

ISSN 1727-9917

SERIES

STUDIES AND
PERSPECTIVES

ECLAC SUBREGIONAL
HEADQUARTERS
FOR THE CARIBBEAN

Opportunities and risks associated with the advent of digital currency in the Caribbean

Shiva Bissessar



UNITED NATIONS

ECLAC

STUDIES

AND

PE

SPEC

TIVES

Opportunities and risks associated with the advent of digital currency in the Caribbean

Shiva Bissessar



UNITED NATIONS



This document has been prepared by Shiva Bissesar, consultant of the Caribbean Knowledge Management Centre (CKMC), of the Economic Commission for Latin America and the Caribbean (ECLAC), subregional headquarters for the Caribbean. Additional contributions were made by Robert Crane Williams, Associate Information Management Officer of CKMC. The paper was prepared under the supervision of Peter Nicholls, Chief of CKMC.

The views expressed in this document, which has been reproduced without formal editing, are those of the authors and do not necessarily reflect the views of the Organization.

It should be noted that throughout this report several references are made to various businesses with operations involving digital currency. The use of such references is for illustrative purposes only, to assist the reader in understanding the various business models and aspects of the digital currency ecosystem. Such references should not be misconstrued as an endorsement for any particular vendor or the viability of their products and services.

United Nations publication
ISSN1727-9917
LC/L.4131
LC/CAR/L.482
Copyright © United Nations, January 2016. All rights reserved.
Printed at United Nations, Santiago, Chile
S.15-01234

Member States and their governmental institutions may reproduce this work without prior authorization, but are requested to mention the source and inform the United Nations of such reproduction.

Contents

Abstract	5
Introduction	7
I. Digital currency explained	11
A. Transactions, mining, and the block chain	13
B. Platforms for digital currency exchange	15
C. Anonymity	15
II. Digital currency policy development in an international context	17
A. Regulation and legislation	17
1. United States Financial Crimes Enforcement Network (FinCEN).....	17
2. New York State Bit Licenses	18
3. Canadian legislation	20
B. Preventing illegal activities	20
C. Exploring opportunities and risks	21
1. The United Kingdom call for information	22
2. European Banking Authority (EBA).....	23
D. Classification and taxation	26
III. Digital currency activity in the Caribbean subregion	29
A. Barbados	29
B. Trinidad and Tobago	30
1. Public awareness from the Central Bank	30
2. Recognition from the private sector	30
3. Calls for objective evaluation.....	31
4. Opportunities for digital currency mining.....	31
C. Saint Kitts and Nevis.....	32
D. Dominica	32
1. “Bit Drop” event	32
2. Bitcoin ATMs	33
E. Survey of Caribbean central banks.....	34

1.	Guyana	35
2.	The Bahamas.....	35
3.	Comparative analysis	35
IV.	Innovating Caribbean payment systems	37
A.	Mobile money	38
B.	Digital Financial Services (DFS)	40
C.	Remittances.....	41
D.	Novel payments in perspective	42
E.	The case for exploring innovation.....	43
V.	Recommendations and conclusion	45
A.	Recommendations.....	45
B.	Conclusions.....	48
	Bibliography.....	49
	Annexes.....	53
	Annex 1.....	54
	Annex 2.....	55
	Studies and Perspectives Series: issues published.....	61
Tables		
TABLE 1	CARIBBEAN MOBILE MONEY DEPLOYMENTS.....	39
TABLE A.1	EUROPEAN BANKING AUTHORITY RISKS.....	55
Boxes		
BOX 1	VIRTUAL CURRENCY, DIGITAL CURRENCY, AND CRYPTOCURRENCY: THE TERMINOLOGY	12
BOX 2	THE UTILITY AND MISUSE OF ANONYMITY TOOLS.....	16
BOX 3	ISSUES WHICH BITLICENSE ATTEMPT TO COVER PER ORGANIZATION.....	18
BOX 4	THE EVOLUTION OF MONEY CONTINUES.....	22
BOX 5	EUROPEAN BANKING AUTHORITY TWENTY RISK DRIVERS OF VIRTUAL CURRENCIES.....	24
BOX 6	LESSONS FROM MT. GOX, AND THE BROADER CONCERN OF SECURITY	25
BOX 7	CLASSIFICATION AND TAX TREATMENT IN VARIOUS JURISDICTIONS.....	27
BOX 8	FROM M-PESA TO PAYM	38
BOX A.1	UK CALL FOR INFORMATION ON DIGITAL CURRENCIES.....	54
Figures		
FIGURE 1	DOMESTIC ELECTRICITY TARIFFS ACROSS CARIBBEAN, SEPT 2012	32
FIGURE 2	COST OF REMITTANCE AS PERCENTAGE FOR EIGHT CARIBBEAN NATIONS	41
Diagrams		
DIAGRAM 1	EXAMPLE DIGITAL CURRENCY PAYMENT TRANSACTION	13
DIAGRAM 2	SWOT ANALYSIS OF DIGITAL CURRENCY IN TRINIDAD AND TOBAGO.....	31
DIAGRAM 3	COMPARISON OF ELECTRONIC PAYMENTS SYSTEMS.....	43

Abstract

This report examines the usage of digital currency technology in the Caribbean subregion with a view to drawing attention to the opportunities and risks associated with this new phenomenon. It discusses the broader context of an emerging activity at the global level and considers how this technology could address subregional deficiencies in the electronic payment infrastructure.

The report also discusses mobile money solutions, and the relationship of that technology to digital currency.

This study utilizes three main sources of data collection: a literature review of subregional and international sources, a solicitation of views from experts in various fields engaged in the sphere of electronic payments, and a formal survey of the subregion's Central Banks regarding awareness of digital currency and mobile money in the evolving landscape of electronic payments.

The report seeks to present Caribbean policy makers with information to begin the process of performing a balanced evaluation of opportunities and risks associated with digital currency in the Caribbean. The study finds that the Caribbean could benefit from innovations to payments technology. While digital currency and mobile money are technologies that could make a contribution in this area, their development is retarded by a reluctance to engage with them on the part of financial regulators. There is a need to expand the scope of participation in the regulatory process to include institutions that advocate for and promote innovation.

Introduction

Many Caribbean countries have long endeavoured to increase national participation in the digital economy. In the case of Trinidad and Tobago, for example, formal efforts to improve the legislative and technological infrastructure to facilitate e-commerce date back to 1999 (National Electronic Commerce Policy Committee, 2000). In the ensuing fifteen years, however, progress has been slow and the challenge continues to engage the attention of national authorities. There is need for a more effective enabling environment that supports the efforts of small and medium enterprises (SMEs) to provide e-commerce services. The sector has therefore yet to grow to its potential. Among the greatest challenges the e-commerce sector has faced, both in Trinidad and Tobago, and throughout the Caribbean subregion, are difficulties surrounding banking and the use of electronic payment systems.

New technologies are emerging that have the potential to address this deficit in electronic payment infrastructure. Digital currency and mobile money solutions are components of new industry classifications referred to as Financial Technology (FinTech) and Digital Financial Services (DFS). These technologies are swiftly evolving, and it will be some time yet before they reach maturity and generate widespread usage. In response, even at this early stage, regulators in financial capitals around the world, including New York, London and Singapore are all examining ways to enable the technological innovation offered by digital currency and related technologies, while putting measures in place to mitigate a number of risks that have been associated with their broader adoption.

Authorities in Caribbean countries would be well-served to follow a similar approach, but many have limited awareness of these technologies. Others harbour deep concerns about the risks associated with digital currencies. Some policy makers may be inclined to push for an outright ban on digital currency technologies, or at least a delay in their adoption for an extended period of time. However, the global and decentralized nature of digital currencies means that this course of action would be unlikely to be effective. It could also come at a high cost to Caribbean innovators, foreclosing a potential avenue for economic growth. Further, as this study will illustrate, the ability of Caribbean regulators to contain the risks of this new technology will largely be determined by their ability to engage constructively with the FinTech industry and with the broader digital currency community. Thus, a more proactive engagement on this issue is needed.

To that end, in an effort to help establish a Caribbean discussion on the topic of digital currency, and to gather information needed for this study, ECLAC convened two Expert Group Meetings (EGMs) on the opportunities and risks associated with the advent of digital currency in the Caribbean¹. The experts at these meetings sought to examine the current state of e-commerce and mobile money solutions in Caribbean countries, to consider the implications of the introduction of these new technologies, and to explore options available to Caribbean authorities seeking to construct an appropriate policy response.

The experts at the meetings were selected to be representative of different countries within the Caribbean subregion, as well of various groups that may have an interest in digital currency. At the meetings, government experts in the areas of money laundering, policy development and law discussed their concerns with digital currency and mobile money vendors seeking to develop services for the Caribbean market. They also considered how improvements to the subregion's payments infrastructure could benefit participants in the e-commerce industry, who were also represented at the meeting.

The following issues were notable as among the key concerns discussed at these EGMs:

- Challenges exist in e-commerce payment infrastructure in the Caribbean subregion that may constrain the ability of small and medium-sized enterprises (SMEs) to participate in the digital economy². Digital currency and mobile money solutions could potentially be used to overcome these challenges.
- Financial authorities are mindful of a number of risks associated with the increased use of digital currencies, including money laundering, terrorism financing, consumer protection, and the use of digital currencies to fund trade in illicit goods, such as drugs, weapons, and child pornography.
- The concern over money laundering is especially salient in the Caribbean subregion, due to the “gray listing” of some Caribbean countries by the Financial Action Task Force on Money Laundering (FATF), and the continuing efforts on the part of these countries to comply with the transparency mandates of that international body.
- Efforts by digital currency and mobile money service providers to establish operations in the subregion have been stymied by regulatory uncertainty. For example, several vendors reported that they have been denied access to financial services —such as checking accounts— by banks in the subregion, and are operating with a degree of uncertainty as per how their operations will be categorized by financial authorities.

Another important finding of the EGM process was that there is potential common ground between the interests of regulators and of the digital currency industry. Industry participants stand to benefit from the timely establishment of national regulations that enable vendors to gain a clear understanding of the terms for operation in Caribbean countries. Regulations could also have the effect of promoting public acceptance of these new payment technologies by enforcing consumer protection measures that could encourage broader trust in digital currency systems. However, in discussion at these meetings it was apparent that engagement between Caribbean regulators and digital currency industry participants has been limited.

¹ The meetings were held in December 2014 and March 2015.

² In light of this finding it is interesting to note that the struggle to find the key to increased participation in the digital economy stretches back as far as 1999 via work done by a Cabinet appointed National Electronic Commerce Policy Committee to establish comprehensive policy recommendations via “Preparing Trinidad and Tobago for Doing Business In The Interneted Global Digital Economy”.

It appears that there is a lack of balance in regulatory consideration of digital currency technology in the Caribbean. The role of international financial compliance bodies ensures that concerns over money laundering draw heavy consideration in the discussion, but there are no corresponding institutionally-driven imperatives that give appropriate countervailing weight to the needs of the subregion's technology and innovation sector. That is why it is important for regulators to consider all sides of the issue, weighing both the opportunities and risks that these new technologies may present. This report attempts to provide some of the background information needed to perform such a balanced assessment, and to present regulators with resources that can be used in further consideration of the issue.

To that end, this report entails an introduction to digital currency and places it in perspective of more traditional electronic payment systems and mobile money solutions. It updates the reader on the activities of digital currency and mobile money vendors who have been seeking entry into Caribbean markets, and examines the international context of policy development in these areas. Further, it explores the views of Caribbean Central Bankers with respect to how digital currency and mobile money can potentially assist the state of electronic payments and participation in the digital economy within their territory. Finally, it presents recommendations on how Caribbean authorities might proceed in exploring the issue within their own territories.

I. Digital currency explained

An objective evaluation of digital currency requires a basic familiarity with the concepts that the technology is built upon. To start this discussion, consider the question “Where does money come from?”

The current international monetary system took its present form following the dissolution of the Bretton Woods system in 1972, when the world moved away from reliance on currencies pegged to intrinsically valuable commodities, such as gold, to fiat money. Fiat money relies on the backing of Governments to ensure the acceptance of its currency as legal tender. It has value, in part, because Governments require that taxes be paid in legal tender, and this ensures that there will always be a demand for it. Money is thus widely considered to be a creation of governments, but the commercial banks also play an important role in the process of money creation. In its first quarterly bulletin of 2014, the Bank of England noted that “Whenever a bank makes a loan, it simultaneously creates a matching deposit in the borrower’s bank account, thereby creating new money”. The bulletin also cites the economist James Tobin’s 1963 reference to “fountain pen money” in recognition of economists who have spoken of money as being “created at the stroke of bankers’ pens when they approve loans”.

But this begs another question, what exactly is money? Before something can be considered money, it must possess three essential characteristics: it must serve as a store of value, a medium of exchange and as a unit of account. Hence, although fiat money has no intrinsic value, it still represents a store of value (as a promise to pay) such that its paper or coin representation can be exchanged for items of equivalent value, at a relatively stable rate of exchange allowing for future date purchases.

Therefore, at its very core, the concept of money is a reflection of popular confidence in the ability of a currency to support a system of value transactions. This confidence is typically upheld by nation states and their associated Central Banks. However the question now arises: if a portion of the population places confidence in an alternate system of currency, can such an alternate currency be considered as money? The arrival of new payment technologies with decentralized systems for ledger management, payment verification and currency supply, presents an opportunity to revisit traditional thinking on electronic payment systems and the fundamental character of money. These decentralized systems are called digital currency, with Bitcoin being the first and, to date, among the most prominent.

The Bitcoin payment system and currency was proposed in October 2008 by a person or persons using the pseudonym Satoshi Nakamoto. It became operational in January 2009. Bitcoin was heralded

as a revolutionary solution to challenges apparent in previously proposed electronic cash systems. These challenges centred on preventing the “double spend”³ of electronic tokens, as well as concerns regarding reliance on a centralized authority for the issuance of currency and verification of transactions within such a system. In Bitcoin, these challenges were overcome by the use of new “distributed ledger” technology. This decentralized system was implemented through a peer-to-peer model, similar in design to earlier networks used for file trading, such as Napster and BitTorrent⁴. The “peers” in the network collectively maintain a cryptographically secure public record of all transactions made using Bitcoin, which is continuously validated by the network and is open to verification by anyone with an understanding of the protocol. Bitcoin was proposed as “an electronic payment system based on cryptographic proof, instead of trust, allowing any two willing parties to transact business directly with each other without the need for a trusted third party” (Nakamoto, 2008).

As Bitcoin was the first digital currency, it will be used as an example to illustrate the workings of such systems. Throughout this paper the capitalized word Bitcoin will be used in reference to the payment system while “bitcoins”, written in lower case will be used in reference to units of the currency. This is in keeping with a commonly used standard within the Bitcoin community. It may be appropriate to begin with an explanation and clarification of various terms used within this report as presented in Box 1.

Box 1
Virtual currency, digital currency, and cryptocurrency: the terminology

The terms virtual currency, cryptocurrency and digital currency have been used interchangeably by some while others have recognized differences. Indeed, digital currency has even been used to describe mobile money solutions, hence some clarity is required.

In a 2012 paper entitled “Virtual Currency Schemes” the European Central Bank (ECB) defined virtual currency as an unregulated digital currency while electronic money and commercial bank deposits (both legal tender) were described as regulated digital currency. Virtual currency schemes which allow for bidirectional flow to and from the real economy, such as Bitcoin, were identified as type III virtual currency.

While the ECB paper does make a clear distinction between electronic money and virtual currency (i.e. electronic money is legal tender), it does not mention the term cryptocurrency. Virtual currency schemes are also recognized as being centralized or decentralized.

In their 2014 Q3 quarterly bulletin entitled “Innovations in payment technologies and the emergence of digital currencies”, the Bank of England (BOE) uses the decentralization of a scheme via the presence of a distributed ledger as a key criterion for qualification for classification as a digital currency. When distributed consensus on the ledger payment system is achieved using cryptographic techniques, these digital currencies are called ‘cryptocurrencies’. The bulletin recognises Bitcoin as the first crypto-currency, and cites Ripple as an example of a digital currency that is not a cryptocurrency, because it uses a non-cryptographic consensus method.

In this paper, we shall adopt the BOE terminology as described above and the term digital currency will be used to describe decentralized distributed ledger systems such as Bitcoin, Litecoin, Dogecoin, etc.

Source: European Central Bank (European Central Bank, 2012) & Bank of England (Ali, Barrdear, Clews, & Southgate, 2014).

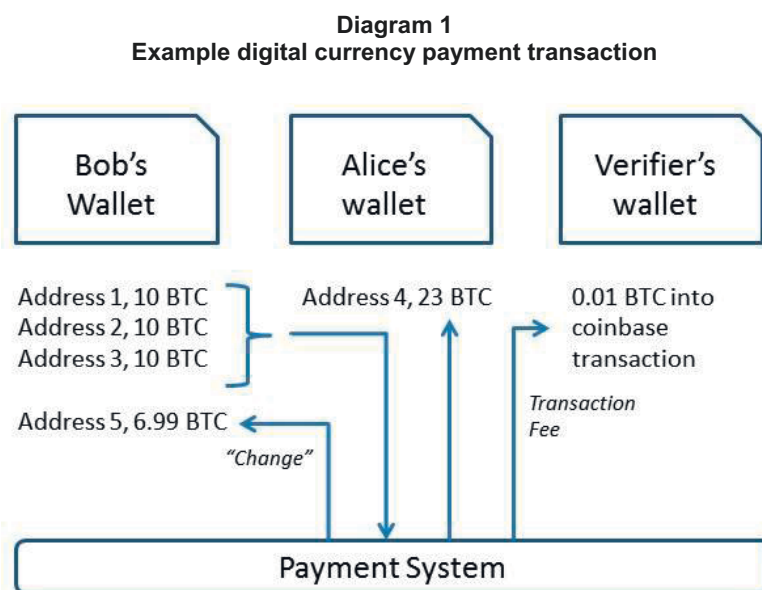
³ The risk of double spend is where person A uses the same units of e-money to pay person B and person C. Bitcoin reduces this risk by allowing for verification of “confirmed” transactions via its secure public ledger of transactions.

⁴ “Peer-to-peer” systems are computer networks that are characterized by a large number of endpoints that interconnect with each other. This is as opposed to a system, such as the World Wide Web, in which endpoint computers access information located on a central server. The peer-to-peer model first gained widespread consumer popularity with the release of the music-file trading service “Napster” in 1999. Bit Torrent, a later iteration of this type of technology, is currently widely used for trading video content.

A. Transactions, mining, and the block chain

Traditional monetary systems require the Central Bank to maintain a ledger of transactions within the commercial banking system that can be used to verify transactions between customers of the commercial banks. However, a distributed ledger-based digital currency system uses standard cryptographic techniques to maintain a public record of all transactions ever carried out within that system. Such a system does not require a central authority to maintain the integrity of the ledger of transactions, instead, the integrity of the public ledger is ensured through the mathematics of cryptography.

In the Bitcoin protocol, when two parties engage in a payment transaction, a record is created indicating that value has been transferred out of one or more “addresses” held in the “wallet” of one of the parties and into an address held in the wallet of another. This process is illustrated in Diagram 1.



Source: Shiva Bissessar.

Diagram 1 shows a transaction flow in which Bob seeks to transfer 23 bitcoins (BTC) to Alice. In doing so, Bob's digital wallet selects Addresses 1, 2, and 3, which together containing enough bitcoins to facilitate the transaction. Next, 23 bitcoins are digitally signed over to Address 4, which is controlled by Alice's wallet. The change from the transaction, in the amount of 6.99 bitcoins, is automatically returned to Bob's digital wallet via the newly created Address 5.

The record of this transaction is broadcast to the network, as a means of verifying that the funds being transferred have not already been transferred elsewhere in the system. This verification role is performed by special participants on the network called “miners.” Miners are constantly receiving the broadcasts of transactions on the network and verifying these transactions. However, these verified transactions do not automatically become part of the ledger of transactions. Instead, mining systems are required to expend computational power to solve a complex mathematical problem. Only upon the successful solution of this problem are the transactions which a miner has verified incorporated into a time-stamped entry on the distributed ledger. In the example from Diagram 1, a transaction fee of 0.01 bitcoin is transferred to the miner that successfully solves the computational problem needed to place the verified transaction into the distributed ledger.

Each set of verified transactions added to the distributed ledger is known as a “block.” Each block is cryptographically connected to all the blocks that have been generated before it, and to those which will be generated after. This sequence of mathematically linked blocks, which together record every transaction that has ever occurred in the system – are known as the “blockchain.” The cryptographic

connection between each block on the blockchain is so strong that it is considered to be virtually impossible to forge, given the limits of current technology and computing power.

The level of computational difficulty to create new blocks on the blockchain is managed so that all of the mining power on the network will yield one new block roughly every 10 minutes. Hence once a transaction occurs, the earliest time it can possibly be integrated into a block is the period of time remaining until the next block is created. So if a transaction occurs at the same point in time when the last block was created, at a minimum, the transaction can be integrated into a block approximately 10 minutes later. A transaction is considered fully ‘confirmed’ after it has been integrated into the blockchain at a level six blocks deep—that is, once five blocks have been added to the blockchain, subsequent to the block that records the transaction. This mechanism is intended to prevent against double-spend of bitcoins, but result in practical problems in terms of the speed of confirmed payment transactions⁵.

For the service that miners perform through the verification of transactions, they are compensated by receiving the previously-mentioned nominal fees attached to the payment transactions being verified. These fees are accrued to the miner on the network that successfully adds a block that the block chain that includes the verified transaction. In addition to these fees, they also receive a mining reward for having a block accepted into the block chain. This reward is a quantity of newly produced or “mined” BTC, provided via a “coinbase” transaction. Presently, from the miner’s perspective, collecting this reward is the primary objective of participating in the Bitcoin network.

Additionally, the quantity of the mining reward is reduced by half approximately every four years. With the initial mining reward quantified at 50 bitcoins per new block in 2009, and currently set at 25 bitcoins, the supply of mined BTCs placed into circulation therefore decreases at an increasing rate over time. This will taper off until the supply limit of 21 million bitcoins is reached, after which, no more new bitcoins will be created. Thus, the system is designed so that mining rewards will decrease over time, which implies that collecting fees will become an increasingly important means of compensation for Bitcoin miners. This supply limit implies that, if there is continued and expanding demand for the digital currency, the value of Bitcoin would be expected to increase over time. This deflationary aspect to Bitcoin has contributed to a widespread tendency among users to hold BTC as a speculative investment, which has undermined its use as a medium of exchange.

One characteristic of the process of mining digital currency is that it tends to require significant computational power.

This is due to the fact that, as Bitcoin increased in popularity, more people dedicated computing resources to getting the mining reward, and that has led to a steep increase in the computational difficulty required to add new blocks to the block chain. Hence, to successfully mine units of BTC today, individual miners have grouped themselves into “mining pools” with shared distributed computing resources and split rewards among all participants.

Some organizations have invested significant amounts of money in building out mining operations akin to server farms, using specially designed computer chips known as Application-Specific Integrated Circuits (ASICs), which function as dedicated Bitcoin mining hardware. This has led to the development of services marketed as cloud-based or digitally hosted Bitcoin mining operations, which consume significant quantities of electricity. Regions with low cost of electricity—including some in the Caribbean⁶—therefore have a competitive advantage which could be used to encourage the development a digital currency mining sector. However, this advantage must be weighed against the environmental cost of the high carbon footprint associated with Bitcoin mining.

⁵ Improving the speed of confirmed transactions is an active research area of digital currency.

⁶ See chapter III.

B. Platforms for digital currency exchange

In the early days of Bitcoin, it was feasible for any technology-savvy computer user to obtain a supply of bitcoins by setting up mining software on their desktop. Over time, as the Bitcoin network grew, so did the power requirements—both in terms of electricity and in terms of computing capacity. Today, bitcoin mining is generally performed at an industrial scale, and the investment necessary to mine a substantial amount of bitcoins has grown to a point well beyond the means of average digital currency enthusiasts.

Thus, the most effective means of obtaining digital currencies is by purchasing them directly. They may be purchased from individuals, through on-line exchanges, or through ATMs. Digital currency purchases from an individual are often facilitated through online communities—such as LocalBitcoins.com—and transactions commonly take place through in-person meetings. In exchange for cash, or other consideration, the seller of digital currency will initiate a blockchain transaction to move funds into an address controlled by the buyer. Many users prefer the in-person option as a means of obtaining digital currency because it is viewed as more difficult to track.

Digital currencies can also be transacted via on-line exchanges, of which there are many. These exchanges are Internet-based marketplaces that accept traditional means of electronic payment—such as credit cards or bank transfers—and provide customers with digital currency in exchange. They also provide a means for holders of digital currency to cash out their holdings into fiat currency. ATMs are another way of buying and selling digital currency. These are stand-alone machines that provide exchange services.

Platforms for exchange between fiat money and digital currency—such as online exchanges and ATMs—provide a natural point for the application of regulatory oversight. They are increasingly being regulated, especially with regard to ensuring compliance with anti-money laundering and “know your customer” (AML/KYC) standards, which requires identity verification of users, monitoring of transactions, and due diligence to reduce the risk of money laundering, terrorist financing, or identity theft.

By comparison, it is relatively difficult to impose this kind of oversight on the transfer of digital currency from one party to another, in cases where national currencies are not involved. This is due in part to the somewhat anonymous nature of digital currency transactions. However, because all transactions on the blockchain are public, the reputed anonymity of digital currency has significant limitations.

C. Anonymity

Bitcoin has a reputation as being able to support untraceable financial transactions, which is one reason that an early, popular use of it was as a means of supporting online trade in contraband via the “dark web”. However, the anonymity afforded by Bitcoin is not actually as strong as is widely believed, and this bears examination because the traceability of transactions is fundamental to many of the most widespread concerns about digital currency technology.

Though Bitcoin users may not have their name directly attached to their funds and transactions, the fact that every transaction is publicly visible in the blockchain means that, with some effort, it is generally possible to trace funds to the entities that control them. By analysing transactions, the various addresses linked to a particular entity can be discovered and, should a physical person make public any of their addresses; a link can be established between one’s physical identity and one’s virtual identity. That person can then be linked to an entity in the ecosystem with links to a multitude of other addresses they have used (Reid & Harrigan, 2011).

Other prominent research into analysis of transaction flows and anonymity of Bitcoin, based on these tracing methods and employment of other clustering methods, include works which revealed:

- High levels of dormancy of mined Bitcoin over time (i.e. 76 per cent remained unspent at the point of analysis) and transaction patterns which seem to indicate attempts to mask the origin of transactions (Ron & Shamir, 2012).

- Identity of major institutions, including the infamous Silk Road⁷ and Mt. Gox, (see Box 7), in the Bitcoin ecosystem and interactions between them via initiation of a small number of transactions (Meiklejohn et al., 2013).

In November 2014, the multinational effort, Operation Onymous, led to the arrest of 17 persons and the takedown of over 400 dark net websites including Silk Road 2.0. While some aspects pertaining to the modalities through which authorities were able to identify the hidden nodes and the persons responsible for them may warrant further research, amongst the various plausible possibilities suggested was the work of Ivan Pustogarov et al., who examined “ways to link transactions and deanonymize Bitcoin clients even if they use Tor” (Tor Project, 2014). An explanation of the terms Tor, the dark web and Silk Road is presented in Box 2.

Box 2
The utility and misuse of anonymity tools

The Tor Project is the group responsible for maintenance of The Onion Router (Tor) network. Tor was initially developed by the U.S. Navy as a means of providing anonymous communication between parties. It was subsequently released into the public domain and has been used by persons and groups who require anonymity and secrecy in the face of oppressive regimes or the intrusive eye of “big brother”.

Like any technology, it can also be used for nefarious purposes. Tor is the primary means of access to the “dark web”, which is an underground collection of websites, not accessible via traditional means, where participants engage in various anonymous activities including the trade of illicit/illegal goods and services.

The aforementioned Silk Road was one of these dark web sites, and it used Bitcoin as a currency to facilitate trade in drugs, forged identification documents, and other illicit goods and services. The trial of the alleged founder and owner of Silk Road, Ross Ulbricht, who assumed the alias “Dread Pirate Roberts,” has resulted in his conviction in a United States court. It is purported that authorities were able to reveal his real identity by tracing the inadvertent linking of an attribute of his physical identity to an attribute of his anonymous persona.

Source: Author compilation.

Within the digital currency community, there has been some effort to develop means of increasing the anonymity of transactions on the blockchain. For example, users desiring a higher level of anonymity are encouraged to create a separate new Bitcoin address for every transaction, and Bitcoin wallet technology is evolving to make this an automated part of the process. There is also extensive use of “tumblers,” processes designed to pool and mix a large number of transactions together, making individual transactions more difficult to discern in analyzing the block chain. These techniques do have the effect of making deanonymization more difficult, but their utility is limited by the fundamentally public nature of the Bitcoin protocol. There have been some efforts at developing alternate digital currency implementations —“Alt Coins”— that have stronger forms of anonymity built into the system, but adoption of these has been extremely limited, as compared to Bitcoin.

⁷ Silk Road was a controversial dark web website which facilitated the purchase of illicit and illegal goods and services with the payments method of choice being the digital currency Bitcoin. The site was shut down by U.S. authorities in October 2013. A few months thereafter, Silk Road 2.0 appeared online to fill the void.

II. Digital currency policy development in an international context

A view of the international landscape affords Caribbean nations an opportunity to learn of methods by which countries are attempting to put controls in place to manage risks associated with digital currency, while still allowing for innovation of new payment systems to be explored.

A. Regulation and legislation

1. United States Financial Crimes Enforcement Network (FinCEN)

From the perspective of anti-money laundering regulation, the United States-based Financial Crimes Enforcement Network (FinCEN) has been proactive with their response to digital currency. Their issuance of guidelines in March 2013 sought to define the various actors in a digital currency ecosystem (“users”, “administrators”⁸ and “exchangers”) based on the role they played in the digital currency ecosystem (FinCEN, 2013). It also sought to clarify the possible regulatory obligations of these different actors to register as a Money Service Business (MSB) and specifically as a money transmitter⁹ within its oversight. Exchangers and administrators were said to be subject to MSB registration while users were said to be exempt.

This caused some ambiguity regarding whether certain operations of miners would have led to classification as an MSB (Marco Santori, 2013).

This was treated with via a clarification in January 2014 (FinCEN, 2014) which established that miners were not engaging in money transmission activities once they acted “solely for the user’s own purposes and not for the benefit of another”. The Network did go further to warn, however, that acts of

⁸ In the case of a decentralized ecosystem such as Bitcoin there are no ‘administrators’.

⁹ FinCEN requires special risk management, risk mitigation, recordkeeping, reporting, and transaction monitoring requirements of MSBs classed as money transmitters. Anti-Money Laundering (AML) and Know Your Customer (KYC) policies are some of the more well-known measures.

transfers to third parties should be closely examined to ensure money transmission was not taking place. FinCEN has issued at least three other clarifications to its initial March 2013 guidance, and continues to attempt to provide businesses with an understanding of how their operations may be classified.

It has been noted that, while the FinCEN provides a federal designation for an MSB, the treatment of this designation is different on a state-by-state level, and this has caused difficulty for businesses wishing to establish themselves across multiple jurisdictions. This is a relevant concern for the Caribbean, because it parallels the potential difficulty for companies that would be more likely to prosper under a uniform regulatory regime within the Caribbean Community (CARICOM), but which will experience costs associated with adjusting to divergent regulatory frameworks at the national level within the individual countries of the subregion (ECLAC, 2015). These costs may effectively limit market participation, especially within the Caribbean’s smaller economies. This suggests that regional bodies, such as CARICOM or the Organisation of Eastern Caribbean States (OECS) should anticipate the future possible importance of digital currency and move to develop uniform regulation to businesses transacting in them.

2. New York State Bit Licenses

While FinCEN sought to clarify the obligations of digital currency businesses under existing MSB and money transmitter categories, the state of New York sought to develop a new regulatory framework that would lead to digital currency firms having to acquire a license to operate or provide services to persons within the state.

In August 2013, prompted by Wall Street interests via the development of financial and investment products based on digital currency, the New York Department of Financial Services (NYDFS), financial regulator for the state, issued subpoenas to 22 digital currency companies and investors as part of an information gathering exercise to understand the industry (Hill, 2013). This led to public hearings in January 2014 (NYDFS, 2014a) and the development of a proposed Bit License regulatory framework in July 2014 (NYDFS, 2014b) which was structured to address the issues under headings outlined in Box 3.

Box 3 Issues which BitLicense attempt to cover PER Organization

- Compliance
- Capital requirements
- Custody and protection of customer assets
- Material change to business
- Change of control; mergers and acquisitions
- Books and records
- Examinations
- Reports and financial disclosures
- Anti-money laundering program
- Cyber security program
- Business continuity and disaster recovery
- Advertising and marketing
- Consumer protection
- Complaints
- Transitional period

Source: New York Department of Financial Services.

During the public comment phase of this process, over 3700 comments were received by the NYDFS from organizations such as:

- The Electronic Frontier Foundation (EFF): U.S. non-profit organization which has been at the forefront of defending civil liberties in the digital world.
- Coinbase Inc.: An organization whose core business involves financial transactions with digital currency as an exchange and wallet services provider.
- Walmart, Amazon: Organizations which carry products that can be potentially classed as being subject to the BitLicense obligations.
- Western Union: U.S. based money transmission services whose existing business model may be threatened, or alternatively enhanced, by digital currency.

Some of the arguments against the proposed BitLicense, centred around the ambiguity in its wording in relation to the types of digital currency products and organizations which would be subject to regulatory oversight. For example, both the EFF and Coinbase Inc. highlighted the fact that digital currencies utilizing blockchain technology, such as Bitcoin, can be used for purposes other than financial transactions, which was also a point discussed during the EGM¹⁰.

This would therefore mean that a financial oversight body could potentially be regulating the activities of organizations that have no real dealings in financial transactions. Walmart and Amazon made similar arguments noting that their gift card products could potentially make them subject to BitLicense requirements given the broad definition of “virtual currencies”.

Coinbase Inc. also made arguments which suggest they favour an approach of amending existing money transmitter license regulations to encompass digital currency products. They opined that there would now be duplicate compliance obligations on organizations in requiring that they acquire both a BitLicense and NY money transmitter license.

They also objected to burdensome application requirements, such as fingerprinting of staff which exceeds the requirements of obtaining a NY money transmitter license, as well as significant capital requirements, onerous policy statement requirements and excessive record keeping requirements (Coinbase Inc., 2014).

Via a joint statement with the Internet Archive and Reddit, the EFF also commented on the excessive compliance requirements; the ambiguity of the broad definitions within the BitLicense proposal; the fact that digital currency can be used for non-financial transaction purposes; as well as the privacy concerns in the proposed recording keeping requirements (Electronic Frontier Foundation, 2014).

“We believe that, as currently drafted, the “BitLicense” regulatory framework raises profound civil liberties concerns and stifles innovation. The proposal would infringe the privacy rights of casual users and digital currency innovators, as well as fundamentally burden freedom of speech and association. The framework would also create expensive new obligations for businesses developing new products and services in the digital currency ecosystem, likely foreclosing many of them from doing business involving New York and its residents.”¹¹

In response to such concerns, the NYDFS released a second draft of the BitLicense in early 2015, with another 30 day comment period. In defending the perceived stringency of the BitLicense regulations for digital currency operators, they sought to clarify that while the proposed licensing model

¹⁰ See *Report of the Expert Group Meeting on Opportunities and Risks Associated with the Advent of Digital Currency in the Caribbean*, LC/CAR/L.461; paragraph 12.

¹¹ Electronic Frontier Foundation.

was introduced to these operators, it was also being considered for use in reviewing the regulation of fiat operators. Amongst some of the changes announced in the revised version were:

- Clarification as to the types of products and organizations which will be subject to BitLicense requirements.
- Reduction of recordkeeping requirements in terms of what information is collected and how long such information needs to be stored.
- The availability of transitional BitLicences to reduce the burden on start-ups.

It is recommended that financial authorities in the Caribbean not only take note of the eventual output regulations established by FinCEN and NYDFS but also note the process of stakeholder engagement undertaken in (i) coming up with their proposed regulations and (ii) issuing comment periods and clarifications to their proposed regulations. Such an approach allows for the achievement of balance in providing regulatory oversight while not completely stifling innovation.

3. Canadian legislation

Similar to the U.S. attempt to retrofit treatment of digital currency within their existing MSB and money transmitter classifications under the FinCEN regulatory body, in June 2014 the Canadian government passed an amending bill C-31 to the existing Proceeds of Crime (Money Laundering) and Terrorist Financing Act (PCMLTFA). This bill sought to clarify how digital currencies would be recognized and treated with by their financial intelligence unit, the Financial Transactions and Reports Analysis Centre of Canada (FINTRAC).

Consistent with the FinCEN approach towards regulation of digital currency, the Canadian legislation sought to address the issue at the control point where digital currency converts into fiat currency via categorizing such points as Money Service Business (MSB) and stipulating verification and recordkeeping requirement as per Anti Money Laundering (AML) best practice. This makes such digital currency businesses subject to registration and compliance requirements expected of an MSB registered with FINTRAC.

Digital currency businesses “that have a place of business outside Canada but who direct services at persons or entities in Canada” were also made subject to these requirements. Additionally, banks were prohibited from opening and maintaining accounts with digital currency MSBs that did not register with FINTRAC (Duhaine, 2014).

It is significant to note that Caribbean vendors have expressed concern about a developing regulatory landscape where authorities may seek to regulate user to user transactions, especially in light of the fact that this may be very difficult—or impossible—for reasons having to do with the decentralized nature of the technology infrastructure that enables the use of digital currencies¹². Thus, the two approaches examined so far, in the U.S. and Canada, utilize the control point at which digital currency converts into fiat as the regulatory point for money laundering and terrorist financing risks rather than user to user transactions.

B. Preventing illegal activities

During the U.S. Senate hearings into digital currency in November 2013, The President and Chief Executive Officer of the International Centre for Missing & Exploited Children (ICMEC), Ernie Allen, stated that his organization had “set out to find a balanced, reasonable response to the problems associated with the misuse of digital currencies for child sexual exploitation and other criminal activity”. In his statement, he highlighted the challenges for law enforcement as posed by anonymity tools such as the Tor client (see Box 2), and the challenges of the mere perception of Bitcoin as facilitating

¹² See *Report of the Expert Group Meeting on Opportunities and Risks Associated with the Advent of Digital Currency in the Caribbean*, LC/CAR/L.461; paragraph 15.

anonymous transactions which leads to persons to engaging in undesired behaviours. He also identified the Tor Project and the Bitcoin Foundation¹³ as having assisted their mandate via active participation in the Digital Economy Task Force.

The task force was described as seeking to “offer recommendations and real solutions for the threats and risks without jeopardizing the promise and potential of the digital economy”. The task force produced a report in March 2014 which established 15 conclusions and recommendations representing an initial starting point towards ensuring digital economy technologies are not abused “to the detriment of our children and our society” (Digital Economy Task Force, 2014).

An examination of the “Regulations” recommendations from this report shows advocacy for an approach whereby risk based analysis of the various identified risks is performed. If we apply these recommendations to the topic of digital currency (as a subset of the digital economy), it also calls for the establishment of a specialised group mandated to research various areas including:

- The process flow and control points in digital currency transactions (e.g. fiat to digital currency conversion)
- Whether there is a need for regulation of digital currency (in context of risk based analysis)?
- A review of existing rules and regulations (should regulation be deemed necessary) to determine:
 - If more effective application of rules and regulations needs to take place
 - If an entirely new regulatory approach needs to be defined

The recommendations state that such a group should “include representatives from across the digital economy and other affected industries” which implies participants from the vendor side, the regulatory authority side, academic experts, among others. This is very much in alignment with the approach taken in seeking the appropriate composition of experts to participate in the EGM.

Finally, the report also calls for further clarification from regulatory bodies like FinCEN and FINTRAC as well as taxation authorities. This listing can be easily augmented with Central Banks, given the critical role which they play in the Caribbean countries, regulating the operations of financial institutions under their purview. However, Central Banks would first need to build up their expertise and knowledge of the area.

It is recommended that this Digital Economy Task Force report be used to guide any position when it comes to developing policy options with respect to digital currencies and the digital economy.

C. Exploring opportunities and risks

Many of the sources reviewed seemed skewed towards one end of the debate or the other, that is; does digital currency provide risk or does it provide opportunity? To counter this, the opportunities and risks of digital currency are discussed together within this section rather than split out between two different sections. Box 4 is presented to highlight the fact that digital currency is now part of the debate on improving payment systems globally.

¹³ Note that, as of April 2014, the Bitcoin Foundation has restructured to focus on development of the Bitcoin protocol and members of its Board have indicated that the organization is stepping back from engagement in public policy efforts.

Box 4
The evolution of money continues

In 2012, The Royal Canadian Mint announced plans to cease production of their penny due to cost of production and relative low purchasing power.

Within a week of this, they announced a “development phase technology”, MintChip, as being available to software developers as part of a challenge to create innovative digital payment applications.

“MintChip brings all the benefits of cash into the digital age. Instant, private and secure, MintChip value can be stored and moved quickly and easily over email, software applications, or by physically tapping devices together”. The MintChip challenge has since come to a close.

In November 2014, Ms Carolyn Wilkins, speaking in her capacity as Senior Deputy Governor of the Bank of Canada, stated that they view “Bitcoin and other cryptocurrencies as investment products rather than money” however she also stated they were “undertaking research on the potential merits of issuing e-money”.

The possibility of utilizing distributed ledger technology without the creation of a new currency is cited by The Bank of England 2014 Q3 paper entitled “Innovations in payment technologies and the emergence of digital currencies” where they state:

“As emphasised by Haldane and Qvigstad (2014), it would technically be possible for an existing central bank to issue digital-only liabilities in a distributed-ledger payment system equivalent to those deployed by recent digital currencies”.

In January 2015, Ecuador, which banned Bitcoin in 2014, delivered on its promise to establish an alternate currency where people pay cash (Ecuador had been using USD since the banking crisis in 2000) for a new electronic form of money stored in mobile wallets. While it was initially referred to as a digital currency scheme, the new Electronic Money System (EMS) seems more akin to mobile money.

Source: Author compilation.

1. The United Kingdom call for information

As part of a consultative process, towards a wider goal of “making it easier for people to access and use financial services”, the Government of the United Kingdom, in November 2014, issued a call for information on the benefits and risks of digital currency. Their rationale for doing so included reasoning which pointed to a desire for:

- A more innovative and competitive banking and payments sector.
- Understanding of the benefits as being touted by digital currency businesses and the community of users of digital currency.
- Understanding of the risks posed to various institutions and interest groups.
- Evaluation of the need for regulation of digital currency.

The process took the form of online submission of comments in response to thirteen questions as presented in Annex 1.

The UK Payments Council, in their response to the call for information, cited several possible benefits of digital currency, with the caveat of appropriate mitigation of their risks¹⁴. These benefits are preceded by a more obvious benefit whereby the United Kingdom can seek to establish itself as a centre for digital currency expertise and the creation of new channels for tax revenue and investment. Some of the highlighted benefits such as (i) fewer barriers to cross border trade, (ii) faster settlement time and (iii) lower transmission charges, speak to the development of products which may support more effective e-commerce, remittance systems and interbank transfer mechanisms. Another benefit of having transactions recorded in a public ledger is seen as supporting international financial crime investigations.

They also specifically highlighted the underlying block chain technology of digital currencies or “distributed ledger technology” as being one of the most innovative aspects of the industry stating that it had the potential to “fundamentally change the way many value transactions both within and outside of

¹⁴ The risks outlined were in alignment with those also highlighted by the NYDFS and European Banking Association.

the payments system are made, including the distribution and communication of assets, company shares, and securities”. They also called for a light handed approach to any “intervention” on this technology so as to continue to support innovation in this area.

The UK Payments Council released a report based on this call for information in March, 2015. In keeping with the approach taken by authorities in the United States and Canada to manage money laundering risk, the report signals intent for the application of AML regulations to digital currency transactions. It further calls for collaboration between the industry and the British Standards Institution for the creation of standards for consumer protection. However, the report also recognizes the innovation which digital currency represents, stating:

“The government recognises that the technology associated with digital currencies offers considerable promise, making it possible for users to transfer value (or other information) quickly, efficiently and securely, providing a permanent record of what has taken place, and without the need for a trusted third party to oversee the process. **In response the government is launching a new research initiative which will bring together the Research Councils, Alan Turing Institute and Digital Catapult with industry in order to address the research opportunities and challenges for digital currency technology, and will increase research funding in the area by £10 million to support this.**” (HM Treasury, 2015)

Governments of the Caribbean would be well-served to take note of this balanced approach to the issues surrounding digital currency, which recognizes risk while encouraging innovation. Caribbean countries have a need to develop new industries in ICT related fields (Williams, 2015), and the area of Financial Technology (FinTech) is one that is poised for growth in the coming years. However, the establishment of the Caribbean subregion as a centre of FinTech development will not be possible without proactive engagement from regulators, and would benefit from broader support from governments and regional organizations.

Thus, it is recommended that Caribbean financial authorities and regulators take note of the inclusive approach adopted by the United Kingdom thus far, to ensure they get a broad and encompassing view of the opportunities and risks of digital currency.

2. European Banking Authority (EBA)

In June 2014, the European Banking Authority (EBA) released the report “EBA Opinion on ‘virtual currencies’”. The report does make mention that “many potential benefits” exist for regions with lesser developed payment infrastructure, such as the Caribbean. The benefits listed in the EBA report includes:

- Economic benefits
 - Transaction costs
 - Transaction processing time
 - Certainty of payments received
 - Contributing to economic growth
 - Financial inclusion outside the European Union
- Individual benefits
 - Security of personal data
 - Limited interference by public authorities

However, the report also outlines approximately 70 risks posed by the use of virtual currencies in the European Union, as presented in Annex 2. These risks are further grouped into 20 underlying risk drivers and the document goes further to establish a regulatory approach to each of the risk driver

groupings as presented in Box 6. The EBA-documented risks encompass those mentioned by the Financial Action Task Force (FATF) report; “Virtual Currencies: Key Definitions and Potential AML/CFL Risks”.

An examination of these drivers reveals similarities in areas of concern which NYDFS attempted to address via the proposed BitLicence (see Box 3). For example, issues of cyber security, reporting requirements, consumer protection and consumer recourse are commonly expressed by both sets of authorities. Some of the issues such as “lack of probity”, “insufficient funds or VC units” and “no separation of accounts” speak to concerns over the lack of proper audit and verification methods for individual accounts and overall reserves as held by digital currency service providers. Additionally, “payer and payee anonymous” or “anonymity in transactions” is cited as a driver for 25 of the approximately 70 identified risks.

Box 5
European banking authority twenty risk drivers of Virtual Currencies

1. VC schemes can be created (and their functioning subsequently changed) by anyone, anonymously
2. Payer and payee are anonymous
3. Global reach
4. Lack of probity
5. Not a legal person
6. Opaque price formation
7. No refunds or payment guarantee
8. Unclear regulation
9. Lack of definitions and standards
10. Inadequate IT safety
11. Information is neither objective nor equally distributed
12. Insufficient funds or VC units
13. No separation of accounts
14. No complaint process
15. Lack of access to redress
16. Lack of corporate capacity and governance
17. No reporting
18. Interconnectedness to FC
19. Not legal tender
20. No stabilising authority

Source: European Banking Authority, (European Banking Authority, 2014).

Advocates for digital currency may argue that recent technology advancements in the digital currency ecosystem and adaptation of existing techniques hold promise to these identified risk drivers:

- **Multi-signature technology** - This minimizes the risk of transactions occurring without the account holder’s knowledge, which bodes well for consumer protection and accountability risks. This technology allows for several private keys to be associated with a single public key. To facilitate a transfer requires that a subset of those private keys (e.g. 3 of 5) be used to digitally sign any transaction. These extra keys are held by the user on different computing devices as well as by authorized personnel at the user’s digital currency service provider (Coinbase Inc., 2014).
- **Proof of Reserves** – In the wake of the Mt. Gox debacle (see Box 7), digital currency exchanges have sought ways to improve methods of maintaining consumer and financial authority confidence in their systems. Some digital currency businesses have developed techniques which allow for verification of Bitcoin balances at the individual customer (account holder) level and organizational level while maintaining the privacy of their customers by not having individual account balances disclosed (Kraken, n.d.).

- Investigative techniques – The question of anonymity of Bitcoin was introduced in chapter I, section C, where it was mentioned that the mere perception of anonymity of digital currency system contributes to illicit/illegal behaviours. One only needs to examine the example of the takedown of Silk Road (Zetter, 2013) to gain insights into how existing law enforcement investigative techniques of infiltrating networks and harvesting information from various sources can be adapted to uncover the identities of bad actors in digital currency ecosystems.
- Regulatory checkpoints – Existing Anti-Money Laundering (AML) and Counter Terrorism Financing (CFT) practices such as Know Your Customer (KYC) information gathering and Customer Due Diligence (CDD) continuous monitoring can be layered onto digital currency ecosystems to ensure the anonymity risks minimized. The digital currency industry vendors at the EGM informed they were already employing such system in anticipation that such regulations would be put in place in the Caribbean at some point¹⁵.

Box 6
Lessons from Mt. Gox, and the broader concern of security

Mt. Gox, the first Bitcoin exchange, was considered to be the largest exchange in terms of volume traded up to early 2013. They suffered a few significant setbacks later in 2013 causing periods of suspended trading and withdrawals. In February 2014 they inaccurately attributed their Bitcoin withdrawal issue to a “transaction malleability” feature within the Bitcoin protocol which was refuted by the Bitcoin development community. Later that month they filed for bankruptcy after leaked documents surfaced implying they lost significant quantities of customers’ account holdings. Investigations as of December 2014 by Japanese authorities indicate that most of the lost Bitcoin was as a result of actions requiring insider knowledge rather than theorized external bad actors.

The case of Mt. Gox serves as a sobering reminder of the need for consumer protection and proper accountability and governance of organizations holding customers’ digital currency accounts. Another benefits in the aftermath of Mt. Gox included the refinement of financial authorities’ abilities to investigate digital currency transactions and the development of public audit practices.

In January 2015, the issue of digital currency consumer protection and IT security again came into focus with the news of Bitstamp, a Slovenian digital currency exchange, losing 19,000 BTC due to hacking.

Within the broader Caribbean region, Coinapult, a Panama-based Bitcoin wallet service, has reported that it lost 150 BTC (approximately \$42,900 USD) in a hacking incident in March 2015. Customer funds were not affected, but withdrawals were halted for five days, and a new protocol has been put in place that requires Coinapult staff to approve all transactions before a withdrawal can be made. This is a significant improvement to security, but it comes at the expense of customer convenience.

Source: Author compilation.

In November 2014, the director of licensing, authorizations and regulations, of the *Autorité de Contrôle Prudentiel et de Résolution* (French Prudential Supervisory Authority), M. Jean-Claude Huyssen, is said to have pledged France’s commitment to following the regulatory approaches outlined in the aforementioned EBA report (Pierre Brondi, 2014). This policy direction could potentially affect territories under French sovereignty in the Caribbean.

While it is recommended that Caribbean authorities review the EBA Opinion document to inform their understanding of the risks (as well as Bit License and FATF documentation), they must also seek appropriate answers to their questions from informed parties who have intimate understanding of the evolving landscape of digital currency ecosystems.

¹⁵ See *Report of the Expert Group Meeting on Opportunities and Risks Associated with the Advent of Digital Currency in the Caribbean*, LC/CAR/L.461; paragraph 19.

D. Classification and taxation

Various authorities in different countries have been struggling with the issue of classification of digital currency based on their own unique perspectives. For example, in August 2013, in a case brought to trial by the U.S. Securities and Exchange Commission (SEC), the presiding judge stated that Bitcoin was a “currency or form of money” contrary to the defence of Trendon Shavers, who claimed that his alleged Ponzi scheme could not be classed as such due to the Bitcoin not being a true form of money (RT, 2013).

Financial authorities, however, have not been so inclined to agree with such a classification and no nation state has acknowledged digital currency as legal tender. The issue of how digital currency is classified is important not only because it reflects on how it is treated in legal contexts, but also because legal classification has significant implications on how digital currency is treated in the context of taxation.

In classifying digital currency, some countries have shown reluctance to treat digital currency as they would any other currency. However, a common alternative, treatment of digital currency as an asset, presents its own range of difficulties. Among these is the implementation problem concerning the calculation of capital gains tax. Since Bitcoin, for example, is prone to highly volatile price swings, treating it like an asset, with a corresponding book value in a national currency, may result in a capital gain or loss every time money is received in a wallet and later spent. In countries where short-term and long-term capital gains are treated differently, there may be additional complexity in the process of tax collection and reporting.

Moreover, in cases where long-term capital gains are given beneficial tax treatment, it’s difficult to make the case that extending lower capital gains tax rates to income generated from speculation in digital currencies could be justified as being socially beneficial. Rather, there is a danger that financial capital which might otherwise be invested in the local economy, either directly, or through savings in a bank, could instead be sidelined as it sits untouched in the digital wallets of Bitcoin speculators. Countries may not wish their tax policy to favour this practice.

The classification of digital currency for legal and taxation purpose is a complex issue, and the appropriate solution for a given country may be highly dependent on the pre-existing legal and taxation context within that country. Thus, from a classification perspective, it is recommended that Caribbean authorities review the referenced material regarding the decisions taken on classification by a variety of jurisdictions, as presented in Box 8, and to also consult more updated material in considering how to classify digital currency.

Box 7
Classification and tax treatment in various jurisdictions

The U.S. Internal Revenue Service (IRS) declared in March 2014 that digital currency should be treated as property rather than currency making it subject to appropriate taxes for federal tax purposes (IRS, 2014) affecting how various entities viewed their operations including investors, miners payment processor and employees.

Subsequent to the IRS ruling, the state of New York issued a clarification citing that digital currency was classed as “intangible property” and hence the purchase of digital currency was not subject to sales tax, removing concerns of possible double taxation upon spending of same (NY State Department of Taxation and Finance, 2014).

In June 2014 the U.S. State of California had to amend its legislation to allow for the legal use of digital currency by allowing such currencies to be classified as “lawful money”. Legal tender is the official fiat currency of a nation and it can exist in electronic form (e.g. funds available via debit card) or physical form (paper or coin) maintaining its legal status and unit of account in transitioning between these forms. It is also the recognized currency which taxes must be paid in to taxation authorities. Lawful money, in contrast, can be seen as a legal alternate to receive payments but persons are not obliged to accept it as payment.

In August 2013 Germany deemed Bitcoin to have the “unit of account” essential characteristic of money further classified as “private money”.

This seems to carry a similar connotation to the lawful money, as explained below, in that it was deemed that Bitcoin can be legally used for private purposes in payments or transacting with exchanges and others as a substitute currency.

In March 2014 Her Majesty’s Revenue and Customs (HMRC) of the U.K. issued a policy tax treatment on the income of actors in digital currency ecosystems including miners, traders, payment processors and exchangers.

This clarified Value Added Tax (VAT) exemptions for miner income received from mining activities and currency trading amongst others. It also delved into other tax treatment of activities involving digital currency including corporate, income and corporate gains tax (HMRC, 2014).

Indeed the issue of taxation is one that appears in many nations’ consideration of treatment of digital currency. In a review “Regulation of Bitcoin in Selected Jurisdictions” the issue of taxation appears in the assessment of at least thirteen (13) different nations (Library of Congress, 2014).

Source: Author compilation.

III. Digital currency activity in the Caribbean subregion

This chapter summarizes some notable digital currency-related activities that have taken place, to date, in various Caribbean countries. Additionally, the chapter analyses the responses to an ECLAC survey of Caribbean Central Banks on the topics of digital currency and mobile money.

Taking a broad view of the Caribbean subregion, it is clear that the use and understanding of digital currency is still in an early, incipient phase. While there is growing awareness of the technology, and there is a sense of opportunity in the emergent digital currency industry, mainstream adoption appears to be a long way off. The industry's need for a supportive regulatory environment is one of these challenges, but perhaps an even larger one is the need to win over the public and convince consumers of the value that digital currencies may offer.

A. Barbados

In February 2014, The Barbados National News reported on the entrepreneurial efforts of two nationals of the Koblitz Group, who were seeking to establish a digital currency exchange to serve the Caribbean (Cumberbatch, 2014), starting off in Barbados and thereafter refocusing on Trinidad and Tobago. An examination of the group's portfolio via their website reveals the existence of two subsidiaries, a digital currency exchange, Bitt, and a hosted digital currency mining service¹, ASICBLOCK. The website also reveals stated intentions of providing merchant processing and digital currency Automated Teller Machines (ATM) with a core focus on "cryptocurrencies in emerging markets". In August 2014, they summarized some of the regulatory roadblocks they were experiencing in becoming operational in certain Caribbean nations (Bissessar, 2014b):

"Regulators are very slow to respond and educate themselves on digital currency technology. Whilst other small economies around the world respond proactively to this emerging technology (See Isle of Man) to establish themselves as forerunners in a new age of finance we have found Caribbean government bodies resistant to change. This is a

shame because not only do our economies need stimulation, but our people need help in entering the age of e-commerce and m-commerce.”¹⁶

In participating in the Expert Group Meetings (EGMs), Koblitz Group cofounder Gabriel Abed echoed these sentiments, encouraging regulators to acquire a better understanding of digital currency and calling for clarity as to how digital currency operations will be perceived by financial authorities in various Caribbean jurisdictions¹⁷.

In March 2015, Bitt officially launched its digital currency exchange in Barbados, having announced that it had secured a US\$1.5 million seed round investment from a venture capital group based in Trinidad and Tobago.

B. Trinidad and Tobago

1. Public awareness from the Central Bank

In March 2014 the Central Bank of Trinidad and Tobago (CBTT) issued public awareness information on the phenomenon of digital currency via its Payment Quarterly publication. This included a warning that “potential users of this product must be aware of the risks involved in investing in virtual currencies as regulators seek to establish appropriate frameworks to ensure the continued safe operation of the payments system and the smooth conduct of monetary policy.” The document also stated that such systems are somewhat addressed under the banner of electronic money within the Financial Institution’s Act, 2008, indicating that “The Act treats with the issuance of virtual currency as stored value, issued on receipt of funds and accepted as payment by persons other than the issuer.” (Central Bank of Trinidad and Tobago, 2014). Later clarification appeared to indicate that this existing legislation does *not* encompass treatment of digital currency, as distinguished from virtual currency (See Box 1 for discussion of this nomenclature). However, it was maintained that the only issuer of currency in Trinidad and Tobago remains CBTT, and that the “law requires organizations to consult with the Central Bank for approval to launch products related to digital currencies”¹⁸.

2. Recognition from the private sector

During a moderated discussion on local impediments to SMEs enabling their web presence with e-commerce payment systems, as part of a session focused on “Digital Economy” at the ICT Business and Innovation Symposium in November 2014, Mazuree Ali, CEO of locally-based e-commerce website TriniTrolley, stated that money was being redefined at present to encompass things like Bitcoin. In the same vein, he later described, the procedural and financial burdens placed upon SMEs to get e-commerce capabilities enabled on their websites. This contributed to the formulation of one of the main conclusions within the report of the December 2014 EGM, indicative of the need for better payment infrastructure in the Caribbean:

“It was noted that there is a need for better payment systems within the Caribbean region, and that the high costs and red-tape associated with providing electronic payment options, are significant challenges to those wishing to establish e-commerce businesses in the region. The region also needs to lower the cost of remittance services. Digital currencies represent a potential option for improving services and reducing costs, but are challenged in receiving acceptance among consumers and regulators.”¹⁹

¹⁶ Oliver Gale, co-founder Koblitz group.

¹⁷ See *Report of the Expert Group Meeting on Opportunities and Risks Associated with the Advent of Digital Currency in the Caribbean*, LC/CAR/L.461; paragraph 22.

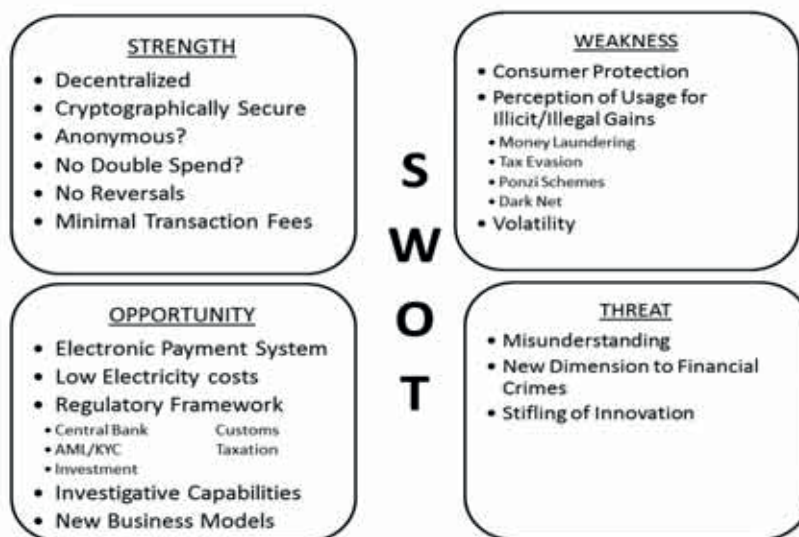
¹⁸ *Ibid.*, paragraph 21.

¹⁹ *Ibid.*, paragraph 1.

3. Calls for objective evaluation

In an analysis of new technology and business models in the digital economy, Bissessar (2014a) called for an objective evaluation of risks and opportunities of digital currency in the Caribbean. All of the issues outlined in the SWOT diagram in Diagram 2 as pertains to opportunities and risks which digital currencies may present to Trinidad and Tobago, and by extension the Caribbean, are treated within this analysis.

Diagram 2
SWOT analysis of digital currency in Trinidad and Tobago



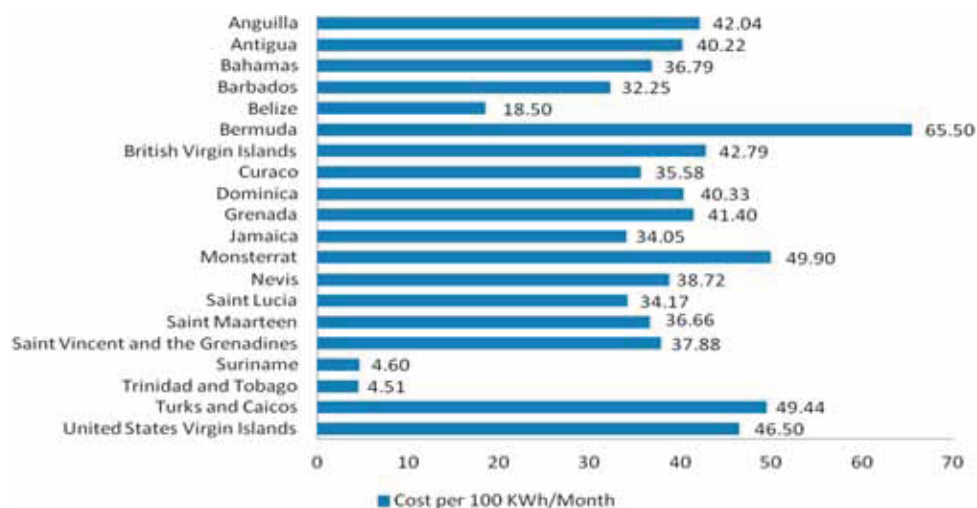
Source: Author (Bissessar, 2014a).

Another article published on ICT Pulse, a Caribbean technology website, also sought to illustrate the utility of digital currency by showing how it can be utilized to increase Caribbean participation in the digital economy. This was illustrated with a practical case of the need to provide better payment infrastructure to Caribbean content creators, thus allowing them to find better opportunities to monetize their work by receiving payments without the hassles and fees associated with traditional Internet payment systems (Bissessar, 2014b).

4. Opportunities for digital currency mining

Trinidad and Tobago has the potential to become a hub of digital currency activity, due in part to its relatively low cost of energy. The low cost of power could make the country an attractive location for operators engaged in the electricity-intensive process of mining of new digital currency. Figure 1 shows a September 2012 Caribbean comparative snapshot of typical electricity bills (USD) for 100kWh per month for domestic customers (CARILEC, 2013). Both Trinidad and Tobago and Suriname are easily distinguishable as having a significant competitive advantage over the rest of the field in terms of electricity cost. Trinidad and Tobago's low cost of electricity is primarily linked to its status as a net producer of oil and gas, from which it derives its electric power. In the case of Suriname, despite being the 3rd largest Caribbean producer of oil and gas (behind Trinidad and Tobago and Cuba) its electric power is primarily derived from hydroelectric plants.

Figure 1
Domestic Electricity Tariffs across Caribbean, Sept 2012
(Dollars)



Source: 2012 Annual Report (CARILEC, 2013).

C. Saint Kitts and Nevis

In June 2014, the St Kitts and Nevis Citizenship by Investment Unit (CIU) sought to clarify that they would not be accepting the popular digital currency Bitcoin as a means by which applicants for citizenship could participate in their programme (Richards, 2014b).

“We further emphasize that we do not accept Bitcoins, have never accepted Bitcoins, and will not accept Bitcoins.”²⁰

This was in response to claims on the website <http://passportsforbitcoin.com>²¹ that a company “authorized by the government to submit citizenship applications” was accepting BTCs “for the required property investment and all fees associated with acquiring St. Kitts citizenship”. The website was being run by one Roger Ver²², via his company, International Investments & Consulting, Ltd (Clenfield & Alpeyev, 2014).

Though the CIU pronouncement on the matter indicated that the Government of St. Kitts and Nevis will directly accept Bitcoin to facilitate the citizenship process, it has been pointed out that the transactions between third-party agents of the programme and parties desirous of gaining citizenship could, in theory, continue to take place. In such an instance, payment of digital currency would first go to an intermediary, who would then handle the conversion necessary to ensure that the CIU would receive all monetary payments in the form of recognized foreign currency (Richards, 2014a).

D. Dominica

1. “Bit Drop” event

In August 2014, it was reported that the 70,000 residents of Dominica would be the beneficiary of a quantity of free Bitcoin via their mobile phones in a “Bit Drop” event planned for March 2015. This

²⁰ St Kitts and Nevis Citizenship by Investment Unit.

²¹ The original webpage is no longer available online, but is still accessible via Internet archival websites.

²² Ver is recognized as an early investor in Bitcoin who became quite wealthy as a result, one of the cohort of “Bitcoin Millionaires” that have been active in promoting the technology. Ver himself attained St. Kitts and Nevis citizenship in February 2014, and subsequently renounced his United States citizenship.

event was to be sponsored by an association of organizations from the digital currency industry (Marty, 2014). One of the main organizations in this association²³, the Panama-based digital currency exchange Coinapault, is noted for having developed one of the first digital currency wallets to facilitate transactions via email and SMS.

This mechanism of transfer was considered particularly suitable for the intention of the Bit Drop event, that is, to distribute a quantity of BTCs to the portion of the population willing to receive it, via their mobile phones. Coinapault's CEO, Ira Miller, reiterated the utility of digital currency transfer via mobile phones during the EGM in the context of a global population of 7 billion mobile phones²⁴.

In September 2014, in response to some of the reactions coming out of Dominica around the Bit Drop event, one national, Adella Toulon-Foerster, who wrote her Master's Degree thesis on Bitcoin, published a brief overview of Bitcoin on the website "Dominica News Online." This explained some of the possible benefits of digital currency and encouraged people to conduct their own research on the matter (Toulon-Foerster, 2014)²⁵. In a response to a post on the popular social networking/community site "reddit" where a link to Toulon-Foerster's article was made available, a Reddit user account (previously linked to Ira Miller) acknowledged that the Bit Drop event faced adoption challenges from some members of the population itself (Coinapault_btc, 2014):

"Yeah, we could have done a better job. Who knew giving people free money was so controversial? I think there has been a lot of confusion (including among journalists) that the government is passing some laws or forcing people. Really, we just got their thumbs up to hand money and tech out to the people."²⁶

The Bitdrop event was subsequently cancelled in February 2015. Among the reasons cited by organizers for the cancellation was the lack of Government support for the project. The reluctance of the Government to support the project may have come as a result of pushback from a population leery of embracing a technology that had garnered negative media coverage, such as stories highlighting the activities of bad actors in the context of episodes such as the *Silk Road* case and the collapse of the *Mt. Gox* Bitcoin exchange. In summarizing discussion on the matter, the report of the second EGM states:

"The experience in Dominica highlighted the need for digital currency vendors to implement strategies aimed at building confidence with both governments and with the public. Digital currency technology will not be able to gain broad acceptance until it is trusted. Hence, there is a need for the industry to create a basis for this trust by proactively supporting efforts to mitigate any negative impacts associated with its use." (ECLAC, 2015)

It is notable that even the perception of risk, rather than actual impacts might be sufficient to limit uptake of digital currency.

2. Bitcoin ATMs

In October 2014, Toulon-Foerster was appointed Vice President of Special Projects at CoinOutlet, a U.S. based Bitcoin ATM manufacturer, which was not directly involved in the BitDrop event but which is seeking to install ATMs in Dominica (Dominica News Online, 2014). During the EGM, Toulon-Foerster indicated that her organization was involved in beta testing of its ATMs in the U.S. and drew attention to the potential application of these ATMs towards the goal of reducing the cost of remittances

²³ Former Prime Minister of Dominica, O.J Seraphim is chairman of the board of Aspen Assurance which is another of the organizations responsible for the BitDrop event.

²⁴ See *Report of the Expert Group Meeting on Opportunities and Risks Associated with the Advent of Digital Currency in the Caribbean*, LC/CAR/L.461; paragraph 11.

²⁵ Some of the comments on this article are very indicative of negative reactions towards the Bit Drop event.

²⁶ Reddit user "Coinapault_btc".

in the Caribbean subregion given the lower transactional costs which Bitcoin offers²⁷. The topic of remittance is examined further in Chapter IV, Section C.

E. Survey of Caribbean central banks

A survey instrument was designed to gauge the Central Bank's awareness and understanding of digital currency and mobile money solutions within the Caribbean. The questionnaire was designed around the topics discussed at the EGM in that it sought to explore:

- The maturity of e-commerce solutions within the respective countries as gauged by factors such as the presence of fully proclaimed legislation to support e-commerce and the relative ease with which an SME can attain a merchant account for e-commerce.
- The level of awareness of mobile money and digital currency business activity within the country as gauged by factors such as knowledge of established or potential vendors in these spheres operating or seeking to operate in their country.
- The perceived significance of opportunities and risks associated with digital currencies.
- Potential policy options available to manage the advent of digital currency in the Caribbean.

Thirteen subregional Central Bank representatives were officially invited to contribute to the study via their responses to questionnaire as listed below.

These included individually addressed members of the Eastern Caribbean Central Bank (ECCB):

- Antigua and Barbuda (ECCB)
- The Bahamas
- Barbados
- Belize
- Dominica (ECCB)
- Grenada (ECCB)
- Guyana
- Jamaica
- St. Kitts and Nevis (ECCB)
- St. Lucia (ECCB)
- St. Vincent and The Grenadines (ECCB)
- Suriname
- Trinidad and Tobago

The participants were given sufficient time to complete the survey and an extension to submit completed questionnaires beyond the initially communicated deadline date was granted to all participants. This was accompanied by three rounds of subsequent phone calls to various responsible parties where assurances were received that the survey was assigned to personnel for completion and some even committing that it will be completed and submitted on time. However, by the close of the survey period, only two completed questionnaires were received from The Bahamas and Guyana respectively.

²⁷ See *Report of the Expert Group Meeting on Opportunities and Risks Associated with the Advent of Digital Currency in the Caribbean*, LC/CAR/L.461; paragraph 14.

The low response rate is revealing in itself, and the reasons for it certainly require exploration. It would appear that Central Banks are exercising caution in going on record on this topic. For example, communication with at least one representative - whose Central Bank did not submit the completed survey - revealed that, while they did complete the survey, they would not be able to submit it due to the fact that as an institution they were still developing their official position on the matter. In this context, the emergence of an environment of greater regulatory certainty with regard to digital currencies in many countries of the subregion will likely benefit from the establishment of official policy positions on the part of Central Banks.

1. Guyana

The survey revealed difficulties for SMEs to achieve financial and approval requirements to provide e-commerce services due to a lack of e-commerce legislation. There are mobile money solutions at present that provide services including airtime top up, bill payment, merchant payment, and domestic Person to Person (P2P) transfers. International remittance services must be licensed but, no mobile money solution provider offers this service at present. There was no report of digital currency vendors or service providers active or seeking to operate and provide any of the services mentioned nor has the Central Bank reported any research into potential impact of advisory to the public with respect to digital currencies.

2. The Bahamas

E-commerce legislation in the Bahamas has been fully proclaimed and enacted. It was reported that there is relatively low difficulty for SMEs to achieve financial and approval requirements to attain an online merchant account to provide e-commerce services. It is estimated that the reliance on external payment providers such as PayPal is only five per cent. It was reported that research into mobile money has taken place and is catered to by legislation, however regulations remain outstanding. Currently, no mobile money services providers or services are present.

Similar to Guyana, international remittance services must be licensed to provide service and there is no knowledge of digital currency vendors or service providers active or seeking to operate and provide any of the services mentioned. While research into potential impact of digital currency has not been conducted, the survey results indicate the potential impact of digital currency is seen as somewhat significant.

3. Comparative analysis

From the perspective of the Central Banks, e-commerce is better supported in terms of legislation and ease of use for SMEs in the Bahamas than Guyana. In both countries, while digital currency is seen as being a factor which can increase participation in the digital economy, proper legislation and ability to access online merchant accounts and even mobile money are seen as more significant factors which can lead to increased participation in the digital economy.

With respect to the opportunities enabled through innovative payment systems, the outlook of the Bahamas appears to be more promising than Guyana's. New business opportunities, digital economy participation and mobile money are seen as the more realistic promises of digital currency. Guyana's optimism on digital currency picks up with respect to mobile money, where they have more experience than the Bahamas, and remittances, where, there is a high remittance rate of over 10 per cent of GDP (See Figure 2 in Section IV). In terms of risks, it would seem that both countries agree that money laundering is the primary concern while tax evasion, financing terrorism and consumer protection are also noteworthy.

IV. Innovating Caribbean payment systems

In 2010, conscious of the success of the M-Pesa mobile money phenomenon out of Kenya, senior-level officials in Trinidad and Tobago examined the issue of mobile money. Their analysis, as reported in discussion at the December 2014 Expert Group Meeting, found that these mobile phone-based value storage and payment solutions are more suitable for countries that are either geographically expansive and/or faced with constraints in financial infrastructure. In the Caribbean context, examples of mobile money deployments in Haiti and Guyana were used to illustrate the point²⁸.

This is in keeping with a World Bank classifications scheme of various types of mobile money business models, which is championed by Mobile Network Operators (MNO) as a response to poor financial infrastructure. In this model, mobile money solutions are seen as providing “alternate infrastructure” and subscribers of such low infrastructure environments have a demand for low-cost, low-speed, infrequent transactions (Mauree & Kohli, 2013). However there are other types of mobile money solutions to be explored.

For example, on the other end of the financial infrastructure development continuum, subscribers have a demand for mobile money solutions that provide high-speed, high-volume transactions. These solutions are generally provided by multiple partners and are seen as being “collaborative” with the financial infrastructure. Examples of mobile money business models from this end of the spectrum include:

- The UK’s Paym which allows for mobile money transfers to another person using only their phone number.
- Apple’s Near Field Communication (NFC) enabled ApplePay which allows iPhone users to pay for items using their devices.

There is also a transition phase between these two extremes found in countries where financial infrastructure development is in the middle ground. In these models, banks are the primary providers of the mobile money solutions seen as “complementary” to the existing financial infrastructure. Hence

²⁸ See *Report of the Expert Group Meeting on Opportunities and Risks Associated with the Advent of Digital Currency in the Caribbean*, LC/CAR/L.461; paragraph 10.

there are various types of services which can be offered to customers depending upon their needs as driven by the surrounding context of financial infrastructure development. Box 9 presents further details on M-PESA and Paym.

Box 8 From M-pesa to Paym

From humble beginnings in 2007, allowing users to transfer airtime between themselves and subsequently trade that airtime in for money via an agent, Safaricom's M-PESA now has over 12.2 million active customers and 8100 agents in Kenya.

This has contributed to an overall growth of the percentage of adults with access to formal financial services which now stands at 67% up from the 2009 figure of 47%. While mobile money contributes only 6.59% of the value national payments, this represents 66.56% in terms of the volume of transactions.

Customers are required to register with an agent, a free process which links their mobile SIM to an account within which money can be deposited.

Once such a deposit is made, customers can use their mobile phones to transfer value across the M-PESA network to other M-PESA users via SMS paying a flat fee for the transfer.

They can also transfer value to non-registered users, pay bills and purchase mobile airtime.

Further arrangement and partnerships have allowed for new services such as supermarket purchases, the payment of school fees and the receipt of international money transfers.

"Safaricom deposits the full value of its customers' balances on the system in pooled accounts in two regulated banks. Thus, Safaricom issues and manages the M-PESA accounts, but the value in the accounts is fully backed by highly liquid deposits at commercial banks."

Paym was launched in April 2014 by the UK's Payments Council immediately servicing over 400,000 registered users of the service across nine (now 16) different banks and building societies with a way to securely send money to another user via their mobile phone number.

"The key feature is that once users have registered their bank accounts to send or receive money with Paym, payments can be triggered simply by knowing a recipient's phone number. Sort codes and account numbers will not have to be keyed in for each transaction, although passcodes will still be required to open an app".

Users are not required to have a smart phone to receive a payment; however they are required to register their phone number in advance.

Source: Consultative Group to Assist the Poor (McKayRafe & Mazer, 2014), International Telecommunications Union (Mayree & Kohli, 2013), & Other.

A. Mobile money

In discussing potential for mobile money solutions in the Caribbean during the December 2014 EGM, an entrepreneur based in the Turks and Caicos described the roadblocks he had faced in bringing a mobile money service to market in that country. Part of the goal of that effort had been to provide financial services to the country's large Haitian migrant population, which was underserved by the existing banking system. Thus, it was expected that a mobile money system, when integrated with existing mobile money systems in Haiti, would reduce the remittance fees that the Haitians pay to send money back to their home country.

However, one of the problems the entrepreneur had run into was difficulty in obtaining a bank account for his company. His experience indicated that traditional financial institutions in the Caribbean were very risk averse with respect to business proposals with novel payment systems. It was speculated that this was due to regulatory imperatives for vigilance on the part of banks to maintain close awareness of customers' activities as a means of preventing money laundering. Partly as a result of this, and also as a result of issues surrounding taxation—see next paragraph—the entrepreneur had not been able to bring this product to market. This was a setback, not just to the entrepreneur, but also for his potential customers, who remain unbanked and continue to pay high remittance fees. Thus, this can be seen as a case where the anti-money laundering regulatory requirements have negatively impacted those at the lowest rungs of the economic ladder.

Another issue discussed in this context was that of taxation of wallet-to-wallet mobile money transfers. It was suggested that once fiat was converted to the mobile money mechanism of transfer (e.g. airtime) any subsequent transfer (to another person or to a remittance company) may be taxed²⁹. While it is reasonable for payments made in mobile money to face the same level of taxation as payments made through more traditional means, there is concern that this type of taxation will be detrimental to the adoption of the technology among poorer members of the community. This is a demographic which commonly participates in the informal economy, and may prefer to operate on a cash basis. Mobile money could represent a potential on-ramp to the formal economy for this population, providing them access to needed financial services and greater social stability, but they may avoid adopting the system if taxation is built into the process. In the long term, this may be an opportunity for the restructuring of tax regimes; rather than continuing to impose a single, flat-rate Value Added Tax, the payment tracking technology inherent to these systems may one day enable the development of mechanisms that allow individual tax rates to vary progressively, based on the total value of an individual's consumption.

The above issues notwithstanding, there have been a number of efforts to establish mobile money systems in the Caribbean. Some products have a narrow focus on a particular sector of the market, such as Boom and Yooz, which target remittances and utility bill payments, respectively. Others attempt to cast a wider net. Table 1 shows the landscape of mobile money solutions within the Caribbean which has been determined from GSMA's *Mobile Money for the Unbanked* website and other publicly available information.

Table 1
Caribbean Mobile Money Deployments

Country	Solution	Organization
Guyana	Mobile Money Guyana Inc.,	GT&T
Dominican Republic	Orange M-Peso	Orange
	CONEC Mobile Wallet	Jamaica Co-operative Credit Union League
Jamaica	M3 Mobile Money for Microfinance	Development Bank for Jamaica
	Boom Haiti	Boom Financial
	Lajancash	HaitiPay and Banque Nationale de Crédit (BNC)
	T-Cash	Voila and Unibank
Haiti	Tcho Tcho / Mon Cash	Digicel and Scotiabank
Trinidad and Tobago	Yooz (utility bill payment)	Resonance

Source: Author compilation.

The most extensive efforts in the subregion at the implementation of mobile money have taken place in Haiti. After the 2010 earthquake in that country, it was considered that mobile money systems would be an effective means to distribute money flowing into the country from various donors, and that this could be used as an opportunity to help jumpstart consumer uptake of the technology. To that end, the Bill and Melinda Gates foundation and the United States Agency for International Development (USAID) funded an initiative to provide US\$10 million dollars in prize awards to organizations establishing mobile money products and to meet certain performance benchmarks. Two mobile money networks – T-Cash and Tcho Tcho - were established, the benchmarks were met, and the prize money was collected. However, an initial user base of 840,000 subscribers eventually dwindled to about 60,000 active users as of December 2014 (Evans and Pirchio, 2015).

Potential contributing factors to the lack of growth of mobile money initiatives in Haiti include a lack of consumer trust in these systems, lack of interoperability between mobile money services run by different operators, and low regulatory limits on the amount of money that could be stored in a mobile wallet, which limited the utility of the system for potential early adopters in Haiti's middle class (Dalberg, 2012). Moreover, the prize-based incentive structure to mobile network operators may have

²⁹ See *Report of the Expert Group Meeting on Opportunities and Risks Associated with the Advent of Digital Currency in the Caribbean*, LC/CAR/L.461; paragraphs 13 and 27.

encouraged them to focus their efforts on maximizing the number of transactions in the system, drawing resources away from the push to strengthen the network as to ensure its long-term sustainability.

Another notable effort at establishing mobile money in a Caribbean country, the “M3 Mobile Money for Microfinance” pilot project, was launched in Jamaica in 2014. It is approved by the Bank of Jamaica for peer to peer transfers and micro financing loans via mobile phones as provided by a Micro Financing Institution (MFI) (Bank of Jamaica, 2014). It should be noted that M3’s model, in being based on providing microfinance services via an MFI, is similar to M-PESA.

In the case of M-PESA the mobile network operator building out the service was not classed as a bank, which possibly assisted in easing the regulatory requirements to get the initiative off the ground.

B. Digital Financial Services (DFS)

In recognizing the utility for mobile money solutions towards the purpose of financial inclusion and seeking to establish standardization across technologies, the International Telecommunication Union (ITU) held the initial meeting of its Focus Group (FS) on Digital Financial Service (DFS), on 5 December 2014 (International Telecommunications Union, 2014). Among its mandates, the group lists:

- Foster collaborative environment between financial service regulators and telecommunications authorities.
- Address regulatory and policy issues possibly hindering the poor from accessing digital financial services.
- Solicit and utilize the expertise of key actors in various rungs of the digital financial services industry
- Guide policy and decision makers in developing countries along the path of the financial inclusion agenda.

Some of these points speak to the blurring of the lines between financial institutions and telecommunications providers with the advent of mobile money solutions designed to transmit value between parties as discussed in the EGM and noted in the previous section.

Indeed, along this same point, one of the Working Groups (WG) established from the FG DFS was the DFS Ecosystem, which is expected to take a “cross-sector (e.g. finance and telecom; provider and regulator) perspective” and “identify the key elements of the ecosystem necessary to make it work in scale for financial inclusion” for the poor of all countries. Other FG DFS Working Groups, covering the topics of Technologies, Interoperability and Consumer Experience and Protection³⁰, also consider initiatives that will have bearing on the Caribbean Telecommunications and Financial sectors as authorities grapple with treatment of both mobile money and digital currencies and the concept of financial inclusion in the near future.

Given the growing population of mobile devices with Internet access, the trend towards increased participation in the Digital Economy, the benefits of financial inclusion finding methods of reaching the unbankable and the desire for better payment infrastructure, it is recommended that Caribbean authorities should take note of the ITU’s FG DFS. This should be done from both a telecom and finance perspective as this work could assist the development of policies towards mobile money and digital currency solutions in Caribbean countries.

³⁰ Each of the four working groups have a responsibility to examine Policy, Regulatory and Oversight issues.

C. Remittances

Reducing the cost of international money transfers is widely cited as an important potential use case for digital currencies. This is especially true in the case of remittances from the developed world to poorer countries, in which the cost of transferring money absorbs a high percentage of the total value transferred. According to an April 2014 report from the Overseas Development Institute, members of the African diaspora face an average 12 per cent cost to send a USD \$200 remittance to their home nations; this is almost twice the global average rate. The high cost has been attributed to low competition in the remittance space with global remittance powerhouses of Western Union and MoneyGram commanding two thirds of the remittance market in terms of transfers.

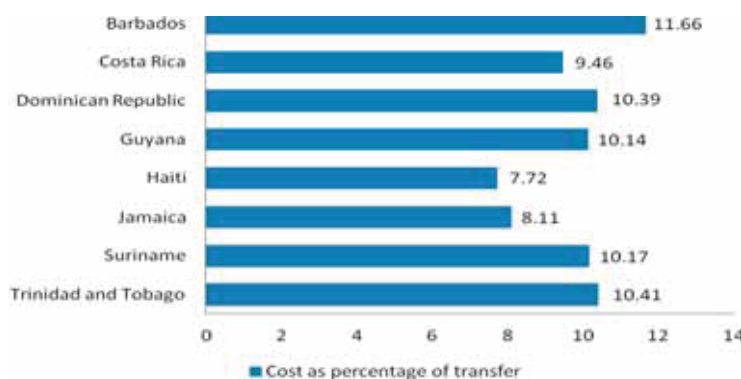
Noting this situation, in 2009 the Heads of State of the G8 set a target remittance transfer fee rate of 5 per cent. If this goal is reached, it will represent an annual increase of USD \$1.8 billion in the amount of money that will actually reach back to home nations (Watkins & Quattri, 2014). The Open Working Group of the United Nations General Assembly on Sustainable Development Goals has envisaged an even lower level of remittance costs, setting a target to “by 2030, reduce to less than 3 per cent the transaction costs of migrant remittances and eliminate remittance corridors with costs higher than 5 per cent.”³¹

According to the World Bank, and in contrast to the situation being faced by the African diaspora, remittance rates for the Latin American and the Caribbean (LAC) grouping of countries averages at 6.02 per cent as of September 2014 (The World Bank, 2014). While this rate is relatively low, it is still above the previously stated global target of five per cent. Additionally, there is the possibility that within this average rate, for such a vast area of disparate and diverse economies with varying levels of competition between remittance providers, there may be high remittance rates being experienced by individual nations within the Caribbean.

Based on a 2009 report, Figure 2 shows the cost of remittances as a percentage of the value transferred for eight Caribbean countries averaging at a rate 9.76 per cent.

In Haiti, Jamaica and Dominican Republic, total remittances value at 27.8 per cent, 17.2 per cent and 14.1 per cent of GDP respectively, while in Trinidad and Tobago it forms less than one per cent. Hence for some Caribbean nations, lower remittance rates could have a strong positive impact on the economy, but for others it is of lesser concern.

Figure 2
Cost of Remittance as percentage for eight Caribbean Nations
 (Percentages)



Source: Inter-American Dialogue (Orozco, 2008).

³¹ See target 10.c of draft of the Sustainable Development Goals, as listed in the *Report of the Open Working Group of the General Assembly on Sustainable Development Goals*. (A/68/970).

One of the promises of digital currency has been that lower transaction costs could result in lower remittance rates. Details of two remittance schemes utilizing digital currency (Bitcoin) to facilitate cheaper and faster transfers are presented below:

- BitPesa is a Nairobi based digital currency exchange which accepts Bitcoin and exchanges it for Kenyan Shillings, which appears in a mobile wallet in Kenya, for a flat fee of three per cent. After beta testing in May 2014, it was officially launched in the UK in June 2014. The solution is amenable to ultimate remittances receivers in Kenya, as given the popularity of mobile money solution M-PESA, there is a high degree of acceptance and understanding amongst the population of receiving payments via their mobile phone.
- Bitspark³² enables Bitcoin remittance between Hong Kong and the Philippines satisfying the needs of an estimated 140,000 Filipinos working in Hong Kong. This is approximately two per cent of the population which on average sends HK\$3,000 (U.S. \$387) and HK\$4,000 (U.S. \$515) back to the Philippines per month. While the existing remittance rate for such transfers is low by international standards at 2.5 per cent, Bitspark is providing their service at rate of one per cent.

Remittances can also be facilitated via Bitcoin ATMs, which use ATM cards linked to a user's Bitcoin address. This means that anyone from around the world can transfer bitcoins to that address and the user can then go to any participating Bitcoin ATM and retrieve the monetary equivalent of value from the recently transferred bitcoins to his address and ATM card³³. While, in theory, this could be achieved at a very low cost, the transfers are exposed to the risk of volatility in the value of Bitcoin during the period that funds are held in bitcoins, and will also have to pay exchange costs associated with transferring fiat currency into bitcoins on one end, and then back to fiat currency on the other. Additionally, as proprietors of Bitcoin ATMs will likely need to shoulder the costs imposed by regulation, which include, but are not limited to Anti-Money Laundering/Know Your Customer requirements, these costs will eventually be passed on the customer. Thus, while it certainly appears possible that the use of digital currencies can bring down the cost of remittances, the magnitude of this cost reduction is still not clear.

D. Novel payments in perspective

SmarTT, The Trinidad and Tobago National ICT Plan for the period 2014-2018 acknowledges the significance of SMEs to the local economy, stating “SMEs constitute 91 per cent of business establishments in Trinidad and Tobago, with 75 per cent of these being Micro Enterprises”. The document further states the intention to provide three workshops per year over a three-year period targeted to SMEs to assist in their e-commerce awareness. However, as previously highlighted in the EGM meeting report, better payment infrastructure may be required to get more SMEs involved in e-commerce locally in Trinidad and Tobago and the wider Caribbean.

Diagram 3 shows how the definition of e-commerce and indeed payment infrastructure is changing by bringing together the various payment methods mentioned thus far in this report. It presents these in the context of familiarity to the Caribbean population, from the perspective of an individual or an SME. It is meant to assist the reader in understanding how mobile money and digital currency solutions can be visualized in relation to more traditional payment systems.

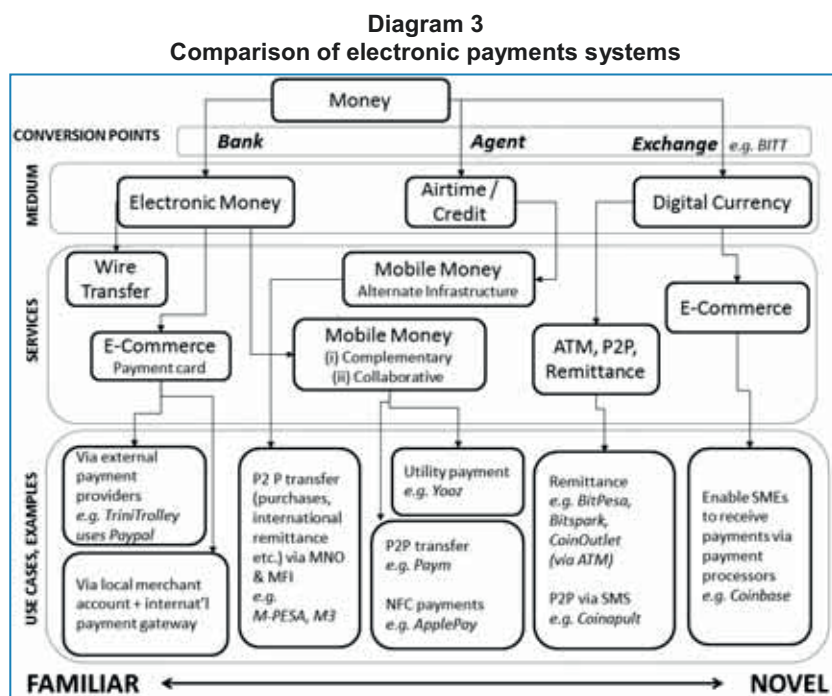
The left-hand side of the diagram shows more familiar concepts (e.g. wire transfer of funds via bank accounts) while the right-hand side shows more novel concepts such as e-commerce solutions that

³² It should be noted that Bitspark is a beneficiary of a Honk Kong business incubator initiative called Cyberport, which is geared towards assisting ICT start-ups with a Financial Technology or FinTech focus. FinTech is relatively new sector where entrepreneurs, companies and incubators seek to bring innovation to financial payments. Caribbean nations have been seeking to develop incubator-type environments to foster ICT innovation (Williams, 2014). As a growing sector in the global marketplace, could FinTech be a possible avenue for exploration as Caribbean nations seek to develop innovation?

³³ See *Report of the Expert Group Meeting on Opportunities and Risks Associated with the Advent of Digital Currency in the Caribbean*, paragraph 14.

are currently offered by payment processors using digital currency as the medium of exchange. While the extreme right shows an SME as benefiting from these e-commerce solutions, such as a Caribbean digital content creator receiving payment for work performed in a territory not supported by external payment providers such as PayPal, it should be noted that larger organizations, such as technology giants Microsoft and DELL, are now also accepting Bitcoin payments for products via some of their sales channels.

The first three levels of the diagram show the essential intermediaries in converting money into various mechanisms of transfer to facilitate payments, while the fourth level illustrates payment and transfer services made possible using these modes of payment. As previously discussed, there is a continuum of mobile money services suitable for use by persons within regions with varying levels of development of payment infrastructure. The diagram illustrates how these mobile money solutions differ from each other in terms of mechanism of transfer and novelty.



Source: Shiva Bissessar.

The last level of the diagram gives some examples of use cases of the various payment systems; however it is by no means exhaustive. Take, for example, the case of Square's mobile point of sale (mPOS) units which allows SMEs to facilitate credit card processing when attached to their mobile phones. Where would such a service of mobile e-commerce fit in this diagram? Additionally, peer to peer (P2P) transfer of digital currency via mobile phone short message service (SMS) is shown as a digital currency service when it could also be thought of as a mobile money solution. Indeed, digital currency has the potential to increase the efficiency of mobile money in terms of transaction speed and cost. This level of the diagram also makes clear the differentiation between payment card e-commerce as facilitated by external payment providers (e.g. PayPal) as opposed to that facilitated by local banks via merchant accounts and partnership with an entity providing payment gateway services.

E. The case for exploring innovation

Various Caribbean leaders have been impressed by the economic success of Singapore over the past 30 years, and there has been a drive to emulate certain aspects of Singapore's economic development within Caribbean countries (Barbados Government Information Service, 2015). However, the uneven level of

development in the innovation sector between Singapore and the Caribbean poses challenges to the subregion's current ability to emulate said economic growth. The recent Singapore financial budget, read in February 2015, cites negligible productivity gains over the past three years after a 13 per cent rise combined over the years 2010 and 2011 (Singapore Ministry of Finance, 2015). This has led to a renewed focus on innovation in that country. Commentators, such as Professor of Quantitative Finance David Lee, Vice President of the Economic Society of Singapore, have cited the need to seek out gains in innovation as a natural next step once productivity has been maximized (SMU News, 2015). This view encourages a proactive stance on the development of more efficient financial services in terms of faster transaction speed and lower transaction cost towards the goal of reaching underserved portions of the population³⁴.

This position on innovation and digital currency is also reflected in statements attributable to the Singapore delegation that participated in a Virtual Currencies Round Table event, held in February 2015, which was hosted by the Commonwealth Secretariat's, Commonwealth Cybercrime Initiative (CCI). Advanced publicity for this event described digital currency as "a new and pressing threat to the successful combating of crime," and stated that the roundtable would "consider the development of a Commonwealth strategy and resources to tackle the rise of virtual and non-fiat currencies"³⁵. Thus, it appeared that the Commonwealth Secretariat at first approached the topic from a point of view that was predominantly focused on examining risks associated with digital currency. In contrast, while the Singapore delegation's presentation to the roundtable noted these risks, framing them in terms of risk management, a subsequent summarization of their take on digital currency noted that Singapore can be characterized as "embracing new technological innovations" (The Commonwealth, 2015). This point underscores the fact that digital currency innovation can be explored while making provisions for containing risk, as more developed economies are doing at present.

Interestingly, this position was also supported by a Caribbean participant of the roundtable event, who subsequently participated in ECLAC's Second Expert Group Meeting (EGM) that reviewed a draft of this report in March 2015. The Director of Legal Reform of Jamaica's Ministry of Justice, Mr. Maurice Bailey, articulated that one of the conclusions coming out of the meeting was that Small Island Developing States need to explore the opportunities which digital currency can potentially bring to their economies. He went further to suggest that this report make explicit overtures to Caribbean policy makers to consider the opportunities which digital currency could potentially bring to the subregion.

³⁴ Professor Lee is also a director at the Sim Kee Boon Institute (SKBI) of Financial Economics, Singapore Management University (SMU). This viewpoint was elucidated as part of the author's discussion with Professor Lee in late February 2015, in conjunction with a forum hosted by the SKBI that explored the issue of digital currency in the Caribbean.

³⁵ The quoted text was transcribed from a document shared via video output with the public audience at said presentation.

V. Recommendations and conclusion

This study provides a high-level overview of issues surrounding the expanding use of digital currency and related technologies in Caribbean countries. It provides a starting point for investigation of the issues, and an opportunity for further investigation for policy makers. For example, the question of how digital currencies should be classified for taxation purposes is a complex decision, which each country in the Caribbean should approach from a perspective considering its existing laws, tax policies, and social needs, while also considering the value of harmonization of policies at a subregional level.

The references to documents provided on this topic can provide guidance on this issue, but by necessity, this paper falls short of providing policy recommendation to be adopted. Thus, this study is generally limited to recommending processes for the development of such policy. In keeping with that, the reader will note that, throughout this paper, references have been made to documents and policies produced by various bodies, and this study does recommend that these resources be used to inform the investigations of regulatory authorities as they consider both the risks and the opportunities that this emerging technology entails.

A. Recommendations

Given the deficiencies in subregional payment infrastructure, and the broader need to increase participation in the digital economy, it is incumbent upon Caribbean authorities responsible for oversight of investment, innovation and academic research to examine the opportunities for innovation that digital currency offers.

It is recommended that authorities in Caribbean countries embark on an inclusive approach to the exploration of digital currency that provides sufficient opportunity for public input and policy review, similar to the process adopted by the United Kingdom, as outlined in Chapter II, Section C.

That process compiled over 120 responses from a wide range of sources, including digital currency users, developers, and service providers, banks, payment scheme companies, academics, consultancies, and other government departments and agencies. The collected information was used to generate a prudent set of suggested policy measures for that country. This was an effective approach, but, given the vast difference in size between the United Kingdom and Caribbean economies, Caribbean

countries that follow this methodology may find it difficult to generate an adequate depth of response in considering the issue at a national level. Thus, it would benefit the process for any planned or anticipated national investigations to have some integration with a broader subregional effort that would facilitate the emergence of networks for knowledge sharing among different countries in the Caribbean. The countries of the Caribbean share many of the same concerns and limitations, and can expect to be dealing with many of the same companies wishing to operate in their territories.

Moreover, to the extent that it would be possible to harmonize public policy on digital currency across the different countries of the Caribbean, such an aligned regulatory environment would help to reduce the costs of compliance, and enable the development of a competitive subregional marketplace in this sector. Thus, it would be valuable for Caribbean countries to begin interregional cooperation in digital currency issues now, at an early stage in the adoption of the technology, by taking part in a shared policy investigation process. Countries can then develop their own national strategies, which are built to match their specific needs and priorities, but which also share some alignment in terms of broader strategic goals and means of implementation.

To that end, it may be prudent to have the issue of digital currency officially recognized as a component of future “digital economy” initiatives in the subregion, within programmes such as CARICOM’s effort to create a Caribbean Single ICT Space.

The Organization of Eastern Caribbean States (OECS), with its shared Central Bank and history of cross-national collaboration, is also well-positioned to play a leading role in the implementation of a common institutional framework for managing the regulatory issues surrounding digital currencies and mobile money solutions. Caribbean authorities should also recognize on-going activity in this area at a global level. In particular, they should consider becoming active participants in the International Telecommunications Union’s Focus Group on Digital Financial Services (See Chapter IV, Section B). Though it is not currently considered within the scope of that body, participation in such an effort – or in a similar working group – may be considered as a potential step in laying the groundwork for the development of some type of global convention to manage cross-national issues surrounding digital currency and blockchain technology.

The ITU’s effort on Digital Financial Services, at present, is especially relevant to examining the phenomenon of mobile money as a means of increasing financial inclusion. Mobile money, in terms of its existing deployment in the Caribbean subregion, is currently the more mature of the two main innovative payment technologies described in this paper. Though use of digital currency is relatively limited by comparison, that technology is quickly evolving. In the long run, though the current generation of digital currency implementations may or may not gain a critical mass of consumer acceptance in the marketplace, the innovation of blockchain-based decentralized ledger technology will likely find its way into a number of new financial applications.

One can speculate that coming years may see an increased convergence between mobile money and digital currency-based payment systems. These could potentially make use of mobile carriers’ existing retail “top up” networks as points of exchange between cash holdings and a payment system managed through decentralized blockchain technology. This type of network would be an example of Financial Technology —FinTech— which is an emerging sector that seeks to improve cost and efficiency of payments systems, and which is poised to be a growth area in coming years. Recognizing this, those charged with formulating industrial policy, as well as researchers, entrepreneurs and academics, should consider looking at this technology as a potential area in which Caribbean economies could develop specialized products and services for export. Consumers in the Caribbean could also benefit from a robust FinTech presence in the subregion, such as through lower costs for remittances and other international funds transfers (Chapter IV, Section C), through more convenient means of paying for services online, and through the associated development of a more competitive e-commerce sector in the subregion. However, if the Caribbean is to become a centre of FinTech development, there will need to be buy-in at the regulatory level. Building confidence between regulators and this new industry will necessitate a close examination of how best to manage the risks associated with the technology.

Among these risks is that of criminal activity facilitated through the use of digital currency. The reputedly anonymous nature of digital currency transactions is cited as an exacerbating factor to this risk, although consideration of the real-world effectiveness of this anonymity is a relatively complex topic. To understand the usage and limitations of anonymity in digital currency transactions, law enforcement agencies, financial investigation units and regulators all need to develop a clear understanding of the Bitcoin protocol, the Tor Project, and techniques used in deanonymization for the purpose of criminal prosecution. To that end, they may wish to review the research papers outlined within Chapter I, Section C on the topic of anonymity. Further, those researching considerations on preventing a range of illegal activities as facilitated by digital currency, such as money laundering, tax evasion, drug trafficking, and child exploitation may wish to review the report of Digital Economy Task Force, which is referenced in Chapter II, Section B. They should also consider that existing crime-fighting tools are likely to exist that can be brought to bear in combating illicit activity that may be facilitated by digital currency. In some cases, they may need to make use of technical assistance from more developed countries, through the use of Mutual Legal Assistance Treaties, or other such mechanism. However, while some external support may be available, in the long term, it is the responsibility of Caribbean nations to develop investigational competency in the area of digital currencies.

In considering criminal risk, the potential use of digital currency for money laundering purposes is among the highest of concerns of regulators. This is because the Caribbean subregion has an unfortunate history as a centre of money laundering activity, and Central Banks of the subregion have been working to lift this stigma by coming into alignment with the mandates of the Financial Action Task Force on Money Laundering (FATF). Thus, in the area of digital currencies, regulators in Caribbean countries can be expected to take careful note of FATF recommendations. In doing so, however, they must consider how these recommendations may be implemented without causing undue difficulty to Caribbean innovators. To achieve this balance, they will need to engage proactively with the companies in the FinTech industry, which are positioned to be the first line of protection in combating digital currency-based money laundering.

At the first Expert Group Meeting, it was noted that digital currency companies in the Caribbean subregion are already taking proactive action by voluntarily engaging third-party services for anti-money laundering/know your customer (AML/KYC) verification. Caribbean regulators can encourage this good behaviour by accrediting these third-party AML/KYC services (ECLAC, 2014), and by apprising industry participants as to their obligations with regard to existing anti-money laundering regulations. Regulators may also consider working with industry representatives to develop a code of conduct to provide mechanisms for cooperation in areas such as consumer protection, tax reporting, and assistance to law enforcement investigations. This code of conduct might stand as a voluntary regime until such time as it becomes clear what more compulsory measures would be appropriate. This approach is similar to the approach that the Government of the United Kingdom has indicated that it is undertaking; it has announced that it will apply anti-money laundering regulation to digital currency exchanges, while working with the industry to develop voluntary standards for consumer protection (HM Treasury, 2015).

It may be that regulators, after balancing consideration of the risks and opportunities posed by digital currency, ultimately decide to reject a broader role for digital currencies and mobile money in their respective countries. In taking this decision, however, they should recognize the risk inherent to the continuation of the current situation with regard to financial services in the Caribbean, in which large portions of the population are not served or are underserved by the banking industry. These traditional systems have underperformed in facilitating increased levels of participation in the digital economy, and opening Caribbean markets to competition from new, innovative payment systems can provide individuals and small and medium enterprises with much needed alternative services.

B. Conclusions

The case has been established that developed economies are embracing the opportunity presented by digital currency and mobile money, while putting measures in place to mitigate the risks. The case has also been made that there are specific areas in which Caribbean economies could benefit from these advancements, and that these warrant further understanding and exploration.

These areas include cheaper remittances systems, improvements to traditional payment systems and increased participation in the digital economy. The “call for information” approach taken by the Government of the United Kingdom, by reaching out to the community prior to the establishment of regulatory controls, is a progressive model for investigating the issue, and one which may prove appropriate for Caribbean authorities to follow. The approach of Singapore, which displays a willingness to examine the innovation offered by digital currency while also being mindful of the risks, is another example of a balanced approach to engaging with new digital currency technology.

However, Caribbean authorities appear to be taking a more cautious approach to issues of digital currency and mobile money. The reluctance to outwardly engage with these issues may be connected to the highly publicized instances of illegal or otherwise questionable activities associated with some users of digital currency. These activities are troubling, but have overshadowed some real potential benefits of this new technology.

The high level of institutional caution in this area may also be influenced by a preference to avoid engaging in perceived areas of risk, as denoted by financial compliance bodies such as FATF. It seems that money laundering is viewed as a dominant concern, and there is little institutional structure that gives an appropriate counterweight based on concern for the needs of innovators. This is why there is a need for the process of developing regulations surrounding innovative payment technology to be broadened to encompass a wider range of institutions, including those which are prepared to advocate for the needs of technology innovators. To that end, Central Banks, in their role as the primary regulators of payment technology, should reach out to academic and research institutions, development and investment initiatives, and Ministries with responsibility for the promotion of trade and industry. This inclusive approach will help to ensure that voices representing the need for innovation are given due consideration as part of the decision making process.

As things currently stand, the high level of institutional caution on the part of regulatory authorities may hinder the prospects for broader adoption of digital currency technology in Caribbean countries. This does not bode well for the subregion’s overall ability to embrace ongoing technological change. Consider, from the example given in this paper’s introduction, the problem of how long it has taken for some countries in the subregion to gain a toe-hold in the e-commerce sector. Institutional processes will likely need to be set in motion to increasingly cater for the emerging needs of entrepreneurs in the ICT sector and their prospective customers. There is a danger of a similar scenario playing out with digital currency, or indeed, with any new technology that may arrive in the Caribbean. That is why there is a need for broad reconsideration of how Caribbean national regulatory systems can be more agile in responding to the emergence of new technology. The advent of digital currency technology represents an opportunity for Caribbean countries to revise this process, and to demonstrate that innovation has an equal place at the table in the consideration of national priorities.

Bibliography

- Ali, R., Barrdear, J., Clews, R., & Southgate, J. (2014, September). Innovations in payment technologies and the emergence of digital currencies, Quarterly Bulletin 2014 Q3. Bank of England,. Retrieved from <http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q3digitalcurrenciesbitcoin1.pdf>.
- Bank of Jamaica. (2014). Bank of Jamaica Clears Way for DBJ Mobile Money for Microfinance Pilot Project. Retrieved from <http://www.dbankjm.com/news/bank-jamaica-clears-way-dbj-mobile-money-microfinance-pilot-project>.
- Barbados Government Information Service. (2015, March). Barbados and Singapore share ideas. Retrieved from <http://www.nationnews.com/nationnews/news/64346/barbados-singapore-share-ideas>.
- Bissessar, S. (2014a, April). Digital currencies new technology new business model. Retrieved from <http://www.slideshare.net/ShivaBissessar1/digital-currencies-new-technology-new-business-model>.
- _____. (2014b, August). Using Digital Currencies To Increase Caribbean Participation In The Internet Economy. Retrieved from <http://www.ict-pulse.com/2014/08/digital-currencies-increase-caribbean-participation-internet-economy/>.
- CARILEC. (2013). CARILEC 2012 Annual Report. Retrieved from http://www.carilec.org/uploads/publication/publication_1378430496.pdf.
- Central Bank of Trinidad & Tobago. (2014, March). Payments Quarterly Dec 2013 Adjusted. Retrieved from http://www.central-bank.org.tt/sites/default/files/Payments_Quarterly_Dec_2013-Adj.pdf.
- Clenfield, J., & Alpeyev, P. (2014, June 16). “Bitcoin Jesus” Calls Rich to Tax-Free Tropical Paradise. Retrieved from http://www.bloomberg.com/news/2014-06-15/-bitcoin-jesus-calls-rich-to-tax-free-tropical-paradise.html?_ga=1.194191396.822127560.1403012188.
- Coinapault_btc. (2014). Dominican Adella Toulon-Foerster explains to Dominicans what Bitcoin is. Retrieved from https://www.reddit.com/r/Bitcoin/comments/2f6yy6/dominican_adella_toulonfoerster_explains_to/
- Coinbase Inc. (2014, August 18). Re: Comments on Proposed Rulemaking regarding Regulation of the Conduct of Virtual Currency Businesses - DFS-29-14-00015-P. Retrieved from <https://dl.dropboxusercontent.com/u/324237/Coinbase%20Letter%20to%20NYSDFS%20on%20proposed%20BitLicense.pdf>.
- Cumberbatch, S. (2014, February 3). Taking Bitcoins to the region. Retrieved from <http://www.nationnews.com/nationnews/news/6898/taking-bitcoins-region>.
- Dalberg (2012). Haiti Mobile Money: A Point-in-Time Case Study. Bill and Melinda Gates Foundation. Retrieved from <http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/05/Haiti-Mobile-Money.pdf>.

- Digital Economy Task Force. (2014, March). The Digital Economy: Potential, Perils, and Promises. Retrieved from <http://thomsonreuters.com/business-unit/legal/digital-economy/digital-economy-task-force-report.pdf>.
- Dominica News Online. (2014, October). Dominican gets top job in Bitcoin industry. Retrieved from <http://dominicannewsonline.com/news/homepage/news/business/dominican-gets-top-job-bitcoin-industry/>.
- Duhaime, C. (2014, June). Canada implements world's first national digital currency law; regulates new financial technology transactions. Retrieved from <http://www.duhaimelaw.com/2014/06/22/canada-implements-worlds-first-national-bitcoin-law/>.
- Electronic Frontier Foundation. (2014, October 21). Comments to the New York State Department of Financial Services on BitLicense. Retrieved from <https://www.eff.org/files/2014/10/21/bitlicense-comments-eff-ia-reddit-hofmann-cover.pdf>.
- Evans, David S. and Pirchio, Alexis (2015, March). An Emperical Examination of Why Mobile Money Schemes Ignite in Some Developing Countries but Flounder in Most. University of Chicago Law School. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2578312.
- European Banking Authority. (2014, July 4). EBA Opinion on “virtual currencies.” Retrieved from <http://www.eba.europa.eu/documents/10180/657547/EBA-Op-2014-08+Opinion+on+Virtual+Currencies.pdf>.
- European Central Bank. (2012, October). Virtual Currency Schemes. Retrieved from <https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemes201210en.pdf>.
- Financial Cryptography and Data Security 2014. (n.d.). Retrieved from <http://fc14.ifca.ai/program.html>
- _____. 2015. (n.d.). Retrieved from <http://fc15.ifca.ai/schedule.html>.
- FinCEN. (2013, March 18). Application of FinCEN's Regulations to Persons Administering, Exchanging, or Using Virtual Currencie. Retrieved from http://fincen.gov/statutes_regs/guidance/pdf/FIN-2013-G001.pdf.
- _____. (2014, January 30). Application of FinCEN's Regulations to Virtual Currency Mining Operations. Retrieved from http://www.fincen.gov/news_room/rp/rulings/pdf/FIN-2014-R001.pdf.
- Groenfeldt, T. (2014, December 18). New York Is Ready With Revision of Bitcoin Regulations. Retrieved December 26, 2014, from <http://www.forbes.com/sites/tomgroenfeldt/2014/12/18/new-york-is-ready-with-revision-of-bitcoin-regulations/>.
- Hill, K. (2013, August 12). Every Important Person In Bitcoin Just Got Subpoenaed By New York's Financial Regulator. Retrieved December 26, 2014, from <http://www.forbes.com/sites/kashmirhill/2013/08/12/every-important-person-in-bitcoin-just-got-subpoenaed-by-new-yorks-financial-regulator/>
- HMRC. (2014, March). Revenue and Customs Brief 9 (2014): Bitcoin and other cryptocurrencies - GOV.UK. Retrieved from <https://www.gov.uk/government/publications/revenue-and-customs-brief-9-2014-bitcoin-and-other-cryptocurrencies/revenue-and-customs-brief-9-2014-bitcoin-and-other-cryptocurrencies>.
- HM Treasury. (2015, March). Digital currencies: response to the call for information. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/414040/digital_currencies_response_to_call_for_information_final_changes.pdf.
- International Telecommunications Union. (2014). DRAFT Summary of the first meeting of Focus Group on Digital Financial Services.
- IRS. (2014, March). IRS Notice 2014-21. Retrieved from <http://www.irs.gov/pub/irs-drop/n-14-21.pdf>.
- Kraken. (n.d.). Kraken Proof-of-Reserves Audit Process. Retrieved from <https://www.kraken.com/security/audit#audit>.
- Library of Congress. (2014, January). Regulation of Bitcoin in Selected Jurisdictions. Retrieved from <http://www.loc.gov/law/help/bitcoin-survey/regulation-of-bitcoin.pdf>.
- Marco Santori. (2013, August). Bitcoin Law: What US businesses need to know. Retrieved from <http://www.coindesk.com/bitcoin-law-what-us-businesses-need-to-know/>.
- Marty, B. (2014, August). Dominica Will Be First Nation with Universal Bitcoin Possession. Retrieved from <http://panampost.com/belen-marty/2014/08/28/dominica-will-be-first-nation-with-universal-bitcoin-possession/>.
- Mauree, V., & Kohli, G. (2013, May). The Mobile Money Revolution Part 2: Financial Inclusion Enabler. International Telecommunications Union. Retrieved from http://www.itu.int/dms_pub/itu-t/oth/23/01/T23010000200002PDFE.pdf.
- McKayRafe, C., & Mazer, R. (2014, October). 10 Myths About M-PESA: 2014 Update. Retrieved from <http://www.cgap.org/blog/10-myths-about-m-pesa-2014-update>.

- Meiklejohn, S., Pomarole, M., Jordan, G., Levchenko, K., McCoy, D., Voelker, G. M., & Savage, S. (2013). A fistful of bitcoins: characterizing payments among men with no names. In *Proceedings of the 2013 conference on Internet measurement conference* (pp. 127–140). ACM.
- Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. *Consulted*, 1(2012), 28.
- National Electronic Commerce Policy Committee. (2000). Preparing Trinidad and Tobago for Doing Business In The Internetworked Global Digital Economy. Retrieved from <http://unpan1.un.org/intradoc/groups/public/documents/caricad/unpan008535.pdf>.
- NYDFS. (2014a, February 3). NYDFS Virtual Currency Hearing. Retrieved from http://www.dfs.ny.gov/about/hearings/vc_01282014_indx.htm.
- _____. (2014b, July). Chapter I. Regulations of the superintendent of financial services part 200. Virtual currencies. Retrieved from <http://www.dfs.ny.gov/about/press2014/pr1407171-vc.pdf>.
- NY State Department of Taxation and Finance. (2014, December). Tax Department Policy on Transactions Using Convertible Virtual Currency. Retrieved from http://www.tax.ny.gov/pdf/memos/9771409303016multitax/m14_5c_7i_17s.pdf.
- Orozco, M. (2008). Remittances in the Latin American and Caribbean Region: A Review of Its Economic Impact. Retrieved from <http://essays.ssrc.org/acrossborders/wp-content/uploads/2009/08/ch13.pdf>.
- Pierre Brondi. (2014, November 10). French Regulator Discussed Bitcoin | BitcoinVox - Bitcoin News, Market, Regulation, Analysis & Reviews. Retrieved from <http://bitcoinvox.com/article/1210/french-regulator-discussed-bitcoin>.
- Reid, F., & Harrigan, M. (2011). An Analysis of Anonymity in the Bitcoin System. *System*, 3, 4.
- Richards, K. (2014a, July). Is One Company Flouting Rules of Citizenship By Investment Programme? Retrieved from <http://www.winnfm.com/news/local/9079-is-one-company-flouting-rules-of-citizenship-by-investment-programme?device=desktop>.
- _____. (2014b, July). St Kitts-Nevis will not accept Bitcoins for economic citizenship. Retrieved from <http://www.caribbeannewsnow.com/headline-St-Kitts-Nevis-will-not-accept-Bitcoins-for-economic-citizenship-21950.html>.
- Ron, D., & Shamir, A. (2012). Quantitative Analysis of the Full Bitcoin Transaction Graph. *IACR Cryptology ePrint Archive*, 584–584.
- RT. (2013, August 8). Court officially declares Bitcoin a real currency. Retrieved from <http://rt.com/usa/bitcoin-sec-shavers-texas-231/>.
- Singapore Ministry of Finance. (2015, February). Singapore 2015 Budget Statement. Retrieved from http://www.singaporebudget.gov.sg/data/budget_2015/download/FY2015_Budget_Statement.pdf.
- SMU News. (2015, February). Budget focuses on encouraging innovation and building the future. Retrieved from <http://skbi.smu.edu.sg/news/2015/02/26/budget-focuses-encouraging-innovation-and-building-future>.
- The Commonwealth. (2015, February). Commonwealth governments call for legislative reforms to prevent criminal exploitation of virtual currencies. Retrieved from <http://thecommonwealth.org/media/news/commonwealth-governments-call-legislative-reforms-prevent-criminal-exploitation-virtual>.
- The World Bank. (2014). Remittance Prices Worldwide: September 2014. Retrieved from https://remittanceprices.worldbank.org/sites/default/files/rpw_report_september_2014.pdf.
- Tor Project. (2014, November 9). Thoughts and Concerns about Operation Onymous. Retrieved from <https://blog.torproject.org/blog/thoughts-and-concerns-about-operation-onymous>.
- Toulon-Foerster, A. (2014, September). COMMENTARY: What is Bitcoin? Retrieved from <http://dominicanewsonline.com/news/homepage/features/commentary/commentary-bitcoin/>.
- Watkins, K., & Quattri, M. (2014, April). Lost in intermediation: How excessive charges undermine the benefits of remittances for Africa. Overseas Development Institute. Retrieved from <http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8901.pdf>.
- Williams, R. C. (2015). Development strategies for the information and communications technology sector in the Caribbean: A global perspective. Retrieved from <http://www.cepal.org/portofspain/noticias/documentosdetrabajo/2/54542/lcarl460.pdf>.
- Zetter, K. (2013, November 18). How the Feds Took Down the Silk Road Drug Wonderland. Retrieved December 28, 2014, from <http://www.wired.com/2013/11/silk-road/>.

Annexes

Annex 1

Box A.1 UK call for information on digital currencies

Question 1

What are the benefits of digital currencies? How significant are these benefits? How do these benefits fall to different groups e.g. consumers, businesses, government, the wider economy? How do these benefits vary according to different digital currencies?

Question 2

Should the government intervene to support the development and usage of digital currencies and related businesses and technologies in the UK, or maintain the status quo? If the government were to intervene, what action should it take?

Question 3

If the government were to regulate digital currencies, which types of digital currency should be covered? Should it create a bespoke regulatory regime, or regulate through an existing national, European or international regime? For each option: what are the advantages and disadvantages? What are the possible unintended consequences (for instance, creating a barrier to entry due to compliance costs)?

Question 4

Are there currently barriers to digital currency businesses setting up in the UK? If so, what are they?

Question 5

What are the potential benefits of this distributed ledger technology? How significant are these benefits?

Question 6

What risks do digital currencies pose to users? How significant are these risks? How do these risks vary according to different digital currencies?

Question 7

Should the government intervene to address these risks, or maintain the status quo? What are the outcomes of taking no action? Would the market be able to address these risks itself?

Question 8

Should the government regulate digital currencies to protect users? If so, should it create a bespoke regime, or regulate through an existing national, European or international regime? For each option: what are the advantages and disadvantages? What are possible unintended consequences (for instance, creating a barrier to entry due to compliance costs)? What other means could the government use to mitigate user detriment apart from regulation?

Question 9

What are the crime risks associated with digital currencies? How significant are these risks? How do these risks vary according to different digital currencies?

Question 10

Should the government intervene to address these risks, or maintain the status quo? What are the outcomes of taking no action?

Question 11

If the government were to take action to address the risks of financial crime, should it introduce regulation, or use other powers? If the government were to introduce regulation, should it create a bespoke regime, or regulate through an existing national, European or international regime? For each option: what are the advantages and disadvantages? What are possible unintended consequences (for instance, creating a barrier to entry due to compliance costs)? What has been the impact of FinCEN's decision in the USA on digital currencies?

Question 12

What difficulties could occur with digital currencies and financial sanctions?

Question 13

What risks do digital currencies pose to monetary and financial stability? How significant are these risks?

Source: HM Treasury, Government of the United Kingdom.

Annex 2

Table A.1
European banking authority risks

A) Risk to Users			
General risks, irrespective of purpose	A01	User suffers loss when an exchange is fraudulent	High
	A02	User suffers loss when an ostensible exchange is not a genuine exchange	High
	A03	User experiences drop in value of VCs due to (significant and unexpected) exchange rate fluctuation	High
	A04	User who is a member of a VC mining pool does not get fair share of mined VC units from a mining consortium	Med
	A05	User suffers loss when buying VCs that do not have the VC features that the user expects	Low
	A06	User's computing capacity is abused for the mining benefit of others	Med
	A07	User suffers loss due to changes made to the VC protocol and other core components	Low
	A08	User is not in a position to identify and assess the risks arising from VC	High
	A09	User is not in a position to identify and assess the risks arising from VCs	Low
	A10	User is in violation of applicable laws and regulation	Med
	A11	User loses VC units through e-wallet theft or hacking	High
	A12	User loses VC units when exchange gets hacked	High
	A13	User's identity may be stolen when providing identification credentials to access VCs	High
	A14	Market participants suffer losses due to unexpected application of law that renders contracts illegal/unenforceable	Med
	A15	Market participants suffer losses due to delays in the recovery of VC units or the freezing of positions	High
	A16	Market participants suffer losses due to counterparties/intermediaries failing to meet contractual settlement obligations	High
	A18	Market participants suffer losses through information inequality regarding other actors	Med

Table A.1 (continued)

When used as a means of payment	A21	User suffers loss when counterparty fails to meet contractual payment or settlement obligations	High
	A22	User experiences fraud or loss of FC when using VC cash machine	Med
	A23	User has no guarantee that VCs are accepted by merchants as a means of payment on a permanent basis	High
	A24	User suffers loss when VC payment they have made to purchase a good is incorrectly debited from their e-wallet	High
	A25	User is not able to convert VCs into fiat currency, or not at a reasonable price	High
	A26	User is unable to access VCs after losing passwords/keys to their e-wallet	High
	A27	User is not able to access VCs on an exchange that is a 'going concern' (i.e. has the resources to operate)	High
	A28	User is not able to access VCs on an exchange that has gone out of business (i.e. does no longer have resources to operate)	High
When used as an investment	A41	User suffers loss as a result of VC prices being manipulated	High
	A42	User investing in regulated financial instruments (e.g. derivatives, SPS, CIS) using unregulated VCs suffers unexpected loss	Med
	A43	User suffers loss when investing in fraudulent VC investment schemes	Med
	A44	User is exposed to significant price volatility within very short time frame	Med
	A45	User is exposed to significant price volatility within very short time frames	Med
	A46	User cannot execute the VC exchange at the expected price	Med
	A47	User is exploited by a VC Ponzi scheme	Med

Table A.1 (continued)

B) Risks to non-user market participants			
Specific to exchanges	B11	Exchange is operationally unable to fulfil payment obligations denominated in VCs or FCs	Med
	B12	Exchange is not in control of its operation	Med
	B13	E-wallet provider faces loss should their refund policies be abused to hedge currency transactions	Med
Specific to merchants	B21	After accepting VC for payment, merchant is not reimbursed	Med
	B22	Unlike a FC, the merchant cannot be certain that they can spend the VCs received	Med
	B23	The merchant cannot be certain of the FC purchasing power of the VCs they have received	Med
	B24	Merchant faces compensation claims from customers if transactions have been wrongly debited	Med
Specific to some other market participants	B31	Wallet provider loses e-wallets provided for individuals	High
	B32	Scheme governance authority fails to meet payment and other obligations	High
	B33	Scheme governance authority is subject to unexpected civil/criminal liability that brings the VC scheme to a halt	Med
	B34	E-wallet provider faces compensation claims from customers if functionality of wallet is compromised or fails to provide expected functionality	Med

Table A.1 (continued)

C) Risks to Financial Integrity			
Money Laundering & Terrorist Financing Risk	C01	Criminals are able to launder proceeds of crime because they can deposit/transfer VCs anonymously	High
	C02	Criminals are able to launder proceeds of crime because they can deposit/transfer VCs globally, rapidly and irrevocably	High
	C03	Criminals/terrorists use the VC remittance systems and accounts for financing purposes	High
	C04	Criminals/terrorists disguise the origins of criminal proceeds, undermining the ability of enforcement to obtain evidence and recover criminal assets	High
	C05	Market participants are controlled by criminals, terrorists or related organisations	High
Financial crime risks	C11	Criminal uses VC exchanges to trade illegal commodities and abuse regulated financial sector at point of entry	High
	C12	Restorative justice of victims of crime is hindered by criminal using VCs to avoid seizure of assets, confiscations & financial sanctions	High
	C13	Criminal can use VCs for anonymous extortion	High
	C14	Criminal organisations can use VCs to settle internal or inter-organisational payments	Med
	C15	VCs make it more feasible for individuals to engage in criminal activity	High
	C16	Hacking of VC software, wallets or exchanges allows a criminal to implicate others in the criminal activities they commit	Med
	C17	Criminals, terrorist financiers and even entire jurisdictions are able to avoid seizure of assets confiscation, embargos and financial sanctions (incl. those imposed by IGOs)	Med
	C18	Criminals are able to create a VC scheme	High
	C19	Tax evaders are able to obtain income in VCs, outside monitored FC payment systems	Med

Table A.1 (continued)

D) Risks to payment systems in VCs			
	D01	Payment service providers (PSPs) that use FC and also provide VC services suffer losses due laws that render VC contracts illegal	Low
	D02	PSPs that use FC and also provide VC services fail due to liquidity exposures in their VC operations	Low
	D03	PSPs that offer VC payment services suffer loss of reputation when VC payments fail, because they gave the impression that VCs were regulated	Med
	D04	Businesses in the real economy suffer losses due to disruptions in financial markets that were caused by VC assets blocked, delayed, etc.	Low
E) Risks to regulatory authorities			
Reputational Risk	E01	Regulators decide to regulate VCs but the chosen regulatory approach fails	Med
	E02	Regulators do not regulate VCs but the viability of regulated financial institutions is compromised as a result of their interaction with VCs	Med
	E03	Regulation and supervision of conventional financial activities is circumvented by unregulated 'shadow' activities that incur the same risks	Med
Legal	E11	Regulator is subject to litigation as a result of introducing regulation that renders pre-existing contracts illegal/unenforceable	Low
Risks to competition objectives	E21	Should the regulator decide to regulate VCs more leniently than FCs, an unequal playing field in the market for payment services will emerge	Med
	E22	If an unequal playing field is retained, the intensity of competition in the market for FC payment services diminishes as providers exit FC markets	Med
	E23	Regulators prevent potential new entrants to payment services market if the regulatory approach to VCs is excessive	Med

Table A.1 (conclusion)

E) Risks to regulatory authorities			
To authority issuing FC (out of scope)	E31	Should VCs gain widespread acceptance, central bank as issuer of FC can no longer steer the economy, as the impact of its monetary measures become difficult to predict	Low

Source: European Banking Authority.

**ECLAC****Studies and Perspectives Series – The Caribbean****Issues published****A complete list as well as pdf files are available at****www.eclac.org/publicaciones**

46. Opportunities and risks associated with the advent of digital currency in the Caribbean, LC/L.4131, LC/CAR/L.482, 2016.
45. Ageing in the Caribbean and the human rights of older persons – Twin imperative for actions, LC/L.4130, LC/CAR/L.481, 2016.
44. Towards a demand model for maritime passenger transportation in the Caribbean – A regional study of passenger ferry services, LC/L.4122, LC/CAR/L.477, 2015.
43. The Caribbean and the post-2015 development agenda, LC/L.4098, LC/CAR/L.472, 2015.
42. Caribbean synthesis review and appraisal report on the implementation of the Beijing Declaration and Platform for Action, LC/L.4087, LC/CAR/L.470, 2015.
41. An assessment of performance of CARICOM extraregional trade agreements – An initial scoping exercise, LC/L.3944/Rev.1, LC/CAR/L.455/Rev.1, 2015.
40. Caribbean Development Report – Exploring strategies for sustainable growth and development in Caribbean small island States, LC/L.3918, LC/CAR/L.451, 2014.
39. Economic Survey of the Caribbean 2014 – Reduced downside risks and better prospects for recovery, LC/L.3917, LC/CAR/L.450, 2014.
38. An assessment of mechanism to improve energy efficiency in the transport sector in Grenada, Saint Lucia, and Saint Vincent and the Grenadines, LC/L.3915, LC/CAR/L.449, 2014.
37. Regional integration in the Caribbean – The role of trade agreements and structural transformation, LC/L.3916, LC/CAR/L.448, 2014.
36. Strategies to overcome barriers to the implementation of the Barbados Programme of Action and the Mauritius Strategy in the Caribbean, LC/L. 3831, LC/CAR/L.441, 2014.
35. Foreign direct investment in the Caribbean – Trends, determinants and policies, LC/CAR/L.433, 2014.
34. Situation of unpaid work and gender in the Caribbean: The measurement of unpaid work through time use studies, LC/L.3763, LC/CAR/L.432, 2014.
33. Progress in implementation of the Mauritius Strategy: Caribbean Regional Synthesis Report, LC/L.3762, LC/CAR/L.431, 2014.
32. Information and communication technologies for disaster risk management in the Caribbean, LC/L.3759, LC/CAR/L.430, 2013.

STUDIES

AND

PE

SPEC

TIVES

46

STUDIES

AND

PE

SPEC

TIVES

STUDIES AND PERSPECTIVES

E C L A C

Series

ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN

COMISIÓN ECONÓMICA PARA AMÉRICA LATINA Y EL CARIBE

www.eclac.org