications for the central bank laws including the law on the CBAR. In its latest publication, the IMF has put forth two important legal issues that the central banks will need to consider: Do they

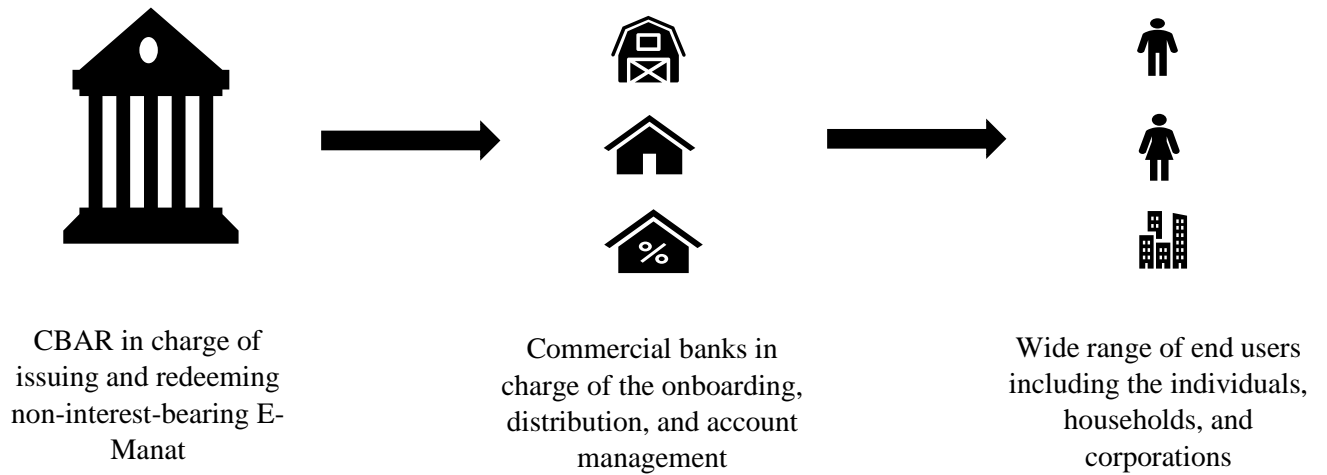
have a right to issue digital currency and what will be the status of the digital currency with regards to the monetary law?

Going through the Law on CBAR, one might argue that the CBAR does not have the power to issue digital currencies. However, the fact of the matter is it already has a digital currency in that it issues electronic money to the commercial banks. The IMF stresses that with regards to the legal authority of the central banks to issue digital currency, two issues must be considered. If the law on the central bank talks about the broad meaning of the currency that the central bank is authorized to issue or if the functions of the central banks give it a broader power to issue any currency to fulfil its mandate, it is already authorized to issue digital currency. However, the wording of the Law on CBAR clearly reveals that the law only talks about the powers of the CBAR to issue coins and banknotes to fulfil its mandate. This makes it extremely clear that the CBAR, at the moment, does not have a power to issue digital currency. Therefore, it is important for the CBAR to have a mandate for the issuance of the CBDC, considering the fact that the issuance of the digital currency is a contentious process that is fraught with other difficulties. Any change on the status of the CBAR and its ability to issue digital currency can be done by the parliament of the country. If the CBAR goes for the token-based issuance, the parliament of the country needs to make relevant amendments to the existing law and remove the references to the banknotes and the coins and allow the CBAR to issue currency in any formats that it deems suitable to fulfil its mandate. However, if the CBAR wishes to go for the account-based e-manat issuance, the law must make it explicitly clear that the CBAR can open digital currency accounts for the general public either through directly or through a categorization of the people and the economic entities.

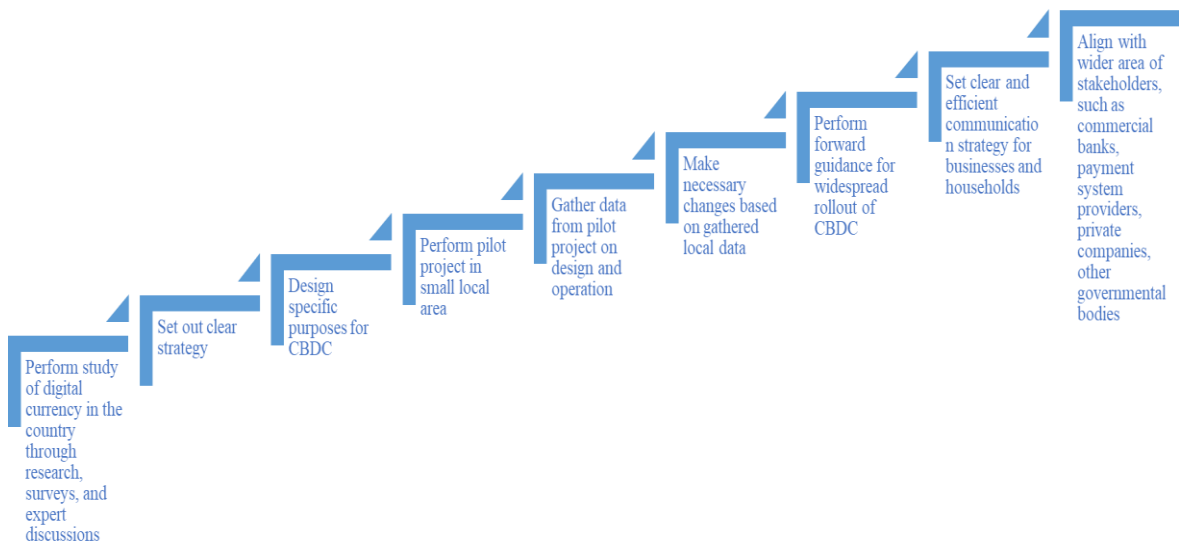
In addition to the amendment of that relevant law, other important issue is the compliance and the privacy. In order to prevent money laundering and fraud, the governments have put in place various laws and other measures. The same is also true in Azerbaijan. However, the issue is whether they will be applicable to the e-manat, considering the fact that they all talk about one form of money. On the other hand, the susceptibility of the digital currencies to the fraud is not less than the conventional currencies. Therefore, the CBAR needs to analyse and assess whether the e-manat will be subject to the existing legislation on the money laundering and fraud. If not, the parliament of the country will need to make relevant amendments and changes to the existing legislation to ensure that the digital currency is not immune from the money laundering legislation. Additionally, the privacy and the confidentiality aspects of the CBDC also raises important question. To what extent the CBAR can guarantee the privacy of the user accounts and transactions while ensuring that the system can be investigated by the authorities for fraud and laundering is also another important issue needing consideration. Finally, the CBAR needs to adopt its own internal rules as

to how it will manage the e-manat. In particular, the CBAR needs to adopt a rule or law that would allow it to retrieve the money that has been stolen or has been addressed to the wrong recipient.

### Possible Design of E-Manat



### Step-up process required for E-manat rollout in Azerbaijan





## 10. Conclusion

The CBDCs are gaining an immense popularity among the central banks of the world. The central banks in different countries seem to have different motivations for adapting the CBDC. While the developing countries do it for payment and financial inclusion purposes, the developed countries seem to do for the sake of innovation and preventing the private cryptocurrencies from gaining too much power. Regardless of the motivation, the CBDCs are seeing massive pilot projects and in some cases, actual implementation. The purpose of this research project was to assess the suitability of the CBDC for Azerbaijan and to come up with concrete recommendations as to how the country can implement an e-manat concept.

The research paper was composed of several parts. Starting with the introduction, the paper provided a comprehensive literature review. In particular, the paper touched upon the operational, design, the implementation, implication, and the legal aspects of the introduction of the CBDCs. CBDC is often defined as the digital version of the fiat currency, to put in layman's terms. It will be a third addition to the currency system that is composed of cash and the bank deposits with same functions. As of now, around 9 countries have officially rolled out their digital currencies with over 80 exploring the concept and 14 doing the pilot projects. There are various advantages and the disadvantages to adopting a digital currency. The central banks around the world and the international financial institutions often argue that the CBDC will help the countries to achieve financial inclusion and increase the efficiency of the payment systems. On the other hand, the implementation of the CBDC will also come with certain benefits in terms of monetary policy. The overwhelming consensus in the academic and the policy circles is that the CBDC will allow the central banks to break the "zero bound lower". However, in addition to the positive aspects of the CBDC, there will also be numerous negative implications including the fact that it can lead to the disintermediation of the commercial banks from the financial system. Due to the dearth of long-term experience with the CBDCs, there is not an established solution for how the central banks can prevent that from happening, but there are various theoretical arguments to do so including active participation of the commercial banks in the CBDC rollout and design, placing caps on how much money can be held in CBDC or central banks directly providing funding to the commercial banks. The comparative case analysis of Ecuador and the Bahamas laid out the factors that led to the failure in the first case and the success in the second case.

A paper also provided a significant space to the analysis of the financial digitalization in Azerbaijan with several metrics. A close diagnostic analysis of the financial digitalization reveals that it falls in the average category of digital financialization. To answer the question of whether

or not the country is ready to embrace the digital currency, the research project came to the conclusion that the country is not ready yet to embrace the digital currency. There are several reasons for that with the most important one being the fact that cash usage in the country is high compared to the countries that have implemented the CBDC. The second factor is the low financial digitalization and the lack of trust in the electronic currencies. The final important factor is the lack of necessary technological infrastructure and legal mandate of the CBAR. However, the research paper also laid out a compelling case for the introduction of the e-manat. First and foremost, the introduction of the e-manat will allow the country to improve the efficiency of the payment systems in the country. Secondly, it will allow the government to expand the financial inclusion. Finally, used properly, the CBAR can also use the CBDC for the monetary policy purposes. However, there are also several common dangers of the CBDC that the CBAR needs to pay attention to. The argument of the paper is that if the country wants to implement the CBDC successfully, it needs to pay close attention to the successful experiences of the countries. The experience of the Bahamas and the Ecuador provides a rich and the insightful lessons in terms of the factors that play the most decisive role in how the CBDCs are implemented. As the case studies demonstrated, there were several factors that played an important role in the failure and success of Ecuador and the Bahamas, respectively. Lack of popular reception, the opposition of the commercial banks as well as the flawed technical designs, lack of clear communication were some of the key reasons why Ecuadorian experience with the CBDC fell short of the expectation. In marked contrast, the localized experiment, clear communication strategy, the active involvement of the private banks and institutions as well as the excellent technical designs and the infrastructure played some of the key and most important roles in the eventual success of the experiment with the CBDC.

A significant portion of the research project was dedicated to the recommendations. In particular, the research project proposed recommendations in several important areas starting with the general and the conceptual recommendations. The conceptual and the general recommendations covered as wide areas as the objectives of the digital currency in Azerbaijan and the communication and the promotion strategy of the CBAR. In particular, the paper suggested that the CBAR should do the CBDC experiment in a local setting, as has been done by several central banks. This will help the CBAR to gather important insights and lessons as to how to best roll out the e-manat. The purpose of the conceptual recommendations is to help the CBAR to specify what it intends to do with the e-manat and how it can learn from the experiences of other countries. The second sets of the recommendations pertain to the technical designs and the choices. There are two types of the CBDC in existence the first of which is the retail and the second one is the wholesale. As noted

earlier, the main motivation of the developing countries in rolling out the CBDC is to increase the efficiency of the payment systems and the financial inclusion. The theoretical arguments and the experience so far suggest that the retail CBDC is the most optimal way to achieve those objectives and it is recommended that the CBAR also rolls out a retail CBDC. That is because the retail CBDC will allow the CBAR to increase the efficiency of the payment systems and include more people in the financial system without disrupting the intermediary role of the commercial banks. In terms of the structure of the CBDC, most countries are planning to implement a two-tier system whereby it is the CBAR who does the issuance and the redeeming of the digital currency and delegates the distribution, onboarding, and the other important day to day tasks to the commercial banks. Such structure would allow the CBAR to involve private sector, in particular, the commercial banks in the design and the implementation of the e-manat. The commercial banks will have custodian accounts with the CBAR, and the individuals will have digital wallets attached to the accounts at the commercial banks. In terms of the implications of the digital currency for the monetary sector, the interest rates on the CBDC are one of the most commonly discussed issues. This research paper suggests that CBAR not to put any interest on the CBDC because there is uncertainty about the potential implications of such interest rates, and it is unknown how the ordinary people will react to the imposition of negative interest rates on their digital currency holdings. On the other hand, no central bank has ever imposed an interest on the CBDC either through pilots or the actual implementation and the full impact of such move remains to be seen.

Another recommendation related to the operational issues of the CBDC, in particular, the operation, the security, transparency as well as the data privacy. The preferred system of structure with regards to the CBDC is the two-tier system whereby CBAR takes the role of minting and redeeming the currency and the commercial banks handling its distribution and the customer onboarding. The CBAR also needs to put in place strong security and privacy measures in order to increase its appeal among the general population. When it comes to the implementation of the e-manat, the research paper provided three general recommendations. First and the foremost, the CBAR should conduct a localized experiment to test out the e-manat. Secondly, the CBAR should ensure the active participation of the commercial banks in the process. Finally, the CBAR should conduct an effective and the articulate communication strategy in order to stir up interest in the e-manat and ensure people of the safety and the security of the new digital currency. Finally, the paper also provided certain recommendations with regards to the legal aspects of the CBDC. In particular, the paper argued that since the law on the CBAR specifically mentions the cash and the bank deposits as the sole authority of the CBAR, it is imperative that the existing law be changed to include the authorization for the rollout and the printing of the e-manat. On the other hand, the

paper also suggested that the CBAR should formulate its own internal management laws in order to deal with any contingency that might arise.

In addition to the CBAR, there is also a strong motivation and case for the business and private players to be involved in this project. The experience of Bahamas shows that one of the key success factors is the active engagement and participation of the private sector in the design, rollout, implementation, and the management of the CBDCs. Therefore, the private sector also has so much to gain from the introduction of the e-manat as they will be in charge of the onboarding account management and the distribution of the digital currencies to the citizens. The potential damage to their deposit bases can be mitigated by the CBAR measures such as limits on e-manat holding or in the most extreme case, CBAR providing liquidity to the private banks.

To conclude, the paper provided an incisive analysis of the CBDC that is being researched, tested, piloted, and implemented all around the world. Not to fall behind of those central banks, it is important that the CBAR also begin its work on the CBDC. On the other hand, the fact that various countries are working on the cross-border CBDC comes with the practical implications for the CBAR. For instance, the cross-border CBDC has the potential to increase the dollarization in the country unless the CBAR comes up with its own CBDC. The content of these recommendations are good starting points for the CBAR to begin the work on the CBDC and explore and pilot it.

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