



Institute  
and Faculty  
of Actuaries

# A Cashless Society in 2019

The Cashless World in Motion review

By Sabrina Rochemont

January 2020



# A Cashless Society in 2019

## Table of Contents

Disclaimer.....	6
A Cashless Society Working Party in 2019.....	7
Acknowledgements.....	8
Executive Summary.....	1
Keywords.....	2
Correspondence details.....	3
Introduction.....	4
Methods, tools, data and scope.....	5
Context: Money and Cashless alternatives.....	6
What is money?.....	6
Cashless alternatives.....	6
Section 1: The Geopolitics of Money in 2019.....	8
1.1 Cryptocurrencies.....	8
1.1.1 The Libra Project.....	8
1.1.2 Volatility of cryptocurrencies.....	10
1.1.3 Ecosystem dynamics.....	11
1.1.4 Regulatory responses.....	12
1.1.5 Crypto crime.....	13
1.2 Central Bank Digital Currencies (CBDC).....	14
1.2.1 Overview.....	15
1.2.2 2019 dynamics.....	16
1.2.3 2019 Pain points.....	19
1.2.4 Spotlight on China.....	19
Section 2: Revisiting 2018 themes.....	21
2.1 Technological innovation.....	22
2.1.1 The Pan-African Payment and Settlement System.....	22
2.1.2 The Mobile Internet infrastructure is maturing.....	22
2.1.3 QR codes.....	23
2.1.4 Spotlight on M-Pesa.....	24
2.1.5 Spotlight on India.....	25
2.2 Reliability, security and privacy.....	25
2.2.1 Reliability.....	25
2.2.2 Security and privacy.....	25

2.2.3 The Data Economy .....	26
2.2.4 Democracy .....	26
2.3 Economics and the politics of money .....	27
2.3.1 Access to Cash .....	27
2.3.2 Spotlight on Ghana .....	29
2.3.3 Spotlight on Nigeria .....	29
Section 3: A Cashless Society in 2019: Risks and Issues .....	30
Conclusion.....	34
Cashless Society Working Party resources .....	35
Bibliography.....	36
References .....	40

## Figures

1The Money Flower: A taxonomy of money. Bank for international Settlements, source: <a href="https://www.bis.org/cpmi/publ/d174.pdf">https://www.bis.org/cpmi/publ/d174.pdf</a> .....	15
2 Bank for International Settlements: Digital innovations have reduced remittance costs and enhanced inclusion. ....	17
3 Statista: % of adults who own no mobile phone or have a non-smartphone in 2018 .....	23

## **Disclaimer**

The views expressed in this publication are those of invited contributors and not necessarily those of the Institute and Faculty of Actuaries. The Institute and Faculty of Actuaries do not endorse any of the views stated, nor any claims or representations made in this publication and accept no responsibility or liability to any person for loss or damage suffered as a consequence of their placing reliance upon any view, claim or representation made in this publication. The information and expressions of opinion contained in this publication are not intended to be a comprehensive study, nor to provide actuarial advice or advice of any nature and should not be treated as a substitute for specific advice concerning individual situations. On no account may any part of this publication be reproduced without the written permission of the Institute and Faculty of Actuaries.

## **A Cashless Society Working Party in 2019**

The Institute and Faculty of Actuaries (IFoA) is the UK's chartered professional body dedicated to educating, developing and regulating actuaries based both in the UK and internationally. The Institute promotes and supports a wide range of research and knowledge exchange activities with members, external stakeholders and international research communities. The Institute hosts the Cashless Society Working Party.

The Cashless Society Working Party (CSWP) was formed in late 2016 with a number of volunteers. Its research delivers a neutral, analytical assessment of developments to comprehend benefits, risks and issues of a cashless society at global level, in the public interest. It provides insights into specialist economic topics, and identifies opportunities to learn from international experiences, and to adapt public policy. It also provides insights into stakeholder interests that underpin entrenched positions on the transition in progress.

Its first paper "A Cashless Society: Benefits, Risks and Issues" (referred to as the "Interim paper") formed the basis for a broader body of work on a number of topics and supported contributions towards several public consultations throughout 2018. "A Cashless Society in 2018" continued its global chronicle and presented the 2018 trends for the topic, followed by a paper discussing the rise of QR codes for payments, a key 2018 trend.

The CSWP started to take interest in the specialist topics of Central Bank Digital Currencies and crypto assets with a first article in The Actuary magazine in December 2018. This set the scene for a focus in these areas throughout 2019, with a specialist paper on the adoption of digital currencies by the life and pension industries. At the end of the first quarter, the paper "Understanding Central Bank Digital Currencies" seemed ominous of tumultuous events to follow in 2019. A later article about the potential of crypto assets for capital markets invited readers to think beyond payments.

Financial inclusion was the second area of focus for the CSWP in 2019. Starting with anecdotal evidence from Africa, the CSWP looked to draw lessons from developing regions for the potential benefit of countries such as the UK where de-cashing has been accelerating, with insidious effects on vulnerable residents. The CSWP has engaged with several events, written to stakeholders and published articles proposing a set of actions to manage the transition towards a less-cash society.

All CSWP contributions are freely available from <https://www.actuaries.org.uk/practice-areas/finance-and-investment/finance-and-investment-research-working-parties/cashless-society-working-party>

## **Acknowledgements**

I wish to thank the Institute and Faculty of Actuaries for the on-going support to the Cashless Society Working Party, in particular the Finance and Investment research sub-committee, Ian Collier, chairman of the working party, as well as its supporting members.

I could not have completed this work without Ludwig van Beethoven, Edvard Grieg, Robert Schumann and Franz Schubert for their piano sonata companionship during hours of data analysis.



## Executive Summary

The Institute and Faculty of Actuaries (IFoA) is the UK's chartered professional body dedicated to educating, developing and regulating actuaries based both in the UK and internationally. The Institute promotes and supports a wide range of research and knowledge exchange activities with members, external stakeholders and international research communities.

The Cashless Society Working Party (CSWP) was formed late 2016 with a number of volunteers. Its first paper "A Cashless Society: Benefits, Risks and Issues" (referred to as "Interim paper") formed the basis for a broader body of work. "A Cashless Society in 2018" continued its global chronicle and presented the 2018 trends for the topic. The 2019 version focuses on the trends of that year. Only significant events or announcements are talked about, and only new findings are reported for the ones that featured in the 2017 and 2018 copies. This version was collated in the spirit of further developing knowledge, compared to previous years.

The first chapter explores the events of 2019 which brought the geopolitical implications of payments to the fore: Facebook's sudden announcement of plans to launch its Libra cryptocurrency with a consortium of companies caused consternation, uniting all regulators against the project and against the ongoing excesses of leading technology platforms as a by-product.

Beyond the headlines, cryptocurrencies have been gaining increasing acceptance, with more businesses preparing to receive them as payments. Regulators are adapting to the new reality with various approaches, while public authorities are under pressure to take enforcement action against money laundering and other crimes associated with anonymous cryptocurrencies.

Behind the scenes, Central Banks have been exploring the potential for applying the technology that underpins cryptocurrencies to deploy digital fiat money, dubbed Central Bank Digital Currency (CBDC); this may take the form of a retail or wholesale instrument.

As the Libra project challenged Central Banks' authority on monetary policy, activity and research on the topic of CBDCs suddenly attracted attention in the midst of international tensions: China announced its readiness to launch a digital Yuan in the near future, emphasising the geopolitical dimension of currencies amongst a complex set of issues.

The paper then revisits the key trends that were identified in 2018, to highlight significant developments in those areas. While technological developments were relentless, reliability and security of digital solutions remain core concerns. The implications of the data economy and the power of behemoth technology platforms over personal data and, potentially, financial transactions, focused the activity of regulators. The public is equally interested in the consequences of a surveillance state on democracy.

The issue of financial exclusion and the effects of a less-cash society on poorer members of developed countries was an additional debate for legislators to consider how to tackle the viability of ATMs and the access to cash more generally. By contrast, some African Central Banks have been driving a digital payments and financial inclusion agenda. Ghana is now engaging in that journey.

Finally, this paper reviews the log of risks and issues that were defined in the interim paper, in the context of the 2018 and 2019 developments. All have evolved to some degree, yet they are still relevant and require attention.

## **Keywords**

cashless society; cashless transactions; de-cashing; cashlessness; risks and issues of a cashless society; demonetization; demonetisation; digital economy; financial inclusion; financial exclusion; data economy; security; privacy; geopolitics; crypto; cryptocurrency; Libra; Facebook; GAFA; Central Bank Digital Currency; CBDC; Digital Yuan; M-Pesa; QR code

## Correspondence details

**Sabrina Rochemont**

[chronicle@cashlessworldinmotion.org](mailto:chronicle@cashlessworldinmotion.org)

## **A Cashless Society in 2019**

### **Introduction**

When publishing “A Cashless Society in 2018” in January 2019, the question was whether the observed tensions could yet intensify. Innovation would undoubtedly continue for yet more convenience and platform integrations. Would the rollout of biometric payment cards lead the headlines? How much industry consolidation would take place? How would providers improve the reliability and security of services? How would western governments lead the transition towards a less-cash economy, and its risk of excluding vulnerable demographic groups?

Behind the scenes, the parallel world of cryptocurrencies has been gradually converging towards the formal economy. The slow-boiling frog effect took place: the sudden announcement of Facebook’s Libra project threw assumptions into disarray, especially those of Central Banks and regulators. Is the architecture of money being challenged in the process?

This new paper synthesises the developments that shook the consensus in 2019. Beyond the travails of Facebook, the first section explores two aspects of the world of cryptocurrencies: the first is the level of innovation taking place to enable cryptocurrencies into the formal economy, as well as regulator responses to developments. The second is crime associated with some cryptocurrencies, the dark side causing concern about scams, terrorism financing, money laundering and ransomware attacks.

The section then introduces Central Bank Digital Currencies, a topic associated with cryptocurrencies’ underlying technology, and possibly the future of fiat money. We will introduce the dynamics at the start of 2019, then its evolution as Central Banks are facing a new challenge: China announces its readiness to pilot a digital Yuan, elevating the topic to geopolitical levels.

The second section reviews the progress against 2018 themes, from technology to security, privacy and democracy, to the economics of money. The final chapter then revisits the risks and issues of a cashless society, in the context of development in 2018 and 2019.

Evidence supporting all statements and citations in this copy can be found in the extensive bibliography and references sections. The bibliography contains items that are sometimes directly referenced within the text and can be considered essential reading or watching for those with professional interest. The citations that underpin the reported events are classified per section to keep the text user-friendly, so can present duplications where relevant.

## **Methods, tools, data and scope**

The method used to deliver this paper is consistent with that of the earlier copies of the Cashless World in Motion, monitoring online content for the topics through a social media analytics and monitoring platform, analysing and synthesising findings.

All data was collected from the public domain. In compliance with licensing agreements and data regulations, no Personally Identifiable Information (PII), or personal data, was consulted for any reason, or referred to in preparation or writing of this paper. No personal data access was granted to any third party. Nor was any report generated that contained any personal data.

### **Approach**

The purpose of the 2019 analysis consisted of identifying and analysing new major trends, as well as monitoring for any changes or events relevant to the 2018 findings.

- Data was reviewed monthly and resulted in a monthly Cashless World in Motion newsletter circulated within the cashless working party for research purposes, and later published as a quarterly copy “Keep Up with a Cashless Society”, available through eBook stores.
- The researched topic, as demonstrated in the earlier papers, is emotive, hence leads to a requirement to filter out opinions and validate the source data, especially in the case of any unusual claim, of either orientation. Care was taken to verify references as much as possible, although some content was kept for the value of points or questions raised, rather than the numbers/statistics put forward in the content.
- Some opinion pieces have been referenced when they challenge, validate or augment prior knowledge of perceptions of events from various stakeholders, but without verifying or accepting any claimed facts into the body of this paper. When in doubt, a cautious “more likely than not” assessment has been made if the same piece has been referred to by multiple reputable sources.

### **Sampling and scope**

- For all regions except North America, >70% of articles in English, French or Spanish were taken into account.
- A gap of this paper is a six-week partial interruption in data collection from May 31 to July 15, 2019, when the author temporarily reverted to Google alerts.
- Commercial reports on market assessments were excluded from analysis.
- Topic ongoing exclusions: wearable payments.

## Context: Money and Cashless alternatives

### What is money?

Although most people use money on a day-to-day basis for the purchase of goods and services, the definition of money remains abstract. Money is usually defined through its functions<sup>1</sup>:

- As a **unit of account**, money provides a common standard to measure the total volume of production, income, savings, wealth, etc.
- As a **medium of exchange**, money provides a common medium for the exchange of goods and services, which would otherwise have taken place with barter.
- As a **store of value**, money allows for wealth to be stored and savings to occur.

As a result of these functionalities, a clear characteristic of whatever constitutes 'money' requires it to be sufficiently acceptable and trusted. Examples of money include notes and coinage, fiat currency (i.e. legal tender whose value is backed by the government), electronic money (e.g. bank deposits) and more recently, digital currencies (i.e., cryptocurrencies like bitcoins).

### Cashless alternatives

Cashless alternatives to physical notes and coins have been in existence for quite some time and have evolved alongside the payment technologies and the financial sophistication of their users. These include cheques, debit cards and credit cards. Each cashless alternative has its own individual level of security, user protection, settlement time, ease of use, and associated costs and fees.

In a quarterly bulletin by the Bank of England, a digital currency and other cashless alternatives through the four innovation categories are summarised as follows:

Category	New Payment System	New Currency	Examples
I: Wrappers	No	No	Apple Pay, Paym
II: Mobile money	Yes	No	M-Pesa (See Case Study)
III: Credits and local currencies	No	Yes	Bristol Pound
IV: Digital currencies	Yes	Yes	bitcoin, ether

The first category of innovation focuses on providing 'wrapper' services to improve the user interface and accessibility of existing payment systems architecture. These innovations therefore represent neither a new currency nor a new core payments system.

Mobile Money is a new payment system, with money stored as credits on a smart card or a system-provider's books but which continues to use national currencies. One example is M-Pesa, a popular service in Kenya that grants access to financial services, including payments, to anybody with a mobile phone.

---

<sup>1</sup> Howells, P., Bain, K., The Economics of Banking, Money and Finance, Fourth edition, [ISBN 978-0273710394](https://doi.org/10.1017/9781009037103)

Credits and local currencies rely on users trusting a new currency as a unit of account and medium of exchange. Credits are schemes in which private companies accept money in exchange for an alternative unit of account, which can be spent on a particular platform (such as within an online game). Nevertheless, they generally make use of existing payment systems, including use of 'wrapper' services, to make transfers.

Local currencies are similar in that people exchange national currencies for a local equivalent, which can be spent in a specific geographical area. UK local currencies such as the Bristol Pound or Liverpool Pound are often backed by and remain on a fixed exchange rate with sterling.

Digital currency is a form of electronic money combined with new technology involving cryptography, peer-to-peer networking, databases and a system of consensus. The most prominent example of a digital currency is bitcoin. The defining feature of digital currencies is the decentralised virtual clearinghouse and asset register, the blockchain. A key criticism of digital or cryptocurrencies is that they do not fulfil the functions of money.

## Section 1: The Geopolitics of Money in 2019

### [Section 1 references](#)

A new theme is emerging. In “A Cashless Society in 2018”, we suggested the geopolitics of money as an additional dimension for the topic, raising a question of how international tensions will weigh on future payment trends. Some countries have been assessing the risks and possible responses to a lack of competition on the market, in particular related to dominant payment processors and the effects of leading technology companies (dubbed BigTech or GAFA<sup>2</sup>) on their national payment ecosystem.

Cryptocurrencies were mentioned as a new form of money in our interim paper. However, these were not material to developments in 2018: as cryptocurrencies operated in a parallel world, with minimal impact on the formal economy, institutions concluded that the numbers suggested a low risk to financial stability. 2019 events challenged that assumption.

### 1.1 Cryptocurrencies

#### 1.1.1 The Libra Project

### [Section 1.1.1 references](#)

From May, Facebook started announcing the launch of a cryptocurrency, with the broad mission of making payments easier, and the hypothesised agenda of shifting the balance of power with advertisers, financially rewarding users for their interaction with features. The value it proposes is a global, inclusive and stable digital currency (dubbed stablecoin). Facebook would be launching Libra in 2020, to enable people to send each other money and pay for goods on its social platform, on the Internet and in the real world without a bank account.

The cryptocurrency would be pegged on a basket of currencies including the Dollar, Japanese Yen and Euro to become a stablecoin, implying Facebook would require alliances with firms approved to operate a cryptocurrency pegged to the Dollar. Facebook hired talent from Paypal and registered the Libra Network company in Switzerland to focus on Blockchain and payments. It also lifted its restrictions towards the circulation of cryptocurrency products and services on its platform.

Facebook formally announced the Libra Project in June, releasing its white paper; it disclosed its partnership with a number of organisations forming an association based in Switzerland, and operated from Facebook’s Research and Development centres in New York and Tel Aviv. The announcement caused an uproar and was received with hostility in the US Congress and with international regulators.

In early July, as the US House Committee on Financial Services called on Facebook to stop its Libra development, the BigTech were being called for hearings on their data practices. In late July, the US Senate conducted a hearing on regulatory frameworks for digital currencies and Blockchain. The Libra executive attempted to convince the senate that “*Libra is not to compete with sovereign currencies or to interfere with monetary policy.*” Facebook also stated publicly that “*Libra would not launch until government approval and regulatory concerns are addressed.*”

Facebook’s quarterly SEC filing in late July detailed the significant regulatory scrutiny and its impact on the business. It elicited the unknown elements of unproven technology, uncertain market acceptance and regulations, with their possible effects on the ability or timeliness to launch the Libra currency. Along with the costs incurred when taking part in the project, they noted the possible adverse effect on the business, reputation, and financial results.

---

<sup>2</sup> GAFA is an acronym for Google, Apple, Facebook, and Amazon — the four most powerful American technology companies.



A particular concern for regulators is the potential for Libra to spread quickly through the social network, away from any central banking or regulatory oversight, and take total control. Central banks must therefore hurry to address issues within the payment systems that encourage cryptocurrency adoption.

Another topic of interest is the ambiguous relationship between the proposed cryptocurrency and the Dollar. Libra announced its stablecoin would be backed by a basket of major currencies. After ruling out the Chinese Yuan, it appears Libra would be covered by up to 50% by Dollars and short-term US government bonds followed by Euro assets, an oxymoron, given the independent selling proposition and the expectation that a successful global cryptocurrency would challenge the Dollar's dominance.

A hearing on the regulatory implications of stablecoins took place with the Committee on Payments and Market Infrastructure, with Libra as well as other players in the field; this resulted in sceptical statements with regard to risk and the requirement for international regulatory coordination. A separate hearing focused on Facebook privacy and market practices.

Political reactions continued through September, with France and Germany announcing an anti-trust probe, and the intention to block Libra from the European Union within existing or new regulatory frameworks. The US regulator was yet to decide if Libra would qualify as a security, commodity or currency. Libra applied for a payment system licence in Switzerland.

The Libra Association kept going through tough times in the autumn, placing strains on its partners' engagement, as well as unsettling its global vision in its attempt to reassure politicians and regulators; these became concerned about other similar projects in the making, yet undisclosed. The Libra developments dominated online news and continued to drive political views and fuel commentary on disruptions to the banking system and the potential for Libra to be the American response to China's planned digital currency in emerging countries, while the association faced a tumultuous October:

- A number of partners withdrew from the Libra Association ahead of its formation, possibly as a result of pressure from the US Senate: Paypal, eBay, Visa, Mastercard, Stripe, Mercado, BOOKING Holdings, Priceline. It left Libra without the backing of a main payments' processor.
- The Libra Association was formed, electing five board members, including Facebook's David Marcus as well as representatives from PayU, venture firm Andreessen Horowitz, Blockchain company Xapo Holdings Limited and non-profit Kiva Microfunds. However, there were doubts about the Libra target launch date.
- A number of European politicians voiced their intentions to regulate digital currencies, considered setting up a new money-laundering watchdog, and the G7 group insisted on a sound legal basis for Libra.
- A Congress hearing on October 23, where Facebook accepted Libra is a risky project and attempted to reassure that it would not launch Libra anywhere until US regulatory approval is achieved. The Facebook CEO was challenged over anonymity, reverse transactions, crime facilitation, and whether Facebook should be broken up. It appeared Facebook rather than the Libra project was on trial. Some commentators concluded he failed to charm congress, with a resulting drop in Bitcoin price.
- The political upheaval appeared to have had no impact on Facebook revenues, as its third quarter earnings demonstrated ongoing business growth, along with its user base. However, the prospect of Libra endangered its future banking relationships.
- China raised the concern that emerging markets must have a greater say in the regulation of digital currencies, as they could bear higher impacts.

As a result of these developments, some media concluded on the demise of the project, possibly with a sigh of relief in Asia, as Libra may be a threat to WePay and AliPay. Zuckerberg's quote on American financial leadership was much commented on.

In November, Facebook launched Facebook Pay in the US, integrating payments across Facebook, Messenger, and shortly Instagram and WhatsApp for peer-to-peer payments as well as some business transactions.

*“However, even if the Facebook initiative fails, it certainly won’t be the last private sector attempt to leverage Distributed Ledger Technology to dominate global payments. If the Fed does not stay ahead of this rapidly-maturing technology, I fear private sector efforts to eclipse fiat monetary systems will get ahead of them, with potential disruptions to our banking system and, in a worst-case scenario, loss of control of our own currency.”* Sheila Bair, Former Chair of the Federal Deposit Insurance Corporation, October 2019, [Source](#).

### 1.1.2 Volatility of cryptocurrencies

#### [Section 1.1.2 references](#)

Cryptocurrencies started 2019 at a low price, then rose and experienced high volatility during the summer, leading to volumes of bullish commentaries as a result of their market gains from the depths of the winter. A number of theories failed to completely explain the mechanisms of such price changes, although the drive to bypass capital controls, geopolitical tensions and their resulting currency wars were thought to be ramping up the demand for cryptos.

The summer events were tumultuous, all of which may have had an impact on the market, to a certain extent. *“When things are going up, bitcoin tends to outperform. And when crypto goes down, the altcoins tend to take larger losses,”* said Mati Greenspan, an analyst at eToro. Others argue about the role of crypto derivatives to smooth that volatility.

For instance, the Bitcoin price dropped sharply on September 24<sup>th</sup>, denting many wallets. The event could be correlated to a number of events:

- Was it due to the Libra regulatory backlash?
- Was it because of the liquidation of long positions, notably from the biggest coin holders?
- Was it linked to the slow start of Bakkt, a new platform that provides custodial services for institutional customers and access to Bitcoin trading through future exchanges?
- Google's quantum maturity statement implies it will hack the current 256-bit cryptography by 2022. Will cryptocurrencies become irrelevant then?
- Are there implications from the SEC vs Kik lawsuit for selling unregulated securities?

*“Who still believes in crypto? There’s a strong core group of enthusiasts remaining:*

- *Hackers drawn by a disdain for authority and the libertarian aspirations behind Bitcoin’s creation.*
- *Technology geeks who believe they’re disrupting the marketplace and getting in early on the next chapter in the history of money.*
- *The biggest force in crypto today, though, are speculators – enticed by the promise of soaring gains and willing to brave the danger of steep losses.”* Olga Kharif, Bloomberg Businessweek writer, November 2019, [Source](#).

### 1.1.3 Ecosystem dynamics

#### [Section 1.1.3 references](#)

The cryptocurrency ecosystem was buoyant throughout the second semester, suggesting numerous businesses were preparing to accept cryptocurrencies as payments.

Banks' reluctance to accommodate crypto businesses seemed to increase with regulatory concerns, e.g., Israeli traders are locked out of the banking system. Barclays no longer bank crypto exchange Coinbase, possibly for similar reasons, or out of concern that customers will not be able to pay their debts in the event of a plunge in the value of their assets. The Goldman Sachs-powered Apple credit card will not allow purchases of cryptos. But UnionBank launched its own crypto in the Philippines.

Payment processors afforded a more ambivalent approach. Coindirect now enables customers to buy cryptos with credit cards. CoinZoom announced a VISA debit card. Coinberry was to provide Bitcoin payment solution to City of Richmond Hill following recent council approval.

Elsewhere, crypto-backed loans are increasingly accessible, and insurer Allianz was in advanced stages of accepting crypto for payment. Austria's telecom provider now accepts cryptocurrency. Huobi and CASHU make buying cryptocurrency effortlessly easy for millions across North Africa and the Middle East.

Security offerings were also being developed, with a solution for crypto wallet theft: a subsidiary of the Austrian State Printing House (OeSD) claimed to have developed a highly secure and forgery-proof cold wallet solution.

The mining industry has also been thriving: Hyperblock took delivery of next-generation Bitmain servers and placed a new order for \$2.9m additional next-generation servers. Over 60% of the daily crypto-trading volume takes place in Asia, the region that also hosts most of the underpinning infrastructure.

In the USA, the New York financial regulator approved a gold-backed stablecoin, and Stock Exchange's parent company launched Bakkt, giving access to Bitcoin trading to investors through future exchanges. An increasing supply of trading vehicles are linking the crypto world to the fiat one. Investment solutions, with shares that can be traded through brokerage accounts, were opening up to meet demand for those institutional buyers seeking exposure to cryptocurrencies, including crypto hedge funds and crypto exchange-traded funds. An example is Malta-based Binance acquisition of the JEX trading platform for spot and derivative trading, amongst a recent flurry of announcements to make crypto derivatives and futures more accessible to investors.

Some shareholder dividends would soon be paid in Bitcoin. In August, Huobi and OKEx led the derivative market in terms of daily volumes. Huobi launched an exchange in Argentina. In parallel, Thailand's largest digital asset exchange announced closure early in the month, prompting a sell-off.

Elsewhere, consumer products prepared for crypto adoption, such as Blockchain-ready smartphones with apps and crypto wallets pre-installed. Entertainment and sport businesses started accepting Bitcoin as payments. Point-of-sale solutions were multiplying, claiming interoperability with crypto-to-fiat conversion, through neobanks.

The risk of crypto financial crimes is a growing business opportunity for those who can spot illicit activity on the chain.

*Despite volatility, nearly half of financial professionals believe Bitcoin will outperform S&P 500 over the next 12 months [...] Nearly 40% of financial professionals identify inability to control for illicit activity as the #1 factor holding them back from doing more work with cryptocurrency." Chainanalysis, November 2019, [Source](#).*

#### 1.1.4 Regulatory responses

##### [Section 1.1.4 references](#)

In addition to their direct responses to the Libra announcements, regulators have been progressing their activities, according to their countries' approach and industrial strategies. *"Any inconsistency in rules among countries creates a loophole that renders the rules ineffective,"* Japan's head of Bank of Japan's (BOJ) payment and settlement system division said.

A few examples include:

- Japan has set up a study of stablecoin regulations and will lead the development of the SWIFT network for cryptos.
- The UK's Financial Conduct Authority published final guidance on crypto-assets regulation, warning consumers against buying assets without intrinsic value.
- In Singapore, the crypto industry body has sought feedback on its proposed code of practice.
- Indian regulators and public bodies have been evaluating the inter-ministerial committee recommendations to ban crypto.
- In New Zealand, the Inland Revenue released guidance on the treatment of crypto-assets for the payment of salaries and other benefits.
- The Czech Republic have been looking to hold stricter rules on crypto-currency firms than the EU 5<sup>th</sup> Anti-Money Laundering Directive (AMLD5).
- Fifteen countries, teaming with the Financial Action Task Force (FATF), have been working to develop a system to gather and share transaction details from individuals.
- The Swiss regulator FINMA has released guidance on its AML rules in the area of Blockchain technology.
- The European Central Bank has also been planning to bridge the existing data gap on crypto-assets and will increase its surveillance.
- Mexico's financial watchdog has issued new Fintech rules for Mexico's banks, focusing on crypto and crowdfunding.
- The US Internal Revenue Service has been sending letters warning of back taxes to more than 10,000 crypto holders.
- The Kik vs SEC lawsuit for selling unregulated securities: Kik's aggressive response has been much commented on.

Regulators have also been approving various platforms, notably a trust licence for Bakkt, a crypto affiliate of the NYSE owner Intercontinental Exchange. It provides custodial services for institutional customers alongside the federally-regulated Bakkt Bitcoin Futures contracts. Elsewhere, institutional digital asset exchange seed Digital Commodities Market and settlement affiliate Zero Hash have both received virtual currency licences.

*"The current problem that crypto is facing is regulation. Waiting for centralised institutions and governments to make decisions on crypto may be the least romantic view of an invention that was made to remove the shackles of such organisations. However, local businesses are not able to embrace crypto as much as they would like to due to lacking regulation, and thus crypto doesn't live up to its full potential in some areas as it should,"* Euroweekly News Media, August 2019, [Source](#).

### 1.1.5 Crypto crime

[Section 1.1.4 references](#)

The range of criminal activity related to cryptocurrencies seemed to validate the level of suspicion towards this parallel world. Over £27 million was lost to crypto and forex investment scams, the UK's Financial Conduct Authority has estimated. Millions were lost in fake celebrity-backed scams, pointing to consumer and investor gullibility. The naïve may think Crypto is as good as gold, as they get sucked into scams and Ponzi schemes, such as a recently-halted \$30 million scheme that targeted 300 investors involving a diamond-related cryptocurrency business; other scams led to international manhunts, suggesting that cryptocurrencies are a scammer's paradise, and should prompt a wake-up call.

Public authorities have been under pressure to take enforcement action against organised crime laundering money through crypto services that grant total anonymity, alongside international cooperation to halt darknet activities. Crypto-laundering services have been busted in the Netherlands and in Spain. Other types of crime were also reported, raising doubts over the legitimacy of upcoming American presidential crypto-donation campaigns:

- The Robinhood ransomware attack, the latest in the ransomware scene that targets companies and the computers on their network, shut down Baltimore key public services from the beginning of May for many weeks, affecting some 10,000 government computers. Hackers demanded Bitcoin payment against removal of the malware. Other US states have been affected by the same, and are building defences from cyber-attacks.
- Proof of Work Cryptocurrency exchange Binance was hacked in a large security breach, stealing 7,000 Bitcoin worth \$40 million, the 6th largest in crypto history, then moving the heist through several digital wallets, with all coins sitting in seven digital addresses of unknown identity and location. Losses of digital coins from hacks and fraud hit \$1.2 billion between January and March, around 70 percent of the level for all of 2018.
- Bitcoin donations to ISIS soared in the day before the Sri Lanka bombings.
- Cryptojacking is the illegal use of another person's computer power to mine cryptocurrency, a particularly big problem in Malaysia and throughout social networks.
- Closer to user concerns, the SIM-swapping fraud spreads, stealing control of the smartphone and its wallet contents.

A BBC radio series titled "The missing Cryptoqueen" has been exploring a crypto scam called OneCoin that has affected millions and is ongoing despite US criminal proceedings. According to the programme, the Bulgaria-based scheme ran on a standard SQL database instead of building a Blockchain. The founding woman, referred to as the "cryptoqueen", was still at large at the time of writing this paper, while her brother has admitted to a \$4bn fraud. Investigations into the scheme's money-laundering routes reached the horse-racing world, while the American authorities have engaged the Irish institutions over the suggestion that the Irish banking system has been used for mass money-laundering for the scam. OneCoin backers have also been linked to the Irish Cryptocurrency MingoCoin. The Irish have also been monitoring another scheme, DasCoin, rebranded GreenPower, that was being promoted in Galway.

Claims that cryptocurrencies offer transparency are also in jeopardy after the largest ever Bitcoin transaction, worth just over \$1 billion transferring between two accounts, has been made anonymously. Could this be from Venezuela? Reports suggest a link with the Bakkt launch, or the product of an early adopter consolidating their wallets.

Following the UN report revelations of North Korea's involvement in international crypto crime, the country denied the allegation and opened up about its national cryptocurrency ambitions. The regime has been known to be involved in Bitcoin mining since 2017. Reasons for the regime to build their national digital currency may include raising international funds for defence programmes and circumventing US sanctions (as done by Iran and Cuba).

Overall, the Libra crisis may have negatively impacted the image of the crypto industry. The ecosystem, including payment processors, has been working on security and compliance with some partnerships

to detect which digital assets are probably securities and cannot be traded. The industry has been showing some level of initiative to gain legitimacy and trust, with some players investing in information security credentials, while Anti-Money Laundering specialists have been building up capabilities near major financial hubs.

*"Highly unregulated and rapidly growing, cryptocurrency markets are ripe for fraudulent transactions."* Cassy Sommer, Staten Island Advance Trending News Manager, October 2019, [Source](#).

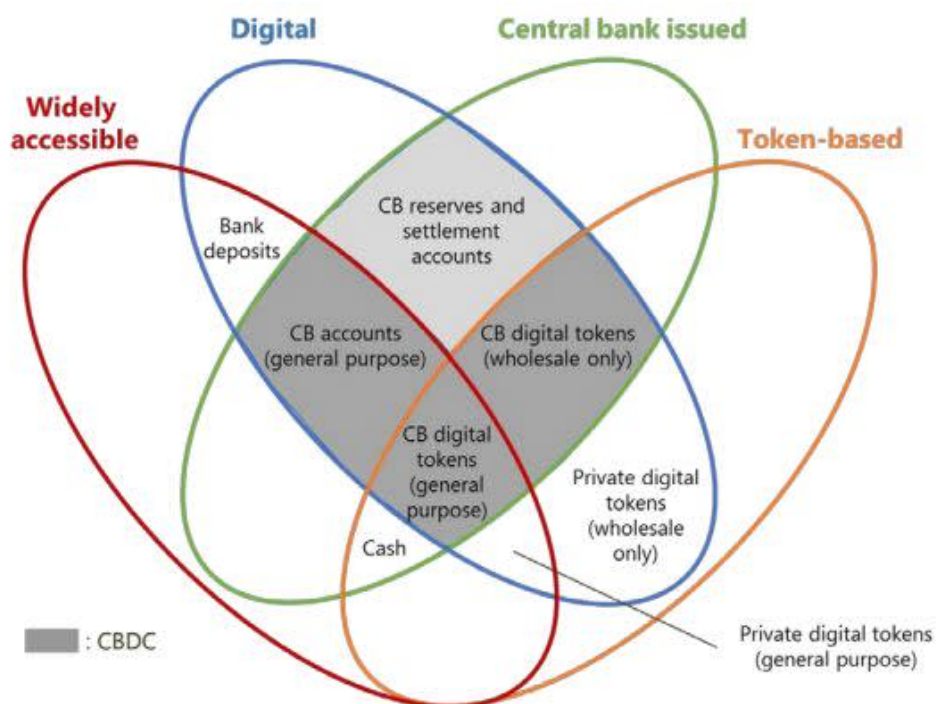
## 1.2 Central Bank Digital Currencies (CBDC)

### [Section 1.2 references](#)

As per the Bank for International Settlements, "CBDC is not a well-defined term. It is used to refer to a number of concepts. However, it is envisioned by most to be a new form of central bank money. That is, a central bank liability, denominated in an existing unit of account, which serves both as a medium of exchange and a store of value [...] This mix of new and already existing forms of central bank money makes it challenging to precisely define what a CBDC is. In fact, for purposes of analysing what may change, it is easier to define a CBDC by highlighting what it is not: a CBDC is a digital form of central bank money that is different from balances in traditional reserve or settlement accounts.

For clarity, CBDCs should be viewed in the context of other types of money. Below is a taxonomy of money in the form of a Venn-diagram referred to as the money flower (Bech and Garratt (2017)). The version here from the Bank for International Settlements focuses on the combinations of four key properties: issuer (central bank or other); form (digital or physical); accessibility (widely or restricted); and technology (token- or account-based). Money is typically based on one of two basic technologies: tokens of stored value or accounts (Green (2008) and Mersch (2017a)). Cash and many digital currencies are token-based, whereas balances in reserve accounts and most forms of commercial bank money are account-based."





<sup>1</sup>The Money Flower: A taxonomy of money. Bank for international Settlements, source: <https://www.bis.org/cpmi/publ/d174.pdf>

The topic and concepts associated with Central Bank Digital Currencies gained extensive public exposure from the summer, leading to some suggestions that central banks were communicating intent to release CBDCs in response to Facebook’s Libra crisis. However, this interpretation is misplaced, as central banks have been working on CBDCs for some time, with regular prompting from the International Monetary Fund and the Bank for International Settlements.

### 1.2.1 Overview

[Section 1.2.1 references](#)

The rise and volatility of cryptocurrencies have captured the interest of many commentators, particularly due to the excitement over a new technology, known as Blockchain, to resolve some economic development limitations and to power decentralised payment systems. Our paper “Understanding CBDCs” provided a thorough overview of the context and the concepts of central bank digital currencies:

A switch from public fiat towards private electronic money challenges the definition of money, the access to legal tender, the role of Central Banks, the financial intermediation model and the transmission of monetary policy. Central Banks have been under pressure to respond to the dramatic developments of cryptocurrencies and improve the efficiency of payment systems.

Central Banks have embarked on exploratory projects to study the potential for issuing Central Bank Digital Currencies. An array of models is under consideration for both wholesale and retail versions, yet a clear proposal is elusive: the effects of a CBDC on interest rates, financial stability, and security require careful assessment. Changes to financial intermediation would have implications for bank funding and liquidity.

Central Banks’ literature throughout 2018 tended to provide a negative view on cryptocurrencies, qualifying them as “the evil spawn of the financial crisis” (European Central Bank, 2018):

- Many countries deny them the definition of currency and point out that they do not meet the functions of money.
- They are a speculative, highly volatile medium that distorts the market, pulling away investment from the real economy and innovation into bubbles.
- They are vulnerable to crime and expose consumers and investors to high risks of loss.
- Despite the decentralisation claims of the underlying technology, intermediaries still exist, such as miners and exchanges.
- The technology is not scalable, is inefficient, and has a high environmental impact due to miners' energy use for computing power.

Technology innovation facilitated cryptocurrencies. The Blockchain technology enables transactions without a central authority which presents advantages that have been hailed as the key to the future growth in international trade. However, performance, interoperability, scalability, and security concerns leave Central Banks unconvinced that the technology is mature enough to replace current critical large-scale payment systems.

However, the Blockchain technology is generally accepted as offering substantial potential for improving public service functions, in particular to improve the cost and complexity of burdensome processes, whether financial or not. This leads several countries to position themselves as Blockchain-friendly countries, to attract investment. Cross-border payments, electronic collaterals and security settlements may be good use cases for implementation, using Blockchain technology.

There is however scepticism about the current potential of Blockchain technology for economic applications. Some have even raised concerns about a bubble situation in Blockchain investment and finance, with speculation, market manipulation and suggested conduct in breach of law and regulation widespread.

Likewise, the potential benefit of a CBDC itself divides opinion in the international community, with a variety of positions. Vast literature published in 2018 reflects the intensive global effort to assess the feasibility of CBDCs, given the breadth of models and applications. The lack of standardised definition and specification of a CBDC seems to reflect the early stage of exploration for opportunities and assessment of risks. Studies tended to unveil more risks than were hypothesised at their inception, spanning from technical, legal, economic, security, operational, to monetary policy. Current systems appear more effective than Blockchain at this stage of maturity.

### 1.2.2 2019 dynamics

#### [Section 1.2.2 references](#)

While many Central Banks had already undertaken studies on the prospect of a CBDC, there is wide acknowledgement that the Libra announcement has pushed central bankers to focus on and maybe accelerate their thinking towards CBDCs.

Others looked at the potential of cross-border payments, with the central banks of Canada and Singapore joining up projects Jasper and Ubin<sup>3</sup>, and concluding a trial using Blockchain and CBDCs, hailed as a first substantial step to make cross-border payments "cheaper, faster and safer", also the focus for Ripple's Blockchain-based payment system developments. Elsewhere, Hong Kong and Thailand signed a Memorandum of Understanding for cross-border collaboration for financial innovation, with a possible application of connecting CBDC projects LionRock and Inthanon.

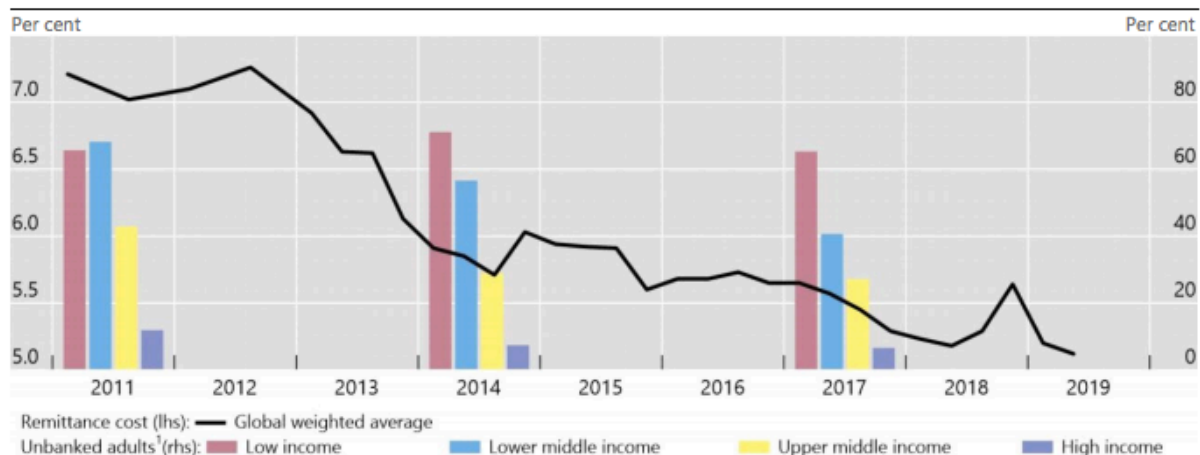
---

<sup>3</sup> In 2017 and 2018, several Central Banks initiated projects to explore the use of Blockchain for wholesale settlements systems in their own territory. Project names include Jasper, Ubin, LionRock, Inthanon. In 2019 Central Banks started to explore interfaces between these proofs of concept.



## Digital innovations have reduced remittance costs and enhanced inclusion

Graph 4



<sup>1</sup> Adults without an account; for each income group, weighted average by population for a selected set of countries.

Sources: World Bank, Global Findex; World Bank, Remittance Prices Worldwide, [remittanceprices.worldbank.org](http://remittanceprices.worldbank.org).

*2 Bank for International Settlements: Digital innovations have reduced remittance costs and enhanced inclusion.*

While Norway examined the potential for a CBDC, the Bahamas announced its own launch by 2020, Russia considered creating a gold-backed crypto, and the South African reserve bank looked to test a digital currency backed by the Rand.

In India, the much-awaited Inter-Ministerial Committee Report, ordered in late 2017, on the review of digital currencies and recommendations for action, was finally released. It proposes that people won't be allowed to "mine, generate, hold, sell, deal in, issue, transfer, dispose of or use cryptocurrency in India." It also supports some aspects of Distributed Ledger Technology and makes provisions for a digital Rupee. Various departments would examine the bill and consult with regulatory authorities before the government makes its decisions.

Elsewhere, other central banks were at various stages of their CBDC journeys. Peru was studying CBDCs and looking into the potential effects of a virtual currency. Currency in circulation amounts to 7% of GDP and most retail payments are cash in this mostly informal economy, despite recent programmes such as electronic invoicing. Financial inclusion is brought into the topic, as only 43% of the population has access to financial instruments.

In Thailand, CBDC project Inthanon was due to enter its third phase in August, to test international money transfers with Hong Kong Monetary Authority's LionRock project. The second phase of Inthanon was hailed as a success, with a number of banking partners. In the crypto department, Thailand continues to position itself as a fintech hub in Asia: Huobi has received the green light to operate a crypto exchange (the 5th digital assets licence). Thailand took a prudent view on Facebook's Libra. Despite a commitment to drive cashless transactions, the Thai people's take-up of new means of payment such as PromptPay and QR codes remained modest.

In Kenya, the Blockchain taskforce has recommended the development of a state digital asset framework which would, in the long run, enable citizens to raise funds through Initial Coin Offerings (ICOs). The strategic report paved a way for a CBDC. Rwanda was also reported to be studying the implementation of a CBDC. Mauritius introduced its new payment system MauCas, and announced a future CBDC, while modernising its regulatory framework towards a risk-based model.

Meanwhile, the East Caribbean Central Bank progressed towards its CBDC pilot into four of its countries, in a region where 80% of transactions are made through cash and cheques. The Central Bank engaged earlier with a local Fintech to launch a pilot for a Digital EC Dollar (DXCD) to address the speed and cost of transactions through retail, and peer-to-peer transactions through digital wallets. It is built on a private permissioned Blockchain platform.

The Turkish Central Bank's development plan includes issuing a CBDC and building infrastructure to support Blockchain-based initiatives to attract foreign funds capital market and for non-bank financial institutions. Will Blockchain reshape microfinance in Turkey? According to Statista, a statistics portal for market data, 20% of Turks already use or own cryptocurrencies. As in other regions, the recent currency crisis may be driving the crypto uptake. Turkey will be completing its digital Lira pilots by the end of 2020.

The confirmation that the Federal Reserve is looking into developing a digital currency has been the most viral news globally on the CBDC topic, which has built on geopolitical stakes with the dominance of the Dollar, a central point of international commentary related to China's plans to launch a digital Yuan.

The BRICs<sup>4</sup> may also be considering a common payment system, although it may not be a cryptocurrency. Other central banks such as Japan are conducting research, yet not necessarily planning to launch a CBDC.

The Eurozone has been opening up about exploring a future CBDC through Benoit Coeure, a prominent member of the ECB. Geopolitics are part of the EU rationale for a CBDC, as well as the necessity to plan for a replacement of cash. France and Germany are said to be keen on pushing the project, and a text was being drafted for the EU members to adopt a common policy towards cryptocurrencies. In addition, Europe's reliance on global payment systems, due to a regional absence of major players, has become an increasing concern. A new initiative, the Pan-European Payment System Initiative (PEPSI), backed by twenty French and German banks, is welcomed.

Meanwhile, the Bank for International Settlements set up an innovation hub centre in Switzerland with a project to examine the use of Distributed Ledger Technology (DLT) for CBDCs, and another to address the tracking of fast-paced electronic markets. In addition, the Swiss National Bank engaged the SIX Digital Exchange for a proof of concept on the use of central bank money for the trading and settlement of tokenised assets.

Elsewhere, Venezuela has been pushing for the adoption of its government-issued cryptocurrency, the Petro, announcing that some 30 million barrels of tanked oil reserves would serve as its backing. Argentina has been considering the implications of stablecoins.

Singapore's Project Ubin has continued its progress, with a prototype network for multicurrency payments. South Korea reiterated it has no plans to issue a CBDC, and that central banks should not rush to do so.

Other Central Banks are embracing Blockchain, separately from CBDC projects: Azerbaijan's Central Bank is planning to introduce a Blockchain-based identification system in 2020. Thailand is reported to plan to use Blockchain for VAT refunds, bonds and procurement.

This points to the importance of geopolitics in the interest towards CBDCs, and cryptos more generally. One aspect is the suspected use to circumvent international sanctions, as is the case with Iran. As the economy has weakened due to the sanctions imposed by the USA, the country is reportedly in the midst of a "Bitcoin craze", leading the government to take action to control the blossoming mining industry. It has simultaneously announced the creation of a gold-backed crypto.

The second aspect is the question of reserve currencies. Bank of England's Mark Carney has raised the issue of the US Dollar domination and the potential for a global digital currency to become a new reserve currency; this could be enabled through a network of CBDCs paving the way for a diversified financial system to provide a Synthetic Hegemonic Currency (SHC). This has been much commented as a Libra-like currency, although the vision will make it a multipolar system, rather than "replace one hegemon with another" (Carney, August 2019).

---

<sup>4</sup> BRIC is a grouping acronym referring to the countries of Brazil, Russia, India and China

### 1.2.3 2019 Pain points

[Section 1.2.3 references](#)

Central banks must lie uneasy at a time of facing a fully-private payment chain, international trade tensions, a shortage of monetary policy tools, and a new threat on the block: Bitcoin arisen from the Great Financial Crisis. As the world is in the midst of a trust crisis, what will be the role of cryptocurrencies in the next recession? What would be the impact of a retail Central Bank Digital Currency launch on neighbouring, weaker or pegged currencies? Could one state launch a digital currency to challenge reserve currencies in other states? How will the international community respond to a state using a digital currency to circumvent sanctions, following in the tracks of Iran?

Beyond the regulatory regime, money is about trust. Will customers forget or forgive Facebook's recent information management history, under public and regulatory scrutiny over the misuse of consumer personal data? Facebook's Libra could reach its social media 2 billion daily users, leading to unique network effects.

Facebook's Mark Zuckerberg approached regulators and central banks for guidance on regulation, yet the answer isn't yet forthcoming: will a stablecoin be considered as eMoney, Futures, or derivatives? Such coin may render cryptocurrency legitimate. Whether Facebook is ready for the regulatory requirements, payments licensing will be required in most jurisdictions – hampering the economic model. How likely is Facebook to be successful on all three payments facets of compliance, security and consumer trust?

Some commentators point to the importance of allowing innovation – provided security, monetary and financial stability are not negatively affected, and payment transactions are not compromised. It is an opportunity to challenge traditional banks to resolve slow and expensive payment systems, in particular cross-border transactions.

Elsewhere, many articles comment on the opportunity to financially include the unbanked people, by using mobile technology without requiring a cryptocurrency.

### 1.2.4 Spotlight on China

[Section 1.2.4 references](#)

In August, China announced that its CBDC is ready to pilot in Shenzhen and can be expected to launch before Facebook's Libra, following a 5-year development cycle. Some speculation, soon refuted by China, has even suggested a launch date as early as November 2019 with eight institutions.

Facebook's Libra announcement might have raised the level of urgency within the People's Bank of China (PBoC), although the effects of ongoing trade tensions with the US may be a valid alternative explanation.

Design and architecture have been the focal points of international commentary following the announcement: the Chinese approach provides a new perspective on options to prevent some risks for a CBDC as an alternative to cash (M0), such as retail management, excessive risk concentration, and financial disintermediation. As a two-tiered system, the CBDC will be issued through the existing financial network, with banks paying the full amount and 100% of the reserve to the PBoC.

The other focus of commentary has been the technology architecture. The original speech highlighted the reasons why the CBDC could not run on Blockchain alone, such as high concurrency performance and scalability limitations, and reiterated the country's neutrality towards technology. This is consistent with earlier communications from the PBoC that raised concerns about performance and the effects of excessive decentralisation of Blockchain. However, later statements seeking to clarify the situation to the western press appeared to confuse the position. Nevertheless, the latter specifies that the PBoC involves and will continue to involve Non-Government Organisations as part of the development cycle and future issuance.

China's announcement in August drove viral content associated with other countries known to be working on CBDCs such as Singapore, Canada, Bahamas, Thailand, Uruguay, Sweden and the Eastern Caribbean. This provided a partial picture of the developments, as coverage did not tend to differentiate between retail and wholesale applications of a possible CBDC and seemed to address the announcements or hearsay in isolation from the countries' views on digital currencies and Blockchain.

For instance, China is known for its opposition to private digital currencies such as Bitcoin through its 2017 ban on crypto platforms. Market players have been saying, though this cannot be verified for lack of official statistics, that current trade tensions and a weaker Yuan have been driving up the Chinese demand for cryptos to evade capital controls. In particular, larger investors are also said to be looking towards exchanges in Malta.

China's position towards private digital currency is however ambiguous, as a second ruling (since October 2018) recently affirmed that Bitcoin is virtual property and is to be protected as such (based on scarcity, value and disposability), but is not fiat money.

Some speculate whether China is about to relax its tight repression of digital currencies. In September, China addressed lingering rumours about the launch of their CBDC, openly declaring that the timing had not been decided. The speculation was however a boon for the Chinese FinTech stocks, while the government clamped down on an ICO<sup>5</sup> firm.

In November, China brought to a halt the craze that followed the announcements on commitments towards Blockchain technology, such as an investment fund. Speculation about a change of attitude towards Bitcoin originated from the misinterpretation of an official quote that "*Bitcoin is the first application of the blockchain, and in a sense it is also the most successful application to date*", and a front-page article in a state-run newspaper that aimed to educate on the Blockchain, how Bitcoin works, and justify the ban on ICOs. The PBoC issued statements to address the rumours, and an official sought to allay fears about privacy with the future CBDC.

Meanwhile, a survey suggests that 89% of Chinese Blockchain companies are planning to launch cryptocurrencies. Further reminding everyone that Blockchain should not be confused with cryptocurrency, the PBoC announced and implemented a crackdown on crypto trading, shutting down a number of platforms, but stopping short of restricting mining activities. This all led to rumours on raids. This crackdown is believed to be the cause of Bitcoin's plummeting value to a 6-month low, along drops for Ethereum and Ripple.

*"If the PBoC [People's Bank of China] issues its own cryptocurrency and uses it to replace the dollar for trade along the Belt and Road, it could challenge the dollar's dominance and offer optionality to these countries. A considerable portion of the Belt and Road trade and investments are being carried out by Chinese state-owned enterprises with a political mandate. This could make the implementation of a PBoC-backed cryptocurrency more efficient. Such a digitally -controlled approach could allow China to strike a balance between capital control and RMB internationalization that wasn't possible before."* Jennifer Zhu Scott, Radian Partners Founding Partner, on World Economic Forum, October 2019, [Source](#).

---

<sup>5</sup> An **Initial Coin Offering** (ICO) is the cryptocurrency industry's equivalent to an Initial Public Offering (IPO). ICOs act as a way to raise funds, where a company looking to raise money to create a new **coin**, app, or service launches an ICO. Source: Investopedia

## Section 2: Revisiting 2018 themes

### [Section 2 references](#)

“A Cashless Society in 2018” first identified the driving trends for the year, pointing to structural disruption of the payments’ ecosystem from conflicting forces. It then reported on regional developments for the topic, with emphasis on India, Kenya, the UK and Australia.

The technology landscape was conducive to adoption of mobile payments, with notable progress for the use of QR code payments in Asia as part of national payment initiatives to improve the cost efficiency of payment solutions and to increase financial inclusion. However, multiple and high-impact outages in payment systems related to the underlying systems or telecoms infrastructure raised concerns about our reliance on technology for critical economic functions.

Convenience continued to drive consumer adoption of contactless card and mobile payments for low-value purchases, with regional preferences as seen in 2017. Data scandals, cyber-crime and fears of a totalitarian state highlighted security and privacy concerns.

Innovation continued to offer consumers increasing levels of integrated retail experience and expanded their choice of financial services suppliers to new and more competitive digital entrants. As the use of cash reduces, the cost of transactions continued to feed the commercial payment ecosystem, costing consumers and businesses. This is also an on-going challenge to the viability of the existing ATM infrastructure, and a threat to the free access to cash.

The following examples demonstrate the themes were still relevant in 2019:

- Transport became contactless, in places such as the Netherlands, New York, Rome, Israel, Scotland (bus system), with early charging glitches in Manchester and Australia.
- Festivals became cashless: Rwanda, Ghana (rise of mobile transactions), although the arrangement benefited organisers more than consumers.
- Ecosystems delivered payment solutions, apps for kids’ financial literacy, and concerns over consumer debt.
- Banks promoted a cashless economy and stepped up to competition through innovation and new services to enable online payments; payment processors continued their acquisitions. In Thailand and the USA, banks adapted to the changing landscape.
- Convenience pushed retailers to accept more means of payment, leading to more trade, including from Chinese tourists abroad, such as in Australia and Thailand. Alternative merchant solutions expanded their reach.
- Vietnamese platforms banked on convenience to compete in buoyant market.
- Resulting boom for Point-of-Sale devices in Vietnam, Japan.
- The overall change in payments ecosystem, with increased use of digital payments, raised the question of the future of cash. Some highlighted fiscal benefits, especially for VAT, and the shadow economy. Others pointed out the discriminatory nature of cashless retailers.
- Ongoing predictions on mobile payment adoptions in developed countries, with articles highlighting opportunities and challenges of integrating with mobile wallets.
- The ongoing growth in QR code use and alliances to boost e-wallet adoption, including for cash withdrawal in Asia and Portugal, and cross-border payments.
- Multiple partnerships to broaden the use of cashless transactions in the Philippines, Greece, Vietnam, Bangladesh, and the gaming industry in South East Asia.
- Remittances continued being a battleground for innovation and start-ups in the Philippines and Africa.
- Concerns over data privacy persisted.
- Government e-payment services in Malaysia and Ethiopia, and a new mobile payment solution in Mauritius. Political drive from some countries such as Vietnam to replicate other countries’ successes with their de-cashing initiatives.
- The need for transition for a cashless society to manage risks.

- Meanwhile, contactless payments were increasingly popular for low-value transactions, Apple unveiled their card, and industrial players influenced retailers towards mobile payments, while AliPay built a new partnership in the UK.
- The UK government consulted with train operators to enable consumers to travel the entire railway network with contactless cards or smartphones.
- Hong Kong has initiated its first virtual banking services.

## 2.1 Technological innovation

Amidst the ongoing investments to drive down friction in transactions in e-commerce to maximise convenience, some developments are noteworthy for long-term implications.

### 2.1.1 The Pan-African Payment and Settlement System

[Section 2.1.1 references](#)

The positive impact of Fintech and associated effects of mobile money on opening economic opportunity in Africa needs no further demonstration. Fintech investment has been buoyant in Africa over the past couple of years, with solutions spreading throughout Africa.

The implementation of the new African Continental Free Trade Area (AfCFTA) is likely to further boost infrastructure investments as the zone is being implemented, already leading to the launch of the Pan-African Payment and Settlement System (PAPSS), the first continent-wide digital payment system. The PAPSS will save an estimated \$5 bn in transaction costs annually.

### 2.1.2 The Mobile Internet infrastructure is maturing.

[Section 2.1.2 references](#)

The mobile industry has now reached a scale to offer a compelling platform for new means of payment. GSMA identified the four enablers of mobile internet as:

- Infrastructure (most improved since 2014, globally)
- Affordability
- Consumer readiness and
- Content and services (second most improved since 2014).

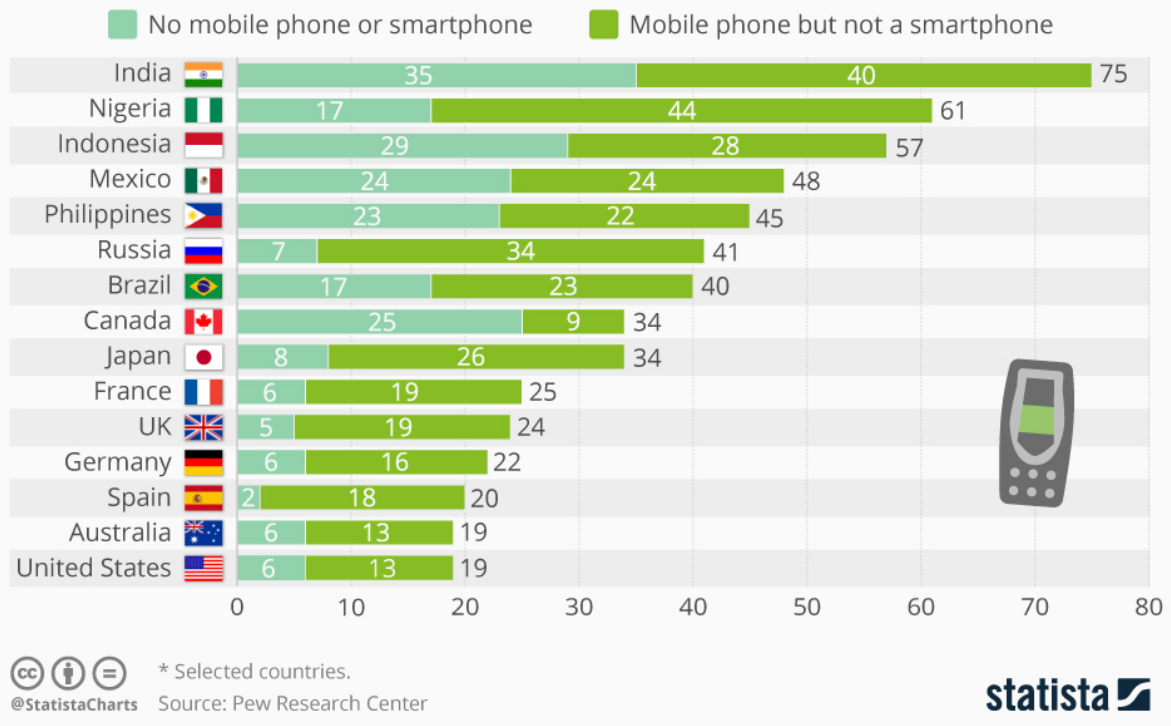
*“Affordability has improved, but remains a key consumer barrier. The average monthly cost of a 500MB data plan fell from 4.8% to 2.5% of monthly GDP per capita between 2014 and 2017. The average cost of an entry-level internet-enabled device fell from 3.6% to 2.3% of GDP per capita. However, affordability remains one of the biggest barriers for consumers to mobile internet adoption in low- and middle-income countries.”* GSMA (mobile network operators’ trade body), July 2019, [Source](#).

However, smartphone ownership is not universal.



## Smartphone Ownership: The Mobile Disconnect

% of adults who own no mobile phone or have a non-smartphone in 2018\*



3 Statista: % of adults who own no mobile phone or have a non-smartphone in 2018

### 2.1.3 QR codes

[Section 2.1.3 references](#)

Payments with Quick Response codes continued to gain adoption, with cross-border payments as a possible new use case.

Seven European payment providers have partnered to create a cross-border mobile payment network, a QR-code based project which is expected to grow and compete against the US giants. This is separate from the Pan-European Payment System Initiative, due to set up a regional system to rival Visa and Mastercard.

The J-coin Pay is Japan's new payment platform to drive cashless transactions, the outcome from a partnership of 60 banks. Launched in March, it enables users to move money from their J-coin Pay account to others' (individuals and retailers) telephone numbers or using a QR code. Transfers are free of charge, and available anytime, anywhere. It is not Blockchain-based. Future plans include payment services for non-Japanese visitors through partnerships with QR code operators outside Japan, starting with UnionPay and Alipay. The ecosystem continues to ramp up interoperable arrangements to facilitate and encourage cashless transactions, notably enabling the use of QR codes for cross-border mobile payments and for retailers. Visitors will be able to use a "Welcome Suica" contactless card.

QR Codes standards are now a core issue for interoperability, as its adoption continues. On the 25th anniversary of its introduction, its inventor calls for a security update. The Central Bank of the Philippines is also looking to set a standard for QR Codes.

*“With QR payments, it’s not that the protocol itself is particularly revolutionary – it’s how economical it is for merchants. It’s not easy for merchants to invest in a 300,000-yen credit card reader – that cost is on the merchant. But now, customers themselves are providing the infrastructure: their smartphones!”* Koichi Nakamura, Managing Executive Officer at Rakuten Inc, July 2019, [Source](#).

#### 2.1.4 Spotlight on M-Pesa

##### [Section 2.1.4 references](#)

There was extensive focus on M-Pesa in the summer, following the death of Safaricom CEO Bob Collymore. He was a social entrepreneur, respected for his contributions beyond M-Pesa and as a businessman. He will be remembered beyond M-Pesa as he brought social innovations such as mother care with maternity leave, the M-Pesa academy to finance students from poorer families, and Mschwari, a micro-saving product.

Collymore also helped avert a financial cryptocurrency catastrophe, suspending services to BitPesa and Lipisha Consortium in 2015, as they were acting as remittance services using Bitcoin without regulatory approval from the Central Bank of Kenya. Continuing the trade could have led Safaricom to breach Anti-Money Laundering and Know-Your-Customer (AML and KYC) rules.

The operating environment remains challenging: following gambling as well as compliance concerns, Safaricom has had to stop processing transactions for sport betting companies after action from the Kenyan regulator.

Mobile money tax continues to draw criticism, as the Kenyan Revenue Authority plans to monitor M-Pesa transactions to spot tax evaders. An earlier Kenyan Central Banker raised the need for Electronic Identification in order to further financial inclusion.

Safaricom’s market dominance has not prompted the regulators to act. Customer experience has improved, despite a fall in mobile cash transfers, although interoperability issues raise concerns. The regulator intervention in 2018 has had limited effects so far, as consumers still pay more for payments across networks.

The new Fuliza (Overdraft) product disbursed KSh 81bn in the first semester of 2019, with an approximate 50% of M-Pesa users’ penetration raising concerns about debt levels.

M-Pesa now focuses on international development with a KSh 407 million investment with predictions for expansion into Ethiopia and Nigeria. The strategy includes Safaricom and Vodacom purchasing the intellectual property rights from Vodafone to enable expansion across Africa. Other initiatives include a new partnership with an off-grid energy company in Mozambique. Following an earlier partnership with Alibaba, Safaricom has also partnered with Travelport, so M-Pesa users can book travel services using the mobile payment.

Business is booming for Vodacom in addition to Safaricom's success, realising some of the value from its international outreach, such as M-Pesa's increased market share in Tanzania, where it has opened its system to subscribers of other networks and launched Fuliza, the overdraft service.

However, the M-Pesa service has been withdrawn from Albania and India.



### 2.1.5 Spotlight on India

[Section 2.1.5 references](#)

In India, out of the 11 payment services banks licensed "in principle" in 2015, 7 licences were confirmed, and only 4 are still operational. M-Pesa ceased trading in July 2019 after the failure of its payments bank partner, and Vodafone faces a \$4bn charge levy for spectrum and licence fees following a supreme court ruling. It appears India's payments bank models became unviable as a result of stringent regulations that affected both assets (lending ban) and liabilities (deposit ceiling), as well as high-capital ratios. Other reports mention elements such as bureaucracy, regulations against cross-selling, and third-party partnerships. Payment banks, due to the deposit ceiling, do not have access to the Adhaar KYC automation, so have to resort to a manual, cumbersome process.

However, in parallel, 87 mobile wallets vie for Indian business, through the Unified Payments Interface (UPI), mainly serving city dwellers; infrastructure and connectivity remain a challenge in rural areas. Consumers also prefer using UPI directly for larger sums and Peer-to-Peer transfers.

The Reserve Bank has issued its 2019-2021 strategy that focuses on Competition/Cost/Convenience/Confidence and articulates around twelve outcomes. For starters, it has waived the transaction charges through RTGS and NEFT system, Internet and mobile banking, and asked banks to immediately pass on the savings to customers.

## 2.2 Reliability, security and privacy

### 2.2.1 Reliability

[Section 2.2.1 references](#)

Following the spate of high-impact incidents in the banking and payments industry, UK regulators have published their policy summary and requirements to strengthen operational resilience in the financial services sector. This means banks should:

- "identify their important business services that if disrupted could cause harm to consumers or market integrity, threaten the viability of firms or cause instability in the financial system.
- set impact tolerances for each important business service, which would quantify the maximum tolerable level of disruption they would tolerate.
- identify and document the people, processes, technology, facilities and information that support their important business services.
- take actions to be able to remain within their impact tolerances through a range of severe but plausible disruption scenarios."

### 2.2.2 Security and privacy

[Section 2.2.2 references](#)

Security is a key requirement for consumer trust and retailer protection and was identified in 2018 as a barrier to adoption of mobile payments. These are affected by SIM-swapping frauds, where hackers control the mobile phone and use its wallets.

Contactless theft is now acknowledged as a problem requiring security standards updates and is a focus for the Payment Card Industry Security Council. A flaw in the VISA contactless system that enables thieves to bypass the £30 limit raised concerns. Yet banks are keen to lift the payment cap for contactless payments.

Japan's second retail group had to stop the smartphone QR code payment roll-out after \$500k was stolen in 2 days through hacking. After reprimanding 7-Eleven, The Financial Services Agency decided to inspect payment service providers.

A new type of malware affected Indian ATMs during the summer, believed to be associated with North Korean hackers.

### 2.2.3 The Data Economy

#### [Section 2.2.3 references](#)

Leading technology platforms, often referred to as GAFAs or BigTech, have been further moving into financial services, such as the Apple card, Facebook Pay, and Google bank. These have led to probes from regulators due to the potential for abuse of personal transaction data for commercial purposes. Facebook's Libra project (detailed in section 2) became the focus of anxiety over individuals' right to privacy.

Mid-July, a Capitol Hill committee challenged the Big Technology companies Facebook, Apple, Amazon and Google over various practices that had been eroding trust in the Silicon Valley. The Swiss Federal Data Protection commissioner acted on the declarations at the US Congress, and wrote to Facebook, asking for further information on Libra. While waiting, other data authorities joined the Swiss in making statements and asking for more clarifications about Facebook's Libra project. Facebook then agreed to create a privacy panel and pay a \$5 billion settlement following a Federal Trade Commission investigation into years of privacy violations. It found itself in further trouble with an SEC complaint leading to a \$100 million penalty over its use of data, a key concern for international regulators. In August, Britain's Information Commissioner Office sent a statement to all Libra partners, signed by a number of authorities and countries. Later in the month, the German data protection authority raised an inquiry over audio transcription. A delegation of the US House of Representatives Committee on financial services travelled to Switzerland to discuss cryptocurrencies, including the Libra project, yet returned still concerned. The EU Antitrust regulators also opened a probe.

The international community united against the Libra project with some strong statements and indications that Facebook's reputation with regard to data mishandling negatively impacts the project:

- Trust with user data, and general trustworthiness due to historical behaviour, perceived as unethical
- A particular concern related to the project's digital identification implications
- Consumer protection and data security
- Level of independence from regulation
- Illicit use: compliance with Anti-Money Laundering, Know Your Customer and anti-terrorism financing regulations
- Financial stability: the attributes of a sovereign currency without the rules and controls
- Implications for monetary policy
- Risk of increased financial cybercrime.

Other related topics were associated with the crisis:

- The role of Facebook in disseminating political propaganda, and its political position, while Facebook launches a Facebook news tab in the mobile app
- Trust issues towards Facebook, with perceived failings towards child abuse, terrorist content, the WhatsApp acquisition, and the use of the social media by hate groups
- A threat to break up Facebook and other Big Tech, and a broadening of the anti-trust violations to 47 states. The EU sets its sights on Apple Pay over anti-trust concerns.

### 2.2.4 Democracy

#### [Section 2.2.4 references](#)

Our earlier papers highlighted the potential for governments to shut down the Internet in order to manage public order. New reports revealed the occurrence of Internet shutdowns in Africa is directly related to authoritarian states:

*“Of the 22 African states that have disrupted connectivity over the past five years, 77% are listed as dictatorships, while 23% are considered partial democracies. The research centre warned of the normalisation of shutdowns, as more governments justify cut-offs to prevent post elective chaos, or the spread of fake news and hate speech.” APC.org*

Hong Kong protesters faced a different scenario in 2019 as they switched their Octopus (payment) cards for cash for anonymity, and shielded their faces from facial-recognition systems, to protect themselves from an authoritative crackdown.

*“Wherever civil rights are not respected by the government, cash – much more than digital payments – helps opposition activists to protect themselves from the illegitimate use of public power, e.g., from surveillance and intimidation.”*  
Heike Mai, Deutsche Bank analyst, July 2019, [Source](#).

## 2.3 Economics and the politics of money

[Section 2.3 references](#)

The ability to access and use cash was a leading theme in 2019. The closure of ATMs and bank branches in Europe caused a popular uproar in 2018, as the scale of the change meant some high streets now lacked a cash service. As part of national infrastructure, access to cash has become a political issue. Is there some European truth to the late Safaricom CEO's comments on M-Pesa's failure to spread through Africa?

*“The reason you find it has failed [in some African countries] is that the banks are really good at lobbying against competition.”* Bob Collymore, Safaricom CEO, February 2019, [Source](#).

### 2.3.1 Access to Cash

[Section 2.3.1 references](#)

Some US cities such as Philadelphia and New York legislated against cashless stores in 2019, in order to protect the poor's ability to access goods and services.

In France, 2,500 ATMs disappeared between 2015 and 2017, with consequences for access to cash in rural areas. France preferred encouraging cashback. Banks have signed 4,000 agreements for shops to install ATMs, an upfront cost of €90,000 and a yearly maintenance cost of €14,000.

A recent comparative study of the costs of using different payment methods in the German retail sector concluded that paying by cash is less costly (€0.24 per transaction) than paying by debit or credit card (€0.33 for cards, and €0.34 per direct debit transaction). Actors in the German cash value chain have been working on efficiency schemes. One in three of the 60,000 German ATMs have so far been replaced with devices that enable customers to both withdraw and deposit cash.

In Belgium, some banks already charge customers to withdraw cash from other banks' ATMs. The local bpost banque caused outrage when updating the terms and conditions of its free bank account b.compact: account holders would only be allowed one monthly free withdrawal, then would be charged 50c thereafter. Following negative public reactions, the bank backtracked, explaining that:

- The bank may have underestimated customers' attachment to free cash withdrawals
- The b.compact account is specifically packaged for digital natives, with no account, card or internet banking fees
- These fees are linked to the effects of low interest rates on the bank's margins
- The bpost banque does not operate its own ATM network: it is a third party to the bpost ATM network.

In the UK, the Treasury Select Committee upheld the public concern that has shown through swathes of media coverage about ATMs and bank branches:

*“With the way that people access their cash seemingly on the precipice of collapsing, the Government can't just bury its head in the sand. This mustn't fall through the gaps of responsibility – the Government and regulators should get a grip of this problem before the whole arrangement collapses.”* Treasury Select Committee, February 2019, [Source](#).

The “Access to cash review”, and its reports provided a reality check for ongoing requirements for cash in the UK: cash is a necessity for 17% of the population, for rural infrastructure issues related to broadband and mobile signal availability, as well as social requirements related to vulnerable groups, and a fundamental right for choice. The review delivered unique insights on the economics of cash in the UK, the supply chain involved, and drew some pragmatic recommendations to ensure the ongoing viability of cash networks.

Following the release of Access to Cash review report in March, as well as associated inquiries for the access to financial services, the Treasury Select Committee delivered its recommendations to the UK Government in May 2019, called for urgent action thereafter, and a debate was held at Westminster. The Government's response in July framed some of the activities within its financial inclusion programme, reiterated the role and commitment towards the "Access to Banking standard", and emphasised the position of the Government towards commercial decisions between Banks and the Post Office Network. In response to the argument that the Post Office network subsidised closing bank branches, the Government pointed out that a new agreement starting early 2020 would remunerate higher fees to Post Offices for banking services. Barclays attempted to exit the Post Office scheme, reverting under pressure.

The Government rejected the call for smaller or rural communities to keep high street banking services as a community matter rather than a commercial matter, or to address gaps in service supply such as direct debit provision where high streets lose their last branch.

*“Yet that always-on [ATM], quiet and reliable face of the high street with its modest display, PIN-pad, and cash dispenser has been dragging its heels behind other financial services for a long time now. Very little, if anything, has changed in what it offers consumers.”* James Tomaney, Renovite Technologies Inc CEO, July 2019, [Source](#).

### 2.3.2 Spotlight on Ghana

[Section 2.3.2 references](#)

The parliament of Ghana passed the new Payment Systems and Settlement Bill that will now control all financial institutions which offer electronic payment services in the country. Ghana has announced that they are considering the potential benefits and costs of a CBDC, a move that appears to have triggered running commentary on Bitcoin being the future of Africa. However, the reports miss the overall strategic perspective of Ghana towards a less-cash society, as it also announced the launch of QR code payments to start in December 2019 and authorised a bank to issue mobile money.

### 2.3.3 Spotlight on Nigeria

[Section 2.3.3 references](#)

The IMF welcomed Nigeria's economic recovery, though urged to resolve structural issues that constrain growth. At micro level, both Internet access and the payments infrastructure do not seem designed to support the growth in Point of Sale transactions, leading to frustration.

The Central Bank of Nigeria hailed the appreciation of the Naira, and the inflow of foreign investment post-elections, on its success in shaping the economy through a number of focused interventions. It had confidence in its cashless policy, in particular with the development of payment systems and financial inclusion. We recently noted investments in the ecosystem, such as banks offering inclusive products, and Nigerian Telcos applying for the new Payment Service Bank licences. Ecobank is one of the players promoting payment solutions using QR codes.

The new m-Naira app is a money transfer services platform that interconnects all Nigerian bank accounts, mobile wallets and billing systems to deliver instant remittance services from anywhere in the world.





The recent regulatory framework has energised the market in Nigeria, with telco operators such as MTN acquiring a super-agent licence. Airtel is to set up a payment service bank. The next stage is for the Nigerian Government to collect VAT from online purchases, an unpopular development. Nigeria attracts international entrants to their market and is expecting M-Pesa to launch in the future.

The Central Bank's announcement of a cashless policy by March 31, 2020 led to many adverse reactions, with diverse opinions, as it also included new charges for deposits. The Senate supported the overall economic programme, with a cautious note about its effects on the plight of the poorest. However, there were some concerns that the policy is being pushed too quickly, as the platforms and services are not mature enough. The realities are different, away from Lagos, and some suggest addressing some underlying causes for cash transactions to still dominate, citing a number of structural as well as socio-economic factors.










### Section 3: A Cashless Society in 2019: Risks and Issues

The 2017 interim paper “A Cashless Society – Benefits, Risks and Issues” explored the risks and issues of a cashless society.





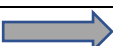


Now may be a time to revisit the log and consider the evolution of these elements. The developments detailed in this paper are relevant to many, as detailed below. The categorisation under the Red/Amber/Green traffic light rating system<sup>6</sup> is a subjective interpretation by the author.

Risk/Issue	RAG status (UK focus)	Trend (UK focus)	Comments
1.0 Hidden agendas	Amber		<ul style="list-style-type: none"> <li>The issue of a surveillance society is of particular concern in the western world, related to their trust in governments.</li> </ul>
2.0 Trust in banks	Red		<ul style="list-style-type: none"> <li>The lack of trust in banks is often cited as a key driver for the adoption of cryptocurrencies such as Bitcoin; it may also explain the rise in notes in circulation in many countries, used as a store of value in a low-interest-rate environment.</li> <li>Note: the public does not necessarily differentiate between banks and payment networks: the perception may apply to the financial industry more generally.</li> </ul>
3.0 Trust in governments	Red		<ul style="list-style-type: none"> <li>The lack of trust in government, its economic proficiency (Venezuela) and authority more generally is often cited as a key driver for the adoption of cryptocurrencies such as Bitcoin.</li> <li>The public may revert to cash in circumstances in which they experience fear of repression, such as reported in Hong Kong in 2019.</li> <li>This issue can be extended to the lack of trust in foreign governments, in the instance of international economic sanctions.</li> </ul>
4.0 The economics of money	Green		<ul style="list-style-type: none"> <li>The requirement for money as a free public commodity is one of the drivers for Central Banks such as Sweden to consider launching a retail CBDC as a replacement for cash.</li> <li>Innovations through 2018 and 2019, and the wide adoption of QR codes, have been threatening network costs and incumbents' revenue.</li> <li>Many Central Banks and governments have focused on transaction fees as part of their policies and strategies.</li> <li>Several governments (UK, Germany, France) have assessed changes</li> </ul>

<sup>6</sup> [https://en.wikipedia.org/wiki/Traffic\\_light\\_rating\\_system](https://en.wikipedia.org/wiki/Traffic_light_rating_system)

			<p>required to keep ATM networks viable, to maintain the cash supply chain.</p> <ul style="list-style-type: none"> <li>The cost and length of cross-border payments is now a focus as a result of the Libra challenge.</li> </ul>
5.0 Financial exclusion	Red		<ul style="list-style-type: none"> <li>The closure of bank branches and ATMs has brought awareness, focus and good intentions in the UK.</li> <li>The issue remains Red, pending effective action. Refer to the Cashless Society Working Party contributions on the topic.</li> </ul>
6.0 Change leadership	Red		<ul style="list-style-type: none"> <li>Lack of ownership and leadership of the structural changes persists in the UK, whereas in developing countries, many Central Banks lead the change, and design for financial inclusion.</li> </ul>
7.0 Digital economy readiness	Amber		<ul style="list-style-type: none"> <li>Rural technology infrastructure pending investments and rollouts.</li> <li>The digital economy cannot be ready until the financial exclusion issue is resolved.</li> </ul>
8.0 Security of transactions, data and biometrics	Red		<ul style="list-style-type: none"> <li>This ongoing global issue is augmented with the various hacks and thefts of cryptocurrencies, the SIM-swapping frauds, security exposure of QR codes, and flaws in contactless payment technology. Prevalence of cybercrime.</li> </ul>
9.0 Social value of cash	Amber		<ul style="list-style-type: none"> <li>For those without smart devices to use applications, cashless transactions encourage spending and therefore debt, or poorer budget management.</li> <li>This issue is related to financial exclusion, as well as education.</li> </ul>
10.0 Removing cash may stall the economy	Green		<ul style="list-style-type: none"> <li>The issue is not likely to have high impact in economies such as the UK with high levels of cashless transactions. It would, however, disproportionately affect the poor and the elderly who rely on cash, so is related to financial exclusion.</li> </ul>
11.0 A cashless society may not live up to its promises	Red		<ul style="list-style-type: none"> <li>Anecdotal evidence that crime has become cashless, ridding gangs of the cumbersome logistics of cash movements and storage.</li> <li>Anonymous cryptocurrencies and gift cards are commonly used for transactions in scams.</li> <li>Black money laundering through Bitcoin ATMs.</li> </ul>
12.0 Displacement towards alternative means of payment	Red		<ul style="list-style-type: none"> <li>The risk of displacement towards cryptocurrencies has risen since the Libra announcement, as well as the ecosystem activity to prepare for acceptance of cryptocurrencies in the formal economy.</li> </ul>
13.0 Totalitarian regimes	Red		<ul style="list-style-type: none"> <li>Internet shutdowns are used in totalitarian states to manage public disorder and dissent.</li> </ul>



			<ul style="list-style-type: none"> <li>Hong Kong protesters have been reported to revert to use cash in order to protect their anonymity during protests, as well as concealing themselves to avoid facial recognition.</li> </ul>
14.0 Sovereignty risks	Red		<ul style="list-style-type: none"> <li>Some regions such as Europe rely on the payment networks of other regions for their own economic activity.</li> <li>Control of the currency is a component of sovereignty: a project such as Libra would be a direct threat to sovereignty.</li> <li>A worldwide currency may be a threat to the weak currencies of emerging countries.</li> </ul>
15.0 End to the right of a private life?	Red		<ul style="list-style-type: none"> <li>The incursion of BigTech/GAFA into financial services, banking and payments more generally exacerbate this risk (see section “The Data Economy” in this paper)</li> </ul>
16.0 Innovation marketplace and user experience	Amber		<ul style="list-style-type: none"> <li>Interoperability remains a challenge globally, although multiple partnerships or initiatives emerge in Asia and Africa to improve convenience.</li> <li>The lack of standard for QR code payments is a core concern that affects consumer experience.</li> </ul>
17.0 Lack of competition on the payments’ marketplace	Amber		<ul style="list-style-type: none"> <li>Many central banks have been opening up licences for non-bank payment providers and developing core infrastructure and sandboxes<sup>7</sup> to support.</li> <li>BigTech/GAFA are competing with mobile wallets.</li> <li>P2P mobile payments continue spreading through Africa and Asia but have yet to break through in Europe.</li> <li>The EU PSD2 directive is now in force.</li> <li>Major payment providers have been acquiring new entrants and local solutions, causing concern about sovereignty.</li> </ul>
18.0 Excessive reliance on technology	Red		<ul style="list-style-type: none"> <li>Ongoing concern about cybersecurity and the threats to critical infrastructure such as banks and public services.</li> <li>Cash is the only payment that does not rely on technology (once withdrawn from ATMs).</li> </ul>
19.0 Politics vs Innovation	Red		<ul style="list-style-type: none"> <li>Regulators seem to be a step behind innovation such the Libra project, that challenges the assumptions and foundations of the monetary system.</li> <li>Delays in delivering regulatory guidance to innovations (such as Libra).</li> </ul>
20.0 Financial stability	Amber		<ul style="list-style-type: none"> <li>The Libra (or other third party) project as well as the prospect of a CBDC, raise the risk to financial stability.</li> </ul>

<sup>7</sup> A regulatory sandbox is a framework setup by a financial sector regulator to allow small scale, live testing of innovations by private firms in a controlled environment.



21.0 Environmental sustainability of a cashless society	Amber		<ul style="list-style-type: none"><li>• Environmental cost of cryptocurrency mining (Proof of Work)</li></ul>
---	-------	---	---

## Conclusion

This paper provides a review of developments that affected the topic of a cashless society in 2019. It attempts to synthesise the developments associated with the rising competition of cryptocurrencies to fiat money. We introduced the thinking and dynamics towards Central Bank Digital Currencies, a sub-topic of geopolitical importance following China's announcement of a digital Yuan.

2019 events also demonstrated the ongoing relevance of the tensions we identified in 2018, with the areas of security, economics and politics of money exacerbated by latest developments.

Governments and Central Banks were the stakeholders most challenged this year. They are likely to remain in focus in 2020. There is, however, a danger that priorities will shift to another crisis and the fundamental issues go unaddressed if the Libra project does not materialise. China's plans for a digital Yuan are likely to keep up the pressure.

## Cashless Society Working Party resources

- A capital idea? | The Actuary, the official magazine of the Institute and Faculty of Actuaries [WWW Document], n.d. URL <https://www.theactuary.com/features/2019/11/a-capital-idea/> (accessed 12.9.19).
- Serrao, J., van Vuuren, L. A Case Study to A Cashless Society- A Cashless Society in Africa – Spotlight on South African and Zimbabwean environments (2017 Addendum), n.d. 47. <https://www.actuaries.org.uk/system/files/field/document/A%20Cashless%20Society%20in%20Africa%2020190226%202040%20FINAL%20-%20disc.pdf> (accessed 12.9.19).
- A Cashless Society Working Party| Institute and Faculty of Actuaries [WWW Document], n.d. URL <https://www.actuaries.org.uk/practice-areas/finance-and-investment/finance-and-investment-research-working-parties/cashless-society-working-party> (accessed 12.12.19).
- Access to cash: a challenge | The Actuary, the official magazine of the Institute and Faculty of Actuaries [WWW Document], n.d. URL <https://www.theactuary.com/features/2019/12/access-to-cash-a-challenge/> (accessed 12.9.19)
- Chan, J., n.d. A Cashless Society- Benefits, Risks and Issues (Interim Paper) 27. <https://www.actuaries.org.uk/system/files/field/document/A%20Cashless%20Society%20-%20QR%20Code%20v2%20-%20final.pdf> (accessed 12.9.19).
- Coping in a Cashless Society | Institute and Faculty of Actuaries [WWW Document], n.d. URL <https://www.actuaries.org.uk/news-and-insights/news/coping-cashless-society> (accessed 12.9.19).
- Digital solutions for access to financial services in a 'less cash' world | Institute and Faculty of Actuaries [WWW Document], n.d. URL <https://www.actuaries.org.uk/news-and-insights/public-affairs-and-policy/sustainable-development-goals/digital-solutions-access-financial-services-less-cash-world> (accessed 12.9.19)
- Payment systems regulator - Call for views on cash access use and acceptance - 20190906 FINAL.pdf, n.d. <https://www.actuaries.org.uk/system/files/field/document/Payment%20systems%20regulator%20-%20Call%20for%20views%20on%20cash%20access%20use%20and%20acceptance%20-%2020190906%20FINAL.pdf> (accessed 12.9.19)
- Rochemont, S., n.d. A Cashless Society in 2018- The Cashless World in Motion review 105. <https://www.actuaries.org.uk/system/files/field/document/A%20Cashless%20Society%20in%202018%20v7%20-%20disc.pdf>
- Sabrina Rochemont: Podcast about the conference Surpass IRN - Fair and non-discriminatory access to financial services [WWW Document], n.d. . Københavns Universitets Videoportal. URL <https://video.ku.dk/sabrina-rochemont-podcast-about-the> (accessed 12.9.19).
- Take the reins | The Actuary, the official magazine of the Institute and Faculty of Actuaries [WWW Document], n.d. URL <https://www.theactuary.com/features/2018/12/take-the-reins/> (accessed 12.13.19).
- Ward, O., Rochemont, S., Understanding CBDCs Final - disc.pdf, n.d. <https://www.actuaries.org.uk/system/files/field/document/Understanding%20CBDCs%20Final%20-%20disc.pdf> (accessed 12.13.19).
- Ward, O., Nardani, S., n.d. Digital-currency adoption by life and pension industries? 14. <https://www.actuaries.org.uk/system/files/field/document/Digital-currency%20adoption%20by%20life%20and%20pension%20industries%20-%20disc.pdf> (accessed 12.13.19).

## Bibliography

- 9 defunct mobile wallets — and why they failed | PaymentsSource [WWW Document], n.d. URL <https://www.paymentsource.com/list/9-defunct-mobile-wallets-and-why-they-failed?feed=0000157-2a60-dceb-aff7-bf62dc340000> (accessed 12.12.19).
- 2019 CIGI-Ipsos Global Survey on Internet Security and Trust | Centre for International Governance Innovation [WWW Document], n.d. URL <https://www.cigionline.org/internet-survey-2019> (accessed 10.20.19).
- 2019-06-kosten-zahlungsmittel-data.pdf, n.d. <https://www.bundesbank.de/resource/blob/800766/0462923c3587a2d98f2c2db5b71047ae/mL/2019-06-kosten-zahlungsmittel-data.pdf> (accessed 10.20.19).
- Access to Cash Review [WWW Document], n.d. URL <https://www.accesstocash.org.uk/> (accessed 12.12.19).
- Africa's Home-grown Cashless Solutions - YouTube [WWW Document], n.d. URL <https://www.youtube.com/watch?v=HxpKBHWktng> (accessed 12.17.19).
- Ant Financial agrees to buy UK-based currency exchange WorldFirst - Reuters [WWW Document], n.d. URL <https://www.reuters.com/article/us-worldfirst-m-a-ant-financial/ant-financial-agrees-to-buy-uk-based-currency-exchange-worldfirst-idUSKCN1Q319G> (accessed 12.12.19).
- Auer, R., 2019. Beyond the doomsday economics of “proof-of-work” in cryptocurrencies. <https://www.bis.org/publ/work765.pdf> (accessed 12.12.19).
- Bank, E.C., n.d. Fintech for the people [WWW Document]. European Central Bank. URL <https://www.ecb.europa.eu/press/key/date/2019/html/ecb.sp190131~24b8e3fb49.en.html> (accessed 12.12.19a).
- Bank, E.C., n.d. Towards the retail payments of tomorrow: a European strategy [WWW Document]. European Central Bank. URL <https://www.ecb.europa.eu/press/key/date/2019/html/ecb.sp191126~5230672c11.en.html> (accessed 11.27.19b).
- Beau, D., 2019. Denis Beau: The role of cryptoassets in the payment system. <https://www.bis.org/review/r191015b.pdf> (accessed 12.12.19).
- Beck, S., n.d. QR mobile payments app that also supports NFC launches in Belgium [WWW Document]. URL <http://www.qrcodepress.com/qr-mobile-payments-app-that-also-supports-nfc-launches-in-belgium/8536041/> (accessed 12.12.19).
- Beermann, J., 2019a. Johannes Beermann: Back to the roots - cash and its core functions. <https://www.bis.org/review/r190910d.pdf> (accessed 12.12.19).
- Beermann, J., 2019b. Johannes Beermann: Cash and digital currencies from a central bank's perspective. <https://www.bis.org/review/r191122l.pdf> (accessed 12.12.19).
- Beermann, J., 2019c. Johannes Beermann: Maintaining a safe and efficient cash cycle in times of change. <https://www.bis.org/review/r191204e.pdf> (accessed 12.12.19).
- Behavioural economics: the psychology of abstract money [WWW Document], 2019. . Raconteur. URL <https://www.raconteur.net/finance/behavioural-economics-abstract> (accessed 12.12.19).
- Belke, A., Beretta, E., 2019. From Cash to Central Bank Digital Currencies and Cryptocurrencies: a balancing act between modernity and monetary stability (No. 201909), ROME Working Papers. ROME Network. <http://www.rome-net.org/RePEc/rmn/wpaper/rome-wp-2019-09.pdf> (accessed 12.12.19).
- Benigno, P., Schilling, L., Uhlig, H., 2019. World wide currency. VoxEU.org. URL [https://voxeu.org/article/world-wide-currency?utm\\_source=sfmc&utm\\_medium=email&utm\\_campaign=2703636\\_AgendaWeekly\\_11October2019-Campaign-Final&utm\\_term=&emailType=Agenda%20Weekly%20Newsletter](https://voxeu.org/article/world-wide-currency?utm_source=sfmc&utm_medium=email&utm_campaign=2703636_AgendaWeekly_11October2019-Campaign-Final&utm_term=&emailType=Agenda%20Weekly%20Newsletter) (accessed 10.12.19).
- Borgonovo, E., Caselli, S., Cillo, A., Masciandaro, D., Rabitti, G., 2019. Money, digital cash and cryptocurrencies: Privacy matters. VoxEU.org. URL <https://voxeu.org/article/money-digital-cash-and-cryptocurrencies-privacy-matters> (accessed 12.12.19).
- Brunnermeier, M., James, H., Landau, J.-P., 2019. The Digitalization of Money (No. w26300). National Bureau of Economic Research, Cambridge, MA. <https://doi.org/10.3386/w26300>
- Candia, A. de, 2019. China vs Japan: two different ways to become cashless countries [WWW Document]. Medium. URL <https://medium.com/future-vision/china-vs-japan-two-different-ways-to-become-cashless-countries-6a0b3e174d4c> (accessed 12.1.19).
- Carstens, A., 2019a. Data, technology and policy coordination. <https://www.bis.org/speeches/sp191114.htm> (accessed 12.1.19).

- Carstens, A., 2019b. The future of money and the payment system: what role for central banks? <https://www.bis.org/speeches/sp191205.pdf> (accessed 12.12.19).
- Cash Use Across Countries and the Demand for Central Bank Digital Currency [WWW Document], n.d. . IMF. URL <https://www.imf.org/en/Publications/WP/Issues/2019/03/01/Cash-Use-Across-Countries-and-the-Demand-for-Central-Bank-Digital-Currency-46617> (accessed 12.12.19).
- CfE\_ - Cash \_\_\_ Digital\_ Payments\_ Response\_ 020519\_vf\_digicomms.pdf, n.d. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/799548/CfE\\_ - Cash \\_\\_\\_ Digital\\_ Payments\\_ Response\\_ 020519\\_vf\\_digicomms.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/799548/CfE_-_Cash___Digital_Payments_Response_020519_vf_digicomms.pdf) (accessed 12.12.19).
- Challenges for banks in the move towards becoming cashless [WWW Document], 2019. . Finextra Research. URL <https://www.finextra.com/videoarticle/2140/challenges-for-banks-in-the-move-towards-becoming-cashless> (accessed 12.12.19).
- Cœuré, B., 2019. Benoît Cœuré: Towards the retail payments of tomorrow - a European strategy. <https://www.ecb.europa.eu/press/key/date/2019/html/ecb.sp191126~5230672c11.en.html> (accessed 12.12.19).
- CryptoGlobe, n.d. IBM Follows Ripple and Joins \$2T Cross Border Payment Game With Stellar-Powered 'World Wire' [WWW Document]. CryptoGlobe. URL <https://www.cryptoglobe.com/latest/2019/03/ibm-follows-ripple-and-joins-cross-border-payment-game-with-stellar-powered-world-wire/> (accessed 12.12.19).
- Despots and Disruptions: Five Dimensions of Internet Shutdowns in Africa | Association for Progressive Communications [WWW Document], n.d. URL <https://www.apc.org/en/pubs/despots-and-disruptions-five-dimensions-internet-shutdowns-africa> (accessed 12.12.19).
- Bank of Finland, Does experience in banking crises affect trust in banks? <https://helda.helsinki.fi/bof/bitstream/handle/123456789/16380/dp2119.pdf;jsessionid=C4E75998DF62BE7D8B362BCF46397EEF?sequence=1> (accessed 12.12.19).
- Engert - A Tale of Two Countries Cash Demand in Canada and Sweden.pdf, 46. <https://www.bankofcanada.ca/wp-content/uploads/2019/08/sdp2019-7.pdf> (accessed 12.12.19).
- International Monetary Fund; Financial Access Survey [WWW Document], n.d. URL <https://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C&sl=1460040555909> (accessed 12.12.19).
- European Neobanks: Top Trends 2019 (Part I) | INVYO Insights Europe : Media Fintech [WWW Document], n.d. URL <https://insights.invyo.io/europe/industries/neobank-baas/european-neobanks-top-trends-2019-part-i/> (accessed 12.12.19).
- Finance myths traditional banks would rather have you believe [WWW Document], n.d. URL <https://thepayers.com/expert-opinion/finance-myths-traditional-banks-would-rather-have-you-believe-779859> (accessed 12.12.19).
- Financial Inclusion in Europe and Central Asia – the Way Forward? [WWW Document], n.d. . World Bank. URL <https://www.worldbank.org/en/news/opinion/2019/04/05/financial-inclusion-in-europe-and-central-asia-the-way-forward> (accessed 12.12.19).
- Financial inclusion in the digital age: how to make a difference ? [WWW Document], 2019. . Banque de France. URL <https://www.banque-france.fr/en/intervention/financial-inclusion-digital-age-how-make-difference> (accessed 12.1.19).
- FIS to Buy Worldpay, an E-Commerce Payments Processor, for \$34 Billion - The New York Times [WWW Document], n.d. URL <https://www.nytimes.com/2019/03/18/business/dealbook/fis-worldpay-deal.html> (accessed 12.12.19).
- French central banker urges pan-European payments system, 2019. . Reuters. <https://uk.reuters.com/article/uk-france-payments/french-central-banker-urges-pan-european-payments-system-idUKKCN1U418V> (accessed 12.12.19).
- Future of Money [WWW Document], n.d. . SIX. URL <https://www.six-group.com/en/home/company/innovation/research-reports/picture-of-the-future-money.html> (accessed 11.30.19).
- Galhau, F.V. de, 2019. François Villeroy de Galhau: Central bank digital currency and innovative payments. <https://www.bis.org/review/r191204f.pdf> (accessed 12.12.19).
- GSMA 2019 Mobile Industry SDG Impact Report [WWW Document], n.d. URL <https://www.gsma.com/betterfuture/2019sdgimpactreport/> (accessed 12.12.19).
- Harford, T., 2019. Why is the world's financial plumbing under pressure? BBC News. <https://www.bbc.com/news/business-50069985> (accessed 12.12.19).
- How important is it for a nation to have a payment system? [WWW Document], n.d. URL <https://www.norges-bank.no/en/news-events/news-publications/Speeches/2019/2019-11-14-nicolaisen/> (accessed 12.1.19).

How to ensure the future of the Swedish krona [WWW Document], n.d. URL <https://www.riksbank.se/en-gb/press-and-published/notices-and-press-releases/debate-articles/how-to-ensure-the-future-of-the-swedish-krona/> (accessed 12.1.19).

IMF Blog, n.d. The Global Informal Economy: Large but On The Decline. IMF Blog. URL <https://blogs.imf.org/2019/10/30/the-global-informal-economy-large-but-on-the-decline/> (accessed 11.11.19).

Jalakasi, W., 2019. The Fight for Mobile Money 2.0 [WWW Document]. Medium. URL <https://medium.com/@wizaj/the-fight-for-mobile-money-2-0-eb2bdbbb8ef> (accessed 12.12.19).

Knot, K., 2019. Klaas Knot: Risks and benefits of modern financial technology; Lessons from a 17th century stablecoin. <https://www.bis.org/review/r191203a.pdf> (accessed 12.12.19).

Kuroda, H., 2019. Haruhiko Kuroda: Payments innovations and the role of central banks - addressing challenges posed by stablecoins. <https://www.bis.org/review/r191204c.pdf> (accessed 12.12.19).

Liu, G., 2019. soCash — a contrarian bet at an evolutionary platform [WWW Document]. Medium. URL <https://medium.com/vertexventures/socash-a-contrarian-bet-at-an-evolutionary-platform-8f7a96ba3546> (accessed 12.12.19).

Menon, R., 2019. Ravi Menon: Financial inclusion and innovation - retaining the customer. <https://www.bis.org/review/r191113d.pdf> (accessed 12.12.19).

National retail payments strategy | Banque de France [WWW Document], n.d. URL <https://www.banque-france.fr/en/financial-stability/national-cashless-payments-committee/national-retail-payments-strategy> (accessed 10.20.19).

Njoroge, P., 2019. Patrick Njoroge: Demonetisation - a step in the fight against corruption. <https://www.bis.org/review/r191106c.pdf> (accessed 12.12.19).

Paiement électronique HPS en lutte contre le cash [WWW Document], 2019. . L’Economiste. URL <https://www.leconomiste.com/article/1042370-paiement-electronique-hps-en-lutte-contre-le-cash> (accessed 12.12.19).

Remittances, The Flywheel Of The Global Economy [WWW Document], n.d. URL <https://www.forbes.com/sites/dantedisparte/2019/04/23/remittances-the-flywheel-of-the-global-economy/#33366bf77cd0> (accessed 12.12.19).

Retail CBDs: The next payments frontier - OMFIF [WWW Document], n.d. URL [https://www.omfif.org/ibm19/?utm\\_source=pressrelease](https://www.omfif.org/ibm19/?utm_source=pressrelease) (accessed 11.1.19).

Rochemont, S., 2019a. Keep Up with a Cashless Society - Quarter 3, 2019: The 4th industrial revolution in motion. Keep Up Press. <https://www.amazon.com/Keep-Cashless-Society-industrial-revolution-ebook/dp/B07YRV13DB> (accessed 12.12.19).

Rochemont, S., 2019b. Keep Up with Crypto - November 2019: Your essential monthly digest. Keep Up Press. <https://www.amazon.com/Keep-Up-Crypto-November-essential-ebook/dp/B082BDSBMY> (accessed 12.12.19).

Rochemont, S., 2019c. Keep Up with Crypto October 2019: Your essential monthly digest. Keep Up Press. <https://www.amazon.com/Keep-Crypto-October-2019-essential-ebook/dp/B081GXFQ3W> (accessed 12.12.19).

Rochemont, S., 2019c. Keep Up with Crypto September 2019: Your essential monthly digest. Keep Up Press <https://www.amazon.com/Keep-Crypto-September-2019-essential-ebook/dp/B07YZRFCPY> (accessed 12.17.19b).

Rochemont, S., 2019c. Keep Up with Crypto August 2019: Your essential monthly digest. Keep Up Press <https://www.amazon.com/Keep-Up-Crypto-essential-monthly-ebook/dp/B07XFP2L9S> (accessed 12.17.19a).

Russian E-Commerce and E-Payments Report| ThePaypers [WWW Document], n.d. URL <https://thepayers.com/reports/russian-e-commerce-and-e-payments-report-2/r780592> (accessed 12.12.19).

Rwanda launches first “Made in Africa” smartphones - Reuters [WWW Document], n.d. URL <https://uk.reuters.com/article/us-rwanda-telecoms/rwanda-launches-first-made-in-africa-smartphones-idUKKBN1WM1TN> (accessed 10.8.19).

Sweden seen likely to force banks to handle cash transactions [WWW Document], 2019. . PaymentsSource. URL <https://www.paymentsource.com/articles/sweden-seen-likely-to-force-banks-to-handle-cash-transactions> (accessed 12.12.19).

Tett, G., 2019. Why Facebook’s data-sharing initiative is faltering [WWW Document]. Financial Times. URL <https://www.ft.com/content/98b5385e-0025-11ea-b7bc-f3fa4e77dd47> (accessed 11.28.19).

The Central Bank of Ethiopia Looking to Decentralize Mobile Money Beyond Banks and MFIs - Bitcoin KE [WWW Document], n.d. URL <https://bitcoinke.io/2019/09/the-central-bank-of-ethiopia-looking-to-decentralize-mobile-money-beyond-banks-and-mfis/> (accessed 12.12.19).

- The future of finance report [WWW Document], n.d. URL <http://www.bankofengland.co.uk/report/2019/future-of-finance> (accessed 12.12.19).
- The Latest Big Data Breach Should Make You Rethink How You Pay For Everything [WWW Document], n.d. URL <https://www.forbes.com/sites/suzannerowankelleher/2019/04/04/the-latest-big-data-breach-should-make-you-rethink-how-you-pay-for-everything/#18b5da8d4e4b> (accessed 12.12.19).
- The real story behind push payments fraud [WWW Document], n.d. . Financial Times. URL <http://ftalphaville.ft.com/2019/11/15/1573815563000/The-real-story-behind-push-payments-fraud/> (accessed 11.20.19).
- The Rise of Digital Money [WWW Document], n.d. URL <https://www.imf.org/en/Publications/fintech-notes/Issues/2019/07/12/The-Rise-of-Digital-Money-47097> (accessed 12.12.19).
- Third party payment licences in China – are they within the grasp of foreign investors? [WWW Document], n.d. . JD Supra. URL <https://www.jdsupra.com/legalnews/third-party-payment-licences-in-china-69969/> (accessed 12.12.19).
- VoxEU World wide currency [https://voxeu.org/article/world-wide-currency?utm\\_source=sfmc&utm\\_medium=email&utm\\_campaign=2703636\\_AgendaWeekly\\_11October2019-Campaign-Final&utm\\_term=&emailType=Agenda%20Weekly%20Newsletter](https://voxeu.org/article/world-wide-currency?utm_source=sfmc&utm_medium=email&utm_campaign=2703636_AgendaWeekly_11October2019-Campaign-Final&utm_term=&emailType=Agenda%20Weekly%20Newsletter) (accessed 12.12.19).
- We need a roadmap for the cashless society [WWW Document], n.d. . European Payments Council. URL <https://www.europeanpaymentscouncil.eu/news-insights/insight/we-need-roadmap-cashless-society> (accessed 11.29.19).
- What does a cashless future mean? | The Economist, n.d. <https://www.youtube.com/watch?v=-0ph-pvCSPc&feature=youtu.be> (accessed 12.12.19).
- What is financial inclusion and why does it matter? [WWW Document], 2019. . The Big Issue. URL <https://www.bigissue.com/latest/finance/what-is-financial-inclusion-and-why-does-it-matter/> (accessed 12.12.19).
- Why are big banks still investing in payment wearables? [WWW Document], 2019. . Raconteur. URL <https://www.raconteur.net/finance/why-are-big-banks-still-investing-in-payment-wearables> (accessed 12.12.19).
- With 18 Million Bitcoins Mined, How Hard Is That 21 Million Limit? - CoinDesk [WWW Document], n.d. URL <https://www.coindesk.com/with-18-million-bitcoins-mined-how-hard-is-that-21-million-limit> (accessed 10.21.19b).



## References

### Section 1

[Back to text](#)

- Rochemont, S., n.d. A Cashless Society in 2018- The Cashless World in Motion review 105. <https://www.actuaries.org.uk/system/files/field/document/A%20Cashless%20Society%20in%202018%20v7%20-%20disc.pdf> (accessed 12.9.19).
- WEF\_Central\_Bank\_Activity\_in\_Blockchain\_DLT.pdf, n.d. [http://www3.weforum.org/docs/WEF\\_Central\\_Bank\\_Activity\\_in\\_Blockchain\\_DLT.pdf](http://www3.weforum.org/docs/WEF_Central_Bank_Activity_in_Blockchain_DLT.pdf) (accessed 12.9.19).

### Section 1.1

[Back to text](#)

- 6 Reasons Bitcoin Price Dropped 20% Down to \$8,000 [WWW Document], n.d. URL <https://insidebitcoins.com/news/6-reasons-bitcoin-price-dropped-20-down-to-8000/238271> (accessed 12.10.19).
- Artist Lincoln Townley sells 19 paintings for £4m worth of bitcoin | London Evening Standard [WWW Document], n.d. URL <https://www.standard.co.uk/go/london/arts/lincoln-townley-bitcoin-greed-paintings-value-a4233971.html> (accessed 12.10.19).
- Bitcoin as a safe haven? More a speculative bet, market players say - Reuters [WWW Document], n.d. URL <https://uk.reuters.com/article/uk-crypto-currencies/bitcoin-as-a-safe-haven-more-a-speculative-bet-market-players-say-idUKKCN1UW1ML> (accessed 12.10.19).
- Bitcoin price chaos as cryptocurrency loses a fifth of its value in mysterious rapid crash | The Independent [WWW Document], n.d. URL <https://www.independent.co.uk/life-style/gadgets-and-tech/news/bitcoin-price-crash-today-cryptocurrency-value-latest-explained-a9122951.html> (accessed 12.10.19).
- Bitcoin slumps to two-week low on technical trading, market jitters | World | News | The Guardian [WWW Document], n.d. URL <https://www.theguardian.pe.ca/news/world/bitcoin-slumps-to-two-week-low-on-technical-trading-market-jitters-341544/> (accessed 12.10.19).
- Bloomberg, O.K., n.d. Analysis | Crypto Goes Up and Down, But Is It Getting Anywhere? [WWW Document]. Washington Post. URL [https://www.washingtonpost.com/business/crypto-goes-up-and-down-but-is-it-getting-anywhere/2019/11/29/8dbc8ca4-126d-11ea-924c-b34d09bbc948\\_story.html](https://www.washingtonpost.com/business/crypto-goes-up-and-down-but-is-it-getting-anywhere/2019/11/29/8dbc8ca4-126d-11ea-924c-b34d09bbc948_story.html) (accessed 12.10.19).
- Central banks drive demand for bitcoin by devaluing their currencies [WWW Document], n.d. . Nikkei Asian Review. URL <https://asia.nikkei.com/Business/Business-Insight/Central-banks-drive-demand-for-bitcoin-by-devaluing-their-currencies> (accessed 12.10.19).
- Crypto Whales Move Massive Amounts of Bitcoin (BTC) Amid Market Mayhem | The Daily Hodl [WWW Document], n.d. URL <https://dailyhodl.com/2019/09/25/crypto-whales-move-massive-amounts-of-bitcoin-btc-amid-market-mayhem/> (accessed 12.10.19).
- Cryptocurrency Market Capitalizations | CoinMarketCap [WWW Document], n.d. URL <https://coinmarketcap.com/> (accessed 12.10.19).
- GmbH, finanzen net, n.d. Facebook's Libra is the US's best shot at beating China to become the dominant digital currency for emerging economies, analyst says | Markets Insider [WWW Document]. markets.businessinsider.com. URL <https://markets.businessinsider.com/news/stocks/facebook-libra-key-us-emerging-market-cryptocurrency-competitiveness-analyst-says-2019-10-1028601103> (accessed 12.10.19).
- Google claims to have reached quantum supremacy | Financial Times [WWW Document], n.d. URL <https://www.ft.com/content/b9bb4e54-dbc1-11e9-8f9b-77216ebe1f17> (accessed 12.10.19).
- July 17, R.U., 2019, 2019. Smaller cryptocurrencies feel pain as criticism of Facebook's Libra grows | Ottawa Citizen. URL <https://nationalpost.com/pm/technology-pmn/smaller-cryptocurrencies-feel-pain-as-criticism-of-facebooks-libra-grows> (accessed 12.10.19).
- Kik is shutting down as it moves into the cryptocurrency space | London Evening Standard [WWW Document], n.d. URL <https://www.standard.co.uk/tech/kik-shut-down-cryptocurrency-bet-a4245326.html> (accessed 12.10.19).
- Millions in Crypto Is Crossing the Russia-China Border Daily. There, Tether Is King [WWW Document], 2019. . CoinDesk. URL <https://www.coindesk.com/tether-usdt-russia-china-importers> (accessed 12.10.19).



Stanford Prof: Crypto Will Rain on Banks' Low-Interest Rate Parade [WWW Document], n.d. URL <https://cointelegraph.com/news/stanford-prof-crypto-will-rain-on-banks-low-interest-rate-parade> (accessed 12.10.19).

Trade tensions and a weaker yuan drive Chinese crypto demand, market players say, 2019. . Reuters. <https://www.reuters.com/article/us-crypto-currencies-idUSKCN1V41PB> (accessed 12.10.19).

Why did Bitcoin plunge by 20% earlier this week? [WWW Document], n.d. URL <https://www.irishtimes.com/business/financial-services/why-did-bitcoin-plunge-by-20-earlier-this-week-1.4034336> (accessed 12.10.19).

### **Section 1.1.1**

[Back to text](#)

Banks may cut ties with Facebook on Libra concerns, ING warns | Financial Times [WWW Document], n.d. URL <https://www.ft.com/content/df2eb1b2-f3d1-11e9-a79c-bc9acae3b654> (accessed 12.10.19).

Facebook's Zuckerberg grilled by Congress on Libra — as it happened | Financial Times [WWW Document], n.d. URL <https://www.ft.com/content/bf16f8ec-6897-38be-9ff4-0f40cc4c779d> (accessed 12.10.19).

Allaire Testimony 7-30-19.pdf, n.d. <https://www.banking.senate.gov/imo/media/doc/Allaire%20Testimony%207-30-19.pdf> (accessed 12.10.19).

Apple says cryptocurrency has “long-term potential” | Business Standard News [WWW Document], n.d. URL [https://www.business-standard.com/article/news-ani/apple-says-cryptocurrency-has-long-term-potential-119090501647\\_1.html](https://www.business-standard.com/article/news-ani/apple-says-cryptocurrency-has-long-term-potential-119090501647_1.html) (accessed 12.10.19).

Armstrong, R., 2019. The end of Libra? [WWW Document]. Financial Times. URL <https://www.ft.com/content/68952c0c-f41c-11e9-b018-3ef8794b17c6> (accessed 12.10.19).

As Congress Asks The Fed To Look Into A Digital Dollar, Former FDIC Chair Sheila Bair Is Ahead Of The Curve ... Again [WWW Document], n.d. URL <https://www.forbes.com/sites/jasonbrett/2019/10/05/as-congress-asks-the-fed-to-look-into-a-digital-dollar-former-fdic-chair-sheila-bair-is-ahead-of-the-curve--again/#3e02e5f53c14> (accessed 12.10.19).

Athawasya, A., 2019. Facebook's Libra may not launch in 2020 as Association questions 'licensing.' AMBCrypto. URL <https://eng.ambcrypto.com/facebooks-libra-may-not-launch-in-2020-as-association-questions-licensing/> (accessed 12.10.19).

Beau, D., 2019. Denis Beau: The role of cryptoassets in the payment system. <https://www.bis.org/review/r191015b.htm> (accessed 12.10.19).

BOJ Kuroda urges global cooperation in regulating Facebook's Libra, 2019. . Reuters. <https://uk.reuters.com/article/japan-economy-boj-libra-idUKT9N25105N> (accessed 12.10.19).

Commissioner (FDPIC), F.D.P. and I., n.d. Latest News [WWW Document]. URL [https://www.edoeb.admin.ch/edoeb/en/home/aktuell/aktuell\\_news.html](https://www.edoeb.admin.ch/edoeb/en/home/aktuell/aktuell_news.html) (accessed 12.10.19).

Committee Democrats Call on Facebook to Halt Cryptocurrency Plans [WWW Document], 2019. . Financial Services Committee. URL <https://financialservices.house.gov/news/documentsingle.aspx?DocumentID=404009> (accessed 12.10.19).

CORRECTED-(OFFICIAL)-Facebook's Libra seeks payment system licence from Swiss FINMA, 2019. . Reuters. <https://uk.reuters.com/article/facebook-cryptocurrency-idUKL5N2620G4> (accessed 12.10.19).

Crypto exchange says it'll handle regulators better than Libra [WWW Document], 2019. . The Star Online. URL <https://www.thestar.com.my/tech/tech-news/2019/08/30/crypto-exchange-says-itll-handle-regulators-better-than-libra> (accessed 12.10.19).

ECB board member slams “cartel-like” Libra [WWW Document], n.d. . Financial Times. URL <http://ftalphaville.ft.com/2019/09/02/1567428778000/ECB-board-member-slams--cartel-like--libra/> (accessed 12.10.19).

Emerging markets need more say on digital currencies: Chinese official - Reuters [WWW Document], n.d. URL <https://uk.reuters.com/article/uk-china-fintech-currency/emerging-markets-need-to-crack-down-on-illegal-flows-via-digital-currency-chinese-official-idUKKBN1X70H1> (accessed 12.10.19).

EU antitrust regulators raise concerns about Facebook's Libra currency: sources, 2019. . Reuters. <https://www.reuters.com/article/us-eu-facebook-antitrust-idUSKCN1VB1BQ> (accessed 12.10.19).

EU looking to see if Facebook's Libra currency poses competition risks, 2019. . Reuters. <https://www.reuters.com/article/us-eu-facebook-antitrust-idUSKCN1VP2LU> (accessed 12.10.19).

EU regulators to set high bar to authorise Libra, ECB's Coeure says, 2019. . Reuters. <https://www.reuters.com/article/us-eu-eurogroup-coeure-idUSKCN1VY15S> (accessed 12.10.19).

EU to consider new supervisor in fight on money laundering, 2019. . Reuters. <https://uk.reuters.com/article/us-eu-moneylaundering-regulations-idUKKBN1WH1XY> (accessed 12.10.19).

Euro Zone Working On Digital Currency Plan, 2019. . PYMNTS.com. URL <https://www.pymnts.com/cryptocurrency/2019/euro-zone-plan-to-roll-out-digital-currency/> (accessed 12.10.19).

Examining Regulatory Frameworks for Digital Currencies and Blockchain | United States Committee on Banking, Housing, and Urban Affairs [WWW Document], n.d. URL <https://www.banking.senate.gov/hearings/examining-regulatory-frameworks-for-digital-currencies-and-blockchain> (accessed 12.10.19).

Facebook - Facebook Reports Third Quarter 2019 Results [WWW Document], n.d. URL <https://investor.fb.com/investor-news/press-release-details/2019/Facebook-Reports-Third-Quarter-2019-Results/default.aspx> (accessed 12.10.19).

Facebook eases ad policies for Blockchain products | newkerala.com News #139425 [WWW Document], n.d. URL <https://www.newkerala.com/news/read/139425/facebook-eases-ad-policies-for-blockchain-products.html> (accessed 12.10.19).

Facebook gets German data probe into voice transcriptions [WWW Document], 2019. . Los Angeles Times. URL <https://www.latimes.com/business/story/2019-08-26/facebook-gets-german-data-probe-into-voice-transcriptions> (accessed 12.10.19).

Facebook holds talks with traders to create new currency [WWW Document], n.d. . The Irish Times. URL <https://www.irishtimes.com/business/technology/facebook-holds-talks-with-traders-to-create-new-currency-1.3902997> (accessed 12.10.19).

Facebook integrates payments over its three networks | Financial Times [WWW Document], n.d. URL <https://www.ft.com/content/abbc08c-0576-11ea-a984-fbbacad9e7dd> (accessed 12.10.19).

Facebook offers \$10,000 to anyone who can hack its Libra cryptocurrency | The Independent [WWW Document], n.d. URL <https://www.independent.co.uk/life-style/gadgets-and-tech/news/facebook-cryptocurrency-libra-hack-bug-bounty-blockchain-release-date-a9081801.html> (accessed 12.10.19).

Facebook rep meets Israeli regulators on Libra [WWW Document], 2019. URL <https://en.globes.co.il/en/article-facebook-holds-first-discussion-on-libra-with-israeli-regulators-1001295472> (accessed 12.10.19).

Facebook sales grow as users tick up; Zuckerberg defends political ads, 2019. . Reuters. <https://uk.reuters.com/article/us-facebook-results-idUKKBN1X92H6> (accessed 12.10.19).

Facebook says central banks have nothing to fear from Libra | IOL Business Report [WWW Document], n.d. URL <https://www.iol.co.za/business-report/international/facebook-says-central-banks-have-nothing-to-fear-from-libra-33116329> (accessed 12.10.19).

Facebook to create privacy panel, pay \$5 billion to U.S. to settle allegations, 2019. . Reuters. <https://www.reuters.com/article/us-facebook-ftc-idUSKCN1UI2GC> (accessed 12.10.19).

Facebook will Kryptowährung Libra nicht an Yuan koppeln - SPIEGEL ONLINE [WWW Document], n.d. URL <https://www.spiegel.de/wirtschaft/facebook-will-kryptowaehrung-libra-nicht-an-yuan-koppeln-a-1287853.html> (accessed 12.10.19a).

Facebook will Kryptowährung Libra nicht an Yuan koppeln - SPIEGEL ONLINE [WWW Document], n.d. URL <https://www.spiegel.de/wirtschaft/facebook-will-kryptowaehrung-libra-nicht-an-yuan-koppeln-a-1287853.html> (accessed 12.10.19b).

Facebook's Libra announces board as support shrinks further, 2019. . Reuters. <https://www.reuters.com/article/us-facebook-cryptocurrency-idUSKBN1WT17D> (accessed 12.10.19).

Facebook's Libra currency abandoned by major financial companies, 2019. . Reuters. <https://in.reuters.com/article/us-facebook-cryptocurrency-ebay-idINKBN1WQ2KL> (accessed 12.10.19).

Facebook's Libra will be disruptive, says ECB's Coeure, 2019. . Reuters. <https://in.reuters.com/article/facebook-libra-ecb-idINKBN1W22DU> (accessed 12.10.19).

Facebook's Libra Marks End of Light Regulatory Touch on Digital Currencies [WWW Document], n.d. URL <https://www.bloombergquint.com/global-economics/facebook-elephant-marks-end-of-light-touch-on-digital-currencies> (accessed 12.10.19).

FDPIC expects official response from the Libra Association [WWW Document], n.d. URL <https://www.edoeb.admin.ch/edoeb/en/home/documentation/media-information/aktuell.msg-id-75872.html> (accessed 12.10.19).

France, Germany blast Facebook's Libra, back public cryptocurrency, 2019. . Reuters. <https://www.reuters.com/article/us-facebook-cryptocurrency-france-idUSKCN1VY0H3> (accessed 12.10.19).

Francisco, H.M. in S., London, P.S. in, n.d. Why Facebook wants to launch its own currency [WWW Document]. The Irish Times. URL <https://www.irishtimes.com/business/technology/why-facebook-wants-to-launch-its-own-currency-1.3903033> (accessed 12.10.19).

Germany vows to fight any efforts to issue parallel currencies, 2019. . Reuters. <https://www.reuters.com/article/germany-blockchain-idUSS8N25G01C> (accessed 12.10.19).

Global money-laundering watchdog closely monitoring Facebook's Libra, official says | Ottawa Citizen [WWW Document], n.d. URL <https://ottawacitizen.com/pmnn/business-pmnn/global-money-laundering-watchdog-closely-monitoring-facebooks-libra-official-says/wcm/cc8fdefa-b7fd-41dd-8fbb-1c10a13e8216> (accessed 12.10.19).

hermesauto, 2019. Libra digital coin is key for "America's financial leadership", says Facebook's Mark Zuckerberg [WWW Document]. The Straits Times. URL <https://www.straitstimes.com/world/united-states/libra-digital-coin-is-key-for-americas-financial-leadership-zuckerberg> (accessed 12.10.19).

How to regulate cryptocurrency: commodity, currency or security? | IOL Business Report [WWW Document], n.d. URL <https://www.iol.co.za/business-report/technology/how-to-regulate-cryptocurrency-commodity-currency-or-security-33567822> (accessed 12.10.19).

Inc, R., n.d. U.S. lawmaker says still concerned about Facebook cryptocurrency after Swiss meetings | The Guardian [WWW Document]. URL <http://www.theguardian.pe.ca/business/reuters/us-lawmaker-says-still-concerned-about-facebook-cryptocurrency-after-swiss-meetings-345017/> (accessed 12.10.19).

Inline XBRL Viewer [WWW Document], n.d. URL <https://www.sec.gov/ix?doc=/Archives/edgar/data/1326801/000132680119000055/fb-06302019x10q.htm> (accessed 12.10.19).

admin, n.d. Joint Statement on Libra - Federal Ministry of Finance - <span>Issues</span> [WWW Document]. Bundesministerium der Finanzen. URL [https://www.bundesfinanzministerium.de/Content/EN/Standardartikel/Topics/Financial\\_markets/Articles/2019-09-17-Libra.html](https://www.bundesfinanzministerium.de/Content/EN/Standardartikel/Topics/Financial_markets/Articles/2019-09-17-Libra.html) (accessed 12.13.19).

Kiran, S., 2019. Facebook's Libra will not succeed, says China's Huang Qifan. AMBCrypto. URL <https://eng.ambcrypto.com/facebooks-libra-will-not-succeed-says-chinas-huang-qifan/> (accessed 12.10.19).

Le bitcoin perd plus de 700 euros, inquiétudes autour de l'audition de Mark Zuckerberg [WWW Document], n.d. . Investir. URL <https://investir.lesechos.fr/marches/bitcoin-cryptomonnaies/le-bitcoin-perd-plus-de-700-euros-inquiet-de-l-audition-de-mark-zuckerberg-1877832.php> (accessed 12.10.19).

L'échec passionnant du libra de Facebook [WWW Document], 2019. . Les Echos. URL <https://www.lesechos.fr/idees-debats/editos-analyses/le-echec-passionnant-du-libra-de-facebook-1141829> (accessed 12.10.19).

Libra is imperialism by stealth | FT Alphaville [WWW Document], n.d. URL <https://ftalphaville.ft.com/2019/09/13/1568370798000/Libra-is-imperialism-by-stealth/> (accessed 12.10.19).

LibraWhitePaper\_en\_US.pdf, n.d. [https://libra.org/en-US/wp-content/uploads/sites/23/2019/06/LibraWhitePaper\\_en\\_US.pdf](https://libra.org/en-US/wp-content/uploads/sites/23/2019/06/LibraWhitePaper_en_US.pdf) (accessed 12.10.19).

Mark Zuckerberg Tried to Charm Congress. He Got Slammed. - The New York Times [WWW Document], n.d. URL <https://www.nytimes.com/2019/10/24/business/dealbook/mark-zuckerberg-facebook-libra.html> (accessed 12.10.19).

Miranda Wood, 2019. Tencent whitepaper: Libra a threat to WePay, AliPay [WWW Document]. Ledger Insights. URL <https://www.ledgerinsights.com/tencent-libra-threat-wepay-alipay/> (accessed 12.10.19).

Not Everything Is Facebook's Fault - WSJ [WWW Document], n.d. URL <https://www.wsj.com/articles/not-everything-is-facebooks-fault-11572389480> (accessed 12.10.19).

O'Neal, S., 2019. Libra Seen as Threat to National Currency Sovereignty, Pleads With G-7 [WWW Document]. Cointelegraph. URL <https://cointelegraph.com/news/libra-seen-as-threat-to-national-currency-sovereignty-pleads-with-g-7> (accessed 12.10.19).

PayPal becomes first member to exit Facebook's Libra Association, 2019. . Reuters. <https://uk.reuters.com/article/us-facebook-cryptocurrency-paypal-idUKKBN1WJ2CY> (accessed 12.10.19).

- Post, K., 2019. Updating Live: Zuckerberg Hearings Before Congress on Libra [WWW Document]. Cointelegraph. URL <https://cointelegraph.com/news/updating-live-zuckerberg-hearings-before-congress-on-libra> (accessed 12.10.19).
- Powell, D., 2019. There'll be no Twitcoin: Twitter founder says he won't release own currency [WWW Document]. Brisbane Times. URL <https://www.brisbanetimes.com.au/business/companies/there-ll-be-no-twitcoin-twitter-founder-says-he-won-t-release-own-currency-20190904-p52nvd.html> (accessed 12.10.19).
- Rudegair, A.A. and P., 2019. Visa, Mastercard, Others Reconsider Involvement in Facebook's Libra Network. Wall Street Journal. <https://www.wsj.com/articles/visa-mastercard-others-reconsider-involvement-in-facebook-s-libra-network-11569967023> (accessed 12.10.19).
- Schroeder, S., n.d. Facebook announces Libra cryptocurrency with a massive list of partners [WWW Document]. Mashable. URL <https://mashable.com/article/facebook-libra/> (accessed 12.10.19).
- Securities And Exchange Commission v. Facebook, Inc. [WWW Document], n.d. URL <https://www.sec.gov/litigation/complaints/2019/comp-pr2019-140.pdf> (accessed 12.10.19).
- Senators Caution Mastercard, Visa, Stripe on Libra Membership, 2019. . Bloomberg.com. <https://www.bloomberg.com/news/articles/2019-10-09/senators-caution-mastercard-visa-stripe-on-libra-membership> (accessed 12.10.19).
- Sound legal basis a must for digital monies like Facebook's Libra: G7 | Business Standard News [WWW Document], n.d. URL [https://www.business-standard.com/article/pti-stories/legal-basis-an-absolute-prerequisite-for-digital-monies-like-libra-g7-119101800082\\_1.html](https://www.business-standard.com/article/pti-stories/legal-basis-an-absolute-prerequisite-for-digital-monies-like-libra-g7-119101800082_1.html) (accessed 12.10.19).
- Spooked by Libra, EU pledges to regulate digital currencies, 2019. . Reuters. <https://uk.reuters.com/article/us-eu-commission-dombrovskis-idUKKBN1WN006> (accessed 12.10.19).
- Suddenly Facebook's Libra is all about defending "the Free World" from China [WWW Document], n.d. . Financial Times. URL <http://ftalphaville.ft.com/2019/09/19/1568891272000/Suddenly-Facebook-s-Libra-is-all-about-defending--the-Free-World--from-China/> (accessed 12.10.19).
- Sweney, M., 2019. Facebook plans to launch "GlobalCoin" cryptocurrency in 2020. The Guardian. <https://www.theguardian.com/technology/2019/may/24/facebook-plans-to-launch-globalcoin-cryptocurrency-in-2020> (accessed 12.10.19).
- Swiss government closely monitoring stable coin developments, 2019. . Reuters. <https://www.reuters.com/article/swiss-stablecoin-idUSS8N26M01Q> (accessed 12.10.19).
- Swiss stocks - Factors to watch on August 19, 2019. . Reuters. <https://uk.reuters.com/article/markets-swiss-stocks-idUKL8N25C1BB> (accessed 12.10.19).
- Switzerland's FINMA boss says Facebook's Libra handled transparently, 2019. . Reuters. <https://www.reuters.com/article/facebook-libra-idUSS8N26B01I> (accessed 12.10.19).
- Telegram Pushes Ahead With Plans for 'Gram' Cryptocurrency - The New York Times [WWW Document], n.d. URL <https://www.nytimes.com/2019/08/27/technology/telegram-cryptocurrency-gram.html> (accessed 12.10.19).
- Telegram secretly plans 'Gram' cryptocurrency [WWW Document], n.d. URL <https://www.thenews.com.pk/latest/522076-telegram-secretly-plans-gram-cryptocurrency> (accessed 12.10.19).
- UK data watchdog demands more clarity over Facebook's crypto [WWW Document], n.d. URL <https://www.deccanchronicle.com/technology/in-other-news/060819/uk-data-watchdog-demands-more-clarity-over-facebooks-crypto.html> (accessed 12.10.19).
- U.S. dollar to be main currency underpinning Facebook's Libra: Spiegel, 2019. . Reuters. <https://www.reuters.com/article/us-facebook-libra-basket-idUSKBN1W522K> (accessed 12.10.19).
- U.S. securities chief "not prepared" to say if Facebook's Libra a security, 2019. . Reuters. <https://www.reuters.com/article/us-usa-house-sec-idUSKBN1W92O4> (accessed 12.10.19).
- Vigna, D.M. and P., 2019. The Coming Currency War: Digital Money vs. the Dollar. Wall Street Journal. <https://www.wsj.com/articles/the-coming-currency-war-digital-money-vs-the-dollar-11569204540> (accessed 12.10.19).
- Zakrzewski, C., Post, T.W., 2019. The Technology 202: Washington lawmakers tell tech executives trust has "run out" [WWW Document]. Connecticut Post. URL <https://www.ctpost.com/news/article/The-Technology-202-Washington-lawmakers-tell-14101903.php> (accessed 12.10.19).
- Zuckerberg in Washington as scrutiny grows over Facebook privacy [WWW Document], n.d. . The Irish Times. URL <https://www.irishtimes.com/business/technology/zuckerberg-in-washington-as-scrutiny-grows-over-facebook-privacy-1.4023530> (accessed 12.10.19).
- リブラ・インパクト お金と国の進化論：日経ビジネス電子版 [WWW Document], n.d. URL <https://business.nikkei.com/atcl/NBD/19/special/00220/> (accessed 12.10.19).



## Section 1.1.2

[Back to text](#)

- Aki, J., 2019. Wave Financial Launches Its Crypto Derivatives Product [WWW Document]. InsideBitcoins.com. URL <https://insidebitcoins.com/news/wave-financial-launches-its-crypto-derivatives-product/238613> (accessed 12.10.19).
- Alchemy Global Payment Solutions Launches Asia's First Hybrid Crypto and Fiat Mobile Payment Solution for Merchants [WWW Document], n.d. . vietnamnews.vn. URL <http://vietnamnews.vn/media-outreach/535559/alchemy-global-payment-solutions-launches-asias-first-hybrid-crypto-and-fiat-mobile-payment-solution-for-merchants.html> (accessed 12.10.19).
- Allianz In "Advanced Stages" Of Accepting Crypto For Payment [WWW Document], n.d. URL <https://www.forbes.com/sites/benjaminpirus/2019/08/08/allianz-among-the-latest-entrants-into-token-based-payment-space-development/#d5e9a3c5c5ef> (accessed 12.10.19).
- Apple Card will not allow purchase of cryptocurrencies | Regina Leader-Post [WWW Document], n.d. URL <https://leaderpost.com/pmn/business-pmn/apple-card-will-not-allow-purchase-of-cryptocurrencies-2/wcm/e8a7a7e4-b817-4083-819e-c47cf9c8e17c> (accessed 12.10.19).
- Asian Institutions Are Finally Warming to Crypto Hedge Funds – My Crypto, n.d. URL <https://mycrypto.ca/coindesk/asian-institutions-are-finally-warming-to-crypto-hedge-funds/> (accessed 12.10.19).
- Austria telecoms provider accepts cryptocurrency, Telecom News, ET Telecom [WWW Document], n.d. URL <https://telecom.economictimes.indiatimes.com/news/austria-telecoms-provider-accepts-cryptocurrency/70805413> (accessed 12.10.19).
- Barclays ends partnership with cryptocurrency exchange Coinbase: sources, 2019. . Reuters. <https://uk.reuters.com/article/us-barclays-coinbase-idUKKCN1V40ZV> (accessed 12.10.19).
- Binance Acquires Cryptoasset Trading Platform JEX [WWW Document], n.d. . Binance. URL <https://www.binance.com/en/support/articles/360033256151> (accessed 12.10.19).
- Celsius Network Announces Increased Accessibility To Crypto-Backed Loans with Updated Terms for Borrowers - ANSA.it [WWW Document], n.d. URL [http://www.ra.ansa.it/sito/notizie/economia/business\\_wire/news/2019-08-14\\_1142034050.html](http://www.ra.ansa.it/sito/notizie/economia/business_wire/news/2019-08-14_1142034050.html) (accessed 12.10.19).
- CME Group Plans to Offer Bitcoin Options in 2020 - WSJ [WWW Document], n.d. URL <https://www.wsj.com/articles/cme-group-plans-to-offer-bitcoin-options-in-2020-11568995492> (accessed 12.10.19).
- Coinberry to Provide Bitcoin Payment Solution to City of Richmond Hill Following Recent Council Approval | Business Wire [WWW Document], n.d. URL <https://www.businesswire.com/news/home/20190715005234/en/Coinberry-Provide-Bitcoin-Payment-Solution-City-Richmond> (accessed 12.10.19).
- CoinZoom, a U.S. Regulated Cryptocurrency Exchange Announces New Visa Debit Card [WWW Document], n.d. URL [http://www.prweb.com/releases/coinzoom\\_a\\_u\\_s\\_regulated\\_cryptocurrency\\_exchange\\_announces\\_new\\_visa\\_debit\\_card/prweb16489716.htm](http://www.prweb.com/releases/coinzoom_a_u_s_regulated_cryptocurrency_exchange_announces_new_visa_debit_card/prweb16489716.htm) (accessed 12.10.19).
- Crypto exchange OKEx eyeing launch of Tether margin futures in October, n.d. . The Block. URL <https://www.theblockcrypto.com/linked/40617/crypto-exchange-okex-eyeing-to-launch-tether-margin-futures-in-october> (accessed 12.10.19).
- CryptoCompare Releases Exchange Review for October 2019 [WWW Document], n.d. . CryptoCompare. URL <https://www.cryptocompare.com/press-release/cryptocompare-exchange-review-october-2019/> (accessed 12.10.19).
- Deka, C., 2019. Japan's Monex announces plans to pay shareholder dividends in Bitcoin. AMBCrypto. URL <https://eng.ambcrypto.com/japans-monex-announces-plans-to-pay-shareholder-dividends-in-bitcoin/> (accessed 12.10.19).
- Dès 2020, plus de 25.000 points de vente en France accepteront les cryptomonnaies - Le Courrier du VietNam [WWW Document], n.d. URL <https://www.lecourrier.vn/des-2020-plus-de-25000-points-de-vente-en-france-accepteront-les-cryptomonnaies/633888.html> (accessed 12.10.19).
- Fidelity Digital Assets to Provide Custody for Bitcoin Derivatives Yield Fund [WWW Document], 2019. . CoinDesk. URL <https://www.coindesk.com/fidelity-digital-assets-to-provide-custody-for-bitcoin-derivatives-yield-fund> (accessed 12.10.19).
- Group, H., n.d. Huobi & CASHU Makes Buying Cryptocurrency Effortless & Easy For Millions Across North Africa & The Mideast [WWW Document]. URL <https://www.pnewswire.com/news-releases/huobi--cashu-makes-buying-cryptocurrency-effortless--easy-for-millions-across-north-africa--the-mideast-300887443.html> (accessed 12.10.19).

House, A.S.P., n.d. Austrian State Printing House: Cold Wallet Solution Prevents Cryptocurrency Theft [WWW Document]. URL <https://www.prnewswire.co.uk/news-releases/austrian-state-printing-house-cold-wallet-solution-prevents-cryptocurrency-theft-833020569.html> (accessed 12.10.19).

HyperBlock Takes Delivery of Next Generation Bitmain Servers and Places New Order for \$2.9M Additional Next Generation Servers [WWW Document], n.d. URL <https://www.lelezard.com/en/news-18853148.html> (accessed 12.10.19).

Inc, C., n.d. Despite Volatility, Nearly Half of Financial Professionals Believe Bitcoin Will Outperform S&P 500 Over the Next 12 Months [WWW Document]. URL <https://www.prnewswire.com/news-releases/despite-volatility-nearly-half-of-financial-professionals-believe-bitcoin-will-outperform-sp-500-over-the-next-12-months-300952338.html> (accessed 12.10.19).

Israeli Cryptocurrency Traders Locked Out of Banking System: Report - CoinDesk [WWW Document], n.d. URL <https://www.coindesk.com/israeli-cryptocurrency-traders-locked-out-of-banking-system-report> (accessed 12.10.19).

Jeong, E.-Y., 2019. Samsung to Launch Smartphone Meant to Make Blockchain Friendlier. Wall Street Journal. <https://www.wsj.com/articles/samsung-launches-smartphone-meant-to-make-blockchain-friendlier-11567656492> (accessed 12.10.19).

Kuznetsov, N., 2019. Are Trading Vehicles Dragging Crypto Into Maturity? [WWW Document]. Cointelegraph. URL <https://cointelegraph.com/news/are-trading-vehicles-dragging-crypto-into-maturity> (accessed 12.10.19).

Limited, B.P.P.C., n.d. BX to stop services at month's end [WWW Document]. <https://www.bangkokpost.com>. URL <https://www.bangkokpost.com/business/1741419/bx-to-stop-services-at-months-end> (accessed 12.10.19).

Loritz, M., n.d. London-based Elliptic raises €21 million to identify financial crimes on the bitcoin blockchain | EU-Startups. URL <https://www.eu-startups.com/2019/09/london-based-elliptic-raises-e21-million-to-identify-financial-crimes-on-the-bitcoin-blockchain/> (accessed 12.10.19).

New York Stock Exchange parent company introduces bitcoin, Banking & Finance - THE BUSINESS TIMES [WWW Document], n.d. URL <https://www.businesstimes.com.sg/banking-finance/new-york-stock-exchange-parent-company-introduces-bitcoin> (accessed 12.10.19).

NY financial regulator approves Paxos' gold-backed token, stablecoin, 2019. . Reuters. <https://af.reuters.com/article/metalsNews/idAFL2N25W0S0> (accessed 12.10.19).

September 17, R.U., 2019, 2019. Huobi announces launch of cryptocurrency exchange in Argentina | The London Free Press. URL <https://business.financialpost.com/pmn/business-pmn/huobi-announces-launch-of-cryptocurrency-exchange-in-argentina> (accessed 12.10.19).

September 30, B.W.U., 2019, 2019. Revolut Chooses Visa as Lead Issuing Partner to Drive Rapid Global Expansion | Saskatoon StarPhoenix. URL <https://business.financialpost.com/pmn/press-releases-pmn/business-wire-news-releases-pmn/revolut-chooses-visa-as-lead-issuing-partner-to-drive-rapid-global-expansion> (accessed 12.10.19).

Silva, M.D., n.d. Credit card companies forbid bitcoin purchases—with good reason [WWW Document]. Quartz. URL <https://qz.com/1682828/why-wont-apples-credit-card-let-people-buy-bitcoin/> (accessed 12.10.19).

South Africans are now able to buy cryptocurrency using a credit card | IOL Personal Finance [WWW Document], n.d. URL <https://www.iol.co.za/personal-finance/my-money/banking/south-africans-are-now-able-to-buy-cryptocurrency-using-a-credit-card-29822223> (accessed 12.10.19).

SportsCastr, 2019. Earn Crypto for Being a Sports Enthusiast! FanChain by SportsCastr Aims to Bring Crypto Mainstream [WWW Document]. GlobeNewswire News Room. URL <http://www.globenewswire.com/news-release/2019/09/17/1916638/0/en/Earn-Crypto-for-Being-a-Sports-Enthusiast-FanChain-by-SportsCastr-Aims-to-Bring-Crypto-Mainstream.html> (accessed 12.10.19).

The future of money is being built in Asia, Opinion - THE BUSINESS TIMES [WWW Document], n.d. URL <https://www.businesstimes.com.sg/opinion/the-future-of-money-is-being-built-in-asia> (accessed 12.10.19).

UnionBank launches own cryptocurrency | Philstar.com [WWW Document], n.d. URL <https://www.philstar.com/business/2019/07/26/1937802/unionbank-launches-own-cryptocurrency> (accessed 12.10.19).

VanEck SolidX bitcoin trust to sell shares to institutional buyers, 2019. . Reuters. <https://www.reuters.com/article/us-crypto-currencies-etf-idUSKCN1VO2HT> (accessed 12.10.19).

Watford will now accept bitcoin for merchandise purchases | Watford Observer [WWW Document], n.d. URL <https://www.watfordobserver.co.uk/sport/17897688.watford-will-now-accept-bitcoin-merchandise-purchases/> (accessed 12.10.19).

### **Section 1.1.3**

[Back to text](#)

- August 2, R.U., 2019, 2019. Former Japan central banker warns Facebook's Libra may undermine monetary policy | Ottawa Citizen. URL <https://business.financialpost.com/pmn/business-pmn/former-japan-central-banker-warns-facebooks-libra-may-undermine-monetary-policy> (accessed 12.10.19).
- Bank, E.C., n.d. Understanding the crypto-asset phenomenon, its risks and measurement issues [WWW Document]. European Central Bank. URL [https://www.ecb.europa.eu/pub/economic-bulletin/articles/2019/html/ecb.ebart201905\\_03~c83aeaa44c.en.html](https://www.ecb.europa.eu/pub/economic-bulletin/articles/2019/html/ecb.ebart201905_03~c83aeaa44c.en.html) (accessed 12.10.19).
- BNamericas - What new fintech rules mean for Mexico's banks [WWW Document], n.d. . BNamericas.com. URL <https://www.bnamericas.com/en/news/what-new-fintech-rules-mean-for-mexicos-banks> (accessed 12.10.19).
- BR Pub 19/01: Income tax – salary and wages paid in crypto-assets (Public rulings) [WWW Document], n.d. URL <https://www.classic.ird.govt.nz/technical-tax/public-rulings/2019/public-ruling-1901.html> (accessed 12.10.19).
- Draft Banning of Cryptocurrency & Regulation of Official Digital Currency Bill, 2019 [WWW Document], 2019. . PRSIndia. URL <http://prsindia.org/billtrack/draft-banning-cryptocurrency-regulation-official-digital-currency-bill-2019> (accessed 12.10.19).
- FCA provides clarity on current cryptoassets regulation [WWW Document], 2019. . FCA. URL <https://www.fca.org.uk/news/press-releases/fca-provides-clarity-current-cryptoassets-regulation> (accessed 12.10.19).
- FINMA, E.F., n.d. FINMA guidance: stringent approach to combating money laundering on the blockchain [WWW Document]. Eidgenössische Finanzmarktaufsicht FINMA. URL <https://www.finma.ch/en/news/2019/08/20190826-mm-kryptogwg/> (accessed 12.10.19).
- From Belarus to Bahrain, the small states going big on cryptocurrency | Regina Leader-Post [WWW Document], n.d. URL <https://leaderpost.com/pmn/business-pmn/from-belarus-to-bahrain-the-small-states-going-big-on-cryptocurrency/wcm/26c1c115-8eb5-4d30-b941-4fd72213a87e> (accessed 12.10.19).
- Gek, T.P., 2019. Industry body seeks feedback on code of practice for Singapore digital asset industry [WWW Document]. The Business Times. URL <https://www.businesstimes.com.sg/banking-finance/industry-body-seeks-feedback-on-code-of-practice-for-singapore-digital-asset> (accessed 12.10.19).
- Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers [WWW Document], n.d. URL <https://www.fatf-gafi.org/publications/fatfrecommendations/documents/guidance-rba-virtual-assets.html> (accessed 12.10.19).
- Huillet, M., 2019. Czech Republic to Impose Stricter Crypto Regulations than EU Requires [WWW Document]. Cointelegraph. URL <https://cointelegraph.com/news/czech-republic-to-impose-stricter-crypto-regulations-than-eu-requires> (accessed 12.10.19).
- Inc, K.I., n.d. Kik Answers SEC Complaint [WWW Document]. URL <https://www.prnewswire.com/news-releases/kik-answers-sec-complaint-300897681.html> (accessed 12.10.19).
- Inc, R., n.d. Japan to lead development of SWIFT network for cryptocurrency: source | The Telegram [WWW Document]. URL <http://www.thetelegram.com/business/reuters/japan-to-lead-development-of-swift-network-for-cryptocurrency-source-334034/> (accessed 12.10.19).
- Institutional Digital Asset Exchange Seed Digital Commodities Market and Settlement Affiliate Zero Hash Both Receive Virtual Currency Licenses [WWW Document], 2019. . EIN Presswire. URL <https://www.einpresswire.com/article/490702108/institutional-digital-asset-exchange-seed-digital-commodities-market-and-settlement-affiliate-zero-hash-both-receive-virtual-currency-licenses> (accessed 12.10.19).
- IRS Sending Warning Letters to More Than 10,000 Cryptocurrency Holders - WSJ [WWW Document], n.d. URL <https://www.wsj.com/articles/irs-sending-warning-letters-to-more-than-10-000-cryptocurrency-holders-11564159523> (accessed 12.10.19).
- Japan to step up study of stable coin regulations following G7 concern over Facebook's Libra project | The Japan Times [WWW Document], n.d. URL [https://www.japantimes.co.jp/news/2019/07/19/business/japan-step-study-stable-coin-regulations-following-g7-concern-facebooks-libra-project/#.Xe\\_k1JP7T-Y](https://www.japantimes.co.jp/news/2019/07/19/business/japan-step-study-stable-coin-regulations-following-g7-concern-facebooks-libra-project/#.Xe_k1JP7T-Y) (accessed 12.10.19b).
- Kik Interactive (Release No. LR-24493; Jun. 6, 2019) [WWW Document], n.d. URL <https://www.sec.gov/litigation/litreleases/2019/lr24493.htm> (accessed 12.10.19).

Media, E.W.N., 2019. Are Cryptocurrencies Living Up to Their Full Potential? Euro Weekly News Spain. URL <https://www.euroweeklynnews.com/2019/08/12/are-cryptocurrencies-living-up-to-their-full-potential/> (accessed 12.10.19).

New York financial regulator approves Bakkt trust license, 2019. . Reuters. <https://in.reuters.com/article/us-crypto-currencies-bakkt-idINKCN1V61J4> (accessed 12.10.19).

Regulating Crypto Exchanges: Mind The Gaps [WWW Document], n.d. URL <https://www.forbes.com/sites/gideonpell/2019/08/14/regulating-crypto-exchanges-mind-the-gaps/#43c312ae6d9c> (accessed 12.10.19).

Staff, G.L.R.D., 2018. Regulation of Cryptocurrency Around the World [WWW Document]. URL <https://www.loc.gov/law/help/cryptocurrency/world-survey.php> (accessed 12.10.19).

经济学家眼中的数字货币系列之六：与时俱进(监管篇)|数字货币\_新浪财经\_新浪网 [WWW Document], n.d. URL <https://finance.sina.com.cn/roll/2019-07-19/doc-ihyctim3141989.shtml> (accessed 12.10.19).

### **Section 1.1.4**

[Back to text](#)

“50 by 50”: Wanting to get rich, lawyer launders \$588m in crypto scam [WWW Document], n.d. URL <https://www.brisbanetimes.com.au/business/markets/50-by-50-wanting-to-get-rich-lawyer-launders-588m-in-crypto-scam-20191121-p53cme.html> (accessed 12.10.19).

A mystery person just moved \$1 billion worth of bitcoin and no one knows why | The Independent [WWW Document], n.d. URL <https://www.independent.co.uk/life-style/gadgets-and-tech/news/bitcoin-mystery-trade-cryptocurrency-market-transaction-blockchain-a9103611.html> (accessed 12.10.19).

ACAMS Launches Chapter in Switzerland | Business Wire [WWW Document], n.d. URL <https://www.businesswire.com/news/home/20190509005153/en/ACAMS-Launches-Chapter-Switzerland> (accessed 12.10.19).

America, T.W.C. and S. for, n.d. Presidential Candidate Swalwell Embraces Blockchain Technology for Fundraising [WWW Document]. URL <https://www.prnewswire.com/news-releases/presidential-candidate-swallow-embraces-blockchain-technology-for-fundraising-300855963.html> (accessed 12.10.19).

As cryptocurrencies go mainstream battle is on to bring them under global control [WWW Document], n.d. URL <https://timesofmalta.com/articles/view/as-cryptocurrencies-go-mainstream-battle-is-on-to-bring-them-under.710226> (accessed 12.10.19).

Avoid Rigen Marketing, SEC tells public | Inquirer Business [WWW Document], n.d. URL <https://business.inquirer.net/271224/avoid-rigen-marketing-sec-tells-public> (accessed 12.10.19).

Back to the classroom for tech's regulators | Financial Times [WWW Document], n.d. URL <https://www.ft.com/content/9251b7b8-5f52-11e9-9300-0becfc937c37> (accessed 12.10.19).

BBC Sounds - The Missing Cryptoqueen - Downloads [WWW Document], n.d. URL <https://www.bbc.co.uk/programmes/p07nkd84/episodes/downloads> (accessed 12.10.19).

Bills aim to protect Louisiana from cyber attacks [WWW Document], n.d. . thetowntalk. URL <https://www.theadvertiser.com/story/news/local/louisiana/2019/05/20/bills-aim-protect-louisiana-cyber-attacks/3746594002/> (accessed 12.10.19).

Binance hackers shift stolen bitcoin, identity still unclear: researchers - Reuters [WWW Document], n.d. URL <https://www.reuters.com/article/us-crypto-currencies-binance/binance-hackers-shift-stolen-bitcoin-identity-still-unclear-researchers-idUSKCN1SF230> (accessed 12.10.19).

Bitcoin donations to ISIS soared day before Sri Lanka bombings - Globes [WWW Document], n.d. URL <https://en.globes.co.il/en/article-exclusive-isis-funded-sri-lanka-bombings-with-bitcoin-donations-1001284276> (accessed 12.10.19).

'Bitcoin is fool's gold': Peter Schiff weighs in on calls to replace gold with cryptocurrencies [WWW Document], n.d. . RT International. URL <https://www.rt.com/business/458997-fools-gold-bitcoin-schiff/> (accessed 12.10.19).

BitPay, 2019. BitPay First Blockchain Payment Processor to Achieve SOC 2 Compliance [WWW Document]. GlobeNewswire News Room. URL <http://www.globenewswire.com/news-release/2019/09/30/1922727/0/en/BitPay-First-Blockchain-Payment-Processor-to-Achieve-SOC-2-Compliance.html> (accessed 12.10.19).

Bulgaria did not Hold Bitcoin Worth \$1.6 Billion, Finance Minister Claimed - Novinite.com - Sofia News Agency [WWW Document], n.d. URL <https://www.novinite.com/articles/197339/Bulgaria+did+not+Hold+Bitcoin+Worth+%241.6+Billion%2C+Finance+Minister+Claimed> (accessed 12.10.19).



Crypto lobby fights to contain backlash from Facebook's Libra - SFGate [WWW Document], n.d. URL <https://www.sfgate.com/news/article/Crypto-lobby-fights-to-contain-backlash-from-14405533.php> (accessed 12.10.19).

Crypto.com, n.d. Crypto.com One of the First Cryptocurrency Companies to Achieve ISO/IEC 27001:2013 Certification [WWW Document]. URL <https://www.prnewswire.com/news-releases/cryptocom-one-of-the-first-cryptocurrency-companies-to-achieve-isoiec-270012013-certification-300847930.html> (accessed 12.10.19).

Cryptoqueen: How this woman scammed the world, then ran, 2019. . BBC News. <https://www.bbc.com/news/stories-50435014> (accessed 12.10.19).

Cryptoqueen's brother admits £4bn fraud | News | The Times [WWW Document], n.d. URL <https://www.thetimes.co.uk/edition/news/cryptoqueen-brother-admits-4bn-fraud-3wzw5hsfn> (accessed 12.10.19).

Crypto's Wake-Up Call: Thefts, Scams and Fraud Could Tally \$1.2 Billion in First Quarter CipherTrace Q1 2019 Cryptocurrency Anti-Money Laundering Report [WWW Document], 2019. URL <https://www.businesswire.com/news/home/20190501005431/en/Crypto%E2%80%99s-Wake-Up-Call-Thefts-Scams-Fraud-Tally> (accessed 12.10.19).

Cybersecurity risks: Consumers should beware of these 4 scams - silive.com [WWW Document], n.d. URL <https://www.silive.com/news/2019/10/cybersecurity-risks-consumers-should-beware-of-these-4-scams.html> (accessed 12.10.19).

Dutch bust major cryptocurrency launderer, IT Security News, ET CISO [WWW Document], n.d. URL <https://ciso.economictimes.indiatimes.com/news/dutch-bust-major-cryptocurrency-launderer/69450798> (accessed 12.10.19).

Eight more arrests in money laundering probe - Tenerife News - Official Website | Tenerife News – Official Website [WWW Document], n.d. URL <https://www.tenerifenews.com/2019/05/eight-more-arrests-in-money-laundering-probe/> (accessed 12.10.19).

Ex-Big Law partner found guilty in cryptocurrency fraud trial, 2019. . Reuters. <https://www.reuters.com/article/usa-lawyer-locke-lord-scott-idUSL2N28202V> (accessed 12.10.19).

Galway investors buy into 'worthless' cryptocurrency DasCoin | Ireland | The Sunday Times [WWW Document], n.d. URL <https://www.thetimes.co.uk/edition/ireland/galway-investors-buy-into-worthless-cryptocurrency-dascoin-rhb7j5f6g> (accessed 12.10.19).

Hackers Hit Twitter C.E.O. Jack Dorsey in a 'SIM Swap.' You're at Risk, Too. - The New York Times [WWW Document], n.d. URL <https://www.nytimes.com/2019/09/05/technology/sim-swap-jack-dorsey-hack.html> (accessed 12.10.19).

Hackers used NSA's tool for Baltimore ransomware attack: Report [WWW Document], 2019. . Hindustan Times. URL <https://www.hindustantimes.com/tech/hackers-used-nsa-s-tool-for-baltimore-ransomware-attack-report/story-L11CZu9mMWUsdsEF4lluGM.html> (accessed 12.10.19).

Kate Winslet takes action against Bitcoin scammers who used her image - Mirror Online [WWW Document], n.d. URL <https://www.mirror.co.uk/3am/celebrity-news/kate-winslet-takes-action-against-20139099> (accessed 12.10.19).

Leading OneCoin backers linked to Irish cryptocurrency MingoCoin | Ireland | The Sunday Times [WWW Document], n.d. URL <https://www.thetimes.co.uk/edition/ireland/leading-onecoin-backers-linked-to-irish-cryptocurrency-mingocoin-kwmfbqxf> (accessed 12.10.19).

Malaysia still an attractive region for cybercriminals [WWW Document], 2019. . Borneo Post Online. URL <https://www.theborneopost.com/2019/05/06/malaysia-still-an-attractive-region-for-cybercriminals/> (accessed 12.10.19).

Man wanted in US over \$2m bitcoin 'thefts' bailed | Ireland | The Times [WWW Document], n.d. URL <https://www.thetimes.co.uk/edition/ireland/man-wanted-in-us-over-2m-bitcoin-thefts-bailed-qt1q9jp9d> (accessed 12.10.19).

Michaels, D., 2019. Cryptocurrency Exchanges Including Coinbase Disclose Ratings of Digital Assets. Wall Street Journal. <https://www.wsj.com/articles/cryptocurrency-exchanges-including-coinbase-to-rate-digital-assets-11569835801> (accessed 12.10.19).

Millions lost in "celebrity-backed scams" - The Dundee Messenger [WWW Document], n.d. URL <https://dundeemessenger.co.uk/business/millions-lost-in-celebrity-backed-scams/> (accessed 12.10.19).

Mooney, J., 2019. Gardai join hunt for the missing OneCoin billions. The Sunday Times. <https://www.thetimes.co.uk/article/gardai-join-hunt-for-the-missing-onecoin-billions-swchhv0nd> (accessed 12.10.19).

MyPR.co.za: The Landscape Of Cryptocurrency Scams In South Africa [WWW Document], n.d. URL <http://buype.co.za/mypr-co-za-the-landscape-of-cryptocurrency-scams-in-south-africa/> (accessed 12.10.19).

North Korea Is Building Its Own Bitcoin - VICE [WWW Document], n.d. URL [https://www.vice.com/en\\_us/article/9ke3ae/north-korea-is-building-its-own-bitcoin](https://www.vice.com/en_us/article/9ke3ae/north-korea-is-building-its-own-bitcoin) (accessed 12.10.19).

North Korea Wants Its Own National Crypto, CBDC Fever Spreads in Asia [WWW Document], n.d. URL <https://cointelegraph.com/news/north-korea-needs-its-own-national-crypto-cbdc-fever-spreads-in-asia> (accessed 12.10.19).

Over £27 million reported lost to crypto and forex investment scams [WWW Document], 2019. . FCA. URL <https://www.fca.org.uk/news/press-releases/over-27-million-reported-lost-crypto-and-forex-investment-scams> (accessed 12.10.19).

Pay up or you'll never see your data again - The Boston Globe [WWW Document], n.d. URL <https://www.bostonglobe.com/business/2019/05/24/pay-you-never-see-your-data-again/3ZYP9nbNBwrgmKRvKLRojM/story.html> (accessed 12.10.19).

Phoenix Thoroughbreds founder accused of stealing €100m from global Ponzi scam | Horse Racing News | Racing Post [WWW Document], n.d. URL <https://www.racingpost.com/news/phoenix-thoroughbreds-founder-accused-of-stealing-eur100m-from-global-ponzi-scam/410788> (accessed 12.10.19).

"Ponzi" victim cost loved ones £216,000 after recruiting them for scam, 2019. . Metro. URL <https://metro.co.uk/2019/05/07/ponzi-victim-cost-loved-ones-216000-after-recruiting-them-for-scam-9287389/> (accessed 12.10.19).

Press, T.A., n.d. European, American authorities make major darknet bust [WWW Document]. The Ledger. URL <https://www.theledger.com/zz/news/20190503/european-american-authorities-make-major-darknet-bust> (accessed 12.10.19).

Proactive checks on crypto risks needed, global watchdog FSB says - Reuters [WWW Document], n.d. URL <https://uk.reuters.com/article/us-crypto-currencies/proactive-checks-on-crypto-risks-needed-global-watchdog-fsb-says-idUKKCN1T116T> (accessed 12.10.19).

Proof of Work: Binance gets hacked, 2019. . The Block. URL <https://www.theblockcrypto.com/post/22716/proof-of-work-binance-gets-hacked> (accessed 12.10.19).

REFILE-ALTCOINS-Privacy coin Monero offers near total anonymity - Reuters [WWW Document], n.d. URL <https://uk.reuters.com/article/crypto-currencies-altcoins/altcoins-privacy-coin-monero-offers-near-total-anonymity-idUKL5N2204RV> (accessed 12.10.19).

September 1, R.U., 2019, 2019. N.Korea denies it amassed \$2 bln through cyberattacks on banks | Montreal Gazette. URL <https://nationalpost.com/pmnn/news-pmn/politics-news-pmn/n-korea-denies-it-amassed-2-bln-through-cyberattacks-on-banks> (accessed 12.10.19).

Share Skirting U. S. sanctions, C. flock to cryptocurrency to shop online, Tumblr, Pinterest, Plus, G., Reddit, LinkedIn, Email, 2019. Skirting U.S. sanctions, Cubans flock to cryptocurrency to shop online, send funds | The Province. URL <https://nationalpost.com/pmnn/entertainment-pmn/skirting-u-s-sanctions-cubans-flock-to-cryptocurrency-to-shop-online-send-funds> (accessed 12.10.19).

Social Networks: The Hunting Ground Where Criminals Are Netting \$3bn Yearly In Illicit Profits [WWW Document], n.d. . Modern Ghana. URL <https://www.modernghana.com/news/929620/social-networks-the-hunting-ground-where-criminal.html> (accessed 12.10.19).

Spain nabs gang offering criminal money laundering services [WWW Document], n.d. . Star Tribune. URL <http://www.startribune.com/spain-nabs-gang-offering-criminal-money-laundering-services/509634062/> (accessed 12.10.19).

Sun, M., 2019. SEC Halts Alleged Ponzi Scheme Involving Diamond-Backed Cryptocurrency. Wall Street Journal. <https://www.wsj.com/articles/sec-halts-alleged-ponzi-scheme-involving-diamond-backed-cryptocurrency-11558565619> (accessed 12.10.19).

Updated FinCEN Advisory Warns Against Continued Corrupt Venezuelan Attempts to Steal, Hide, or Launder Money | PressReleasePoint [WWW Document], n.d. URL <http://www.pressreleasepoint.com/updated-fincen-advisory-warns-against-continued-corrupt-venezuelan-attempts-steal-hide-or-launder> (accessed 12.10.19).

U.S. investor awarded \$75 million in cryptocurrency crime case, 2019. . Reuters. <https://uk.reuters.com/article/us-crypto-currency-lawsuit-idUKKCN1SG2CO> (accessed 12.10.19).

Venezuela has Bitcoin stash and doesn't know what to do with it [WWW Document], n.d. URL <https://www.livemint.com/market/stock-market-news/venezuela-has-bitcoin-stash-and-doesn-t-know-what-to-do-with-it-11569631234903.html> (accessed 12.10.19).

Weinstein, D., 2019. Opinion | Hackers Hold Baltimore Hostage. Wall Street Journal. <https://www.wsj.com/articles/hackers-hold-baltimore-hostage-11559256722> (accessed 12.10.19).

Woman who lifted lid on “pyramid scheme” receives rape threats for speaking out | Metro News [WWW Document], n.d. URL <https://metro.co.uk/2019/09/25/woman-lifted-lid-pyramid-scheme-receives-rape-threats-speaking-10805032/> (accessed 12.10.19).

www.ETCIO.com, n.d. ‘RobbinHood’ ransomware attack: What we can learn? - ET CIO [WWW Document]. ETCIO.com. URL <https://cio.economictimes.indiatimes.com/news/digital-security/robbinhood-ransomware-attack-what-we-can-learn/69465122> (accessed 12.10.19).

www.ETtech.com, n.d. Bengaluru faced the highest number of cyber attacks in 2018: Report - ETtech [WWW Document]. ETtech.com. URL <https://tech.economictimes.indiatimes.com/news/internet/bengaluru-faced-the-highest-number-of-cyber-attacks-in-2018-report/69400778> (accessed 12.10.19).

## **Section 1.2**

[Back to text](#)

Central bank digital currency (CBDC) and financial inclusion [WWW Document], 2019. . Cenfri | Centre for Financial Inclusion. URL <https://cenfri.org/publications/central-bank-digital-currency-cbdc-and-financial-inclusion/> (accessed 12.11.19).

The Central Bank Digital Currency, Ep. 15 by Fintech Beat, n.d. <https://cms.megaphone.fm/channel/fintechbeat?selected=FISCAL4877650651> (accessed 12.11.19).

The IMF on How to Design Central Bank Digital Currencies [WWW Document], 2019. . Unchained Podcast. URL <https://unchainedpodcast.com/the-imf-on-how-to-design-central-bank-digital-currencies/> (accessed 12.11.19).

Ward, O., Rochemont, S., Understanding CBDCs Final - disc.pdf, n.d. <https://www.actuaries.org.uk/system/files/field/document/Understanding%20CBDCs%20Final%20-%20disc.pdf> (accessed 12.13.19).

### **Section 1.2.1**

[Back to text](#)

Ward, O., Rochemont, S., Understanding CBDCs Final - disc.pdf, n.d. <https://www.actuaries.org.uk/system/files/field/document/Understanding%20CBDCs%20Final%20-%20disc.pdf> (accessed 12.13.19).

### **Section 1.2.2**

[Back to text](#)

Carstens, A., 2019. The future of money and the payment system: what role for central banks? <https://www.bis.org/speeches/sp191205.htm> (accessed 12.13.19).

Central bank group BIS taps Benoit Cœuré to lead digital currency push | Financial Times [WWW Document], n.d. URL <https://www.ft.com/content/c7739de6-03e7-11ea-a984-fbbacad9e7dd> (accessed 12.11.19).

20% of Turks Use or Own Cryptocurrencies, Report Says | CryptoGlobe [WWW Document], n.d. URL <https://www.cryptoglobe.com/latest/2019/08/one-in-five-turks-use-cryptoassets-report-says/> (accessed 12.11.19).

Argentina: Banco Central señala riesgos de las stablecoins para ese país, 2019. . DiarioBitcoin. URL <https://www.diariobitcoin.com/index.php/2019/11/20/argentina-banco-central-senala-riesgos-de-las-stablecoins-para-ese-pais/> (accessed 12.11.19).

Arnold, M., 2019. ECB explores development of a digital currency [WWW Document]. Financial Times. URL <https://www.ft.com/content/56db1f62-104b-11ea-a7e6-62bf4f9e548a> (accessed 12.11.19).

Authority, H.K.M., n.d. Hong Kong Monetary Authority - Fintech Collaboration between the Hong Kong Monetary Authority and the Bank of Thailand [WWW Document]. Hong Kong Monetary Authority. URL <https://www.hkma.gov.hk/eng/news-and-media/press-releases/2019/05/20190514-3/> (accessed 12.11.19).

Azerbaijan’s Central Bank to introduce digital identification system [WWW Document], n.d. URL <https://en.trend.az/business/finance/3144779.html> (accessed 12.11.19).

Bank, E.C., n.d. Towards the retail payments of tomorrow: a European strategy [WWW Document]. European Central Bank. URL <https://www.ecb.europa.eu/press/key/date/2019/html/ecb.sp191126~5230672c11.en.html> (accessed 12.11.19).

Bank of Mauritius overhauling supervisory framework – governor - Central Banking [WWW Document], n.d. URL <https://www.centralbanking.com/central-banks/financial-stability/micro->

- [prudential/4385216/bank-of-mauritius-overhauling-supervisory-framework-googoolye](#) (accessed 12.11.19).
- BCR estudia impacto de eventual creación de moneda virtual en Perú | Mercados | Gestión [WWW Document], n.d. URL <https://gestion.pe/economia/mercados/bcr-estudia-impacto-eventual-creacion-moneda-virtual-peru-273387-noticia/> (accessed 12.11.19).
- Bitcoin craze hits Iran as U.S. sanctions squeeze weak economy - Washington Times [WWW Document], n.d. URL <https://www.washingtontimes.com/news/2019/jul/18/bitcoin-craze-hits-iran-as-us-sanctions-squeeze-we/> (accessed 12.11.19).
- Blenkinsop, C., 2019. How Crypto and Blockchain Are Influencing Geopolitics [WWW Document]. Cointelegraph. URL <https://cointelegraph.com/news/how-crypto-and-blockchain-are-influencing-geopolitics> (accessed 12.11.19).
- BOJ conducting research on digital currency: Kuroda - Reuters [WWW Document], n.d. URL <https://uk.reuters.com/article/us-japan-economy-kuroda-fintech/boj-conducting-research-on-digital-currency-kuroda-idUKKBN1XT06Q> (accessed 12.11.19).
- BoT more amenable but still leery of Libra landing [WWW Document], n.d. URL <https://www.bangkokpost.com/business/1714876/bot-more-amenable-but-still-leery-of-libra-landing> (accessed 12.11.19).
- Central Bank of Bahamas to Launch a CBDC by 2020 | BTCMANAGER [WWW Document], 2019. . URL <https://btcmanager.com/>. URL <https://btcmanager.com/central-bank-bahamas-launch-cbdc-2020/> (accessed 12.11.19).
- Central Banks Settle Cross-Border Payments With Blockchain for First Time - CoinDesk [WWW Document], n.d. URL <https://www.coindesk.com/central-banks-settle-cross-border-payments-with-blockchain-for-first-time> (accessed 12.11.19).
- China's digital currency could threaten dollar's dominance | The Japan Times [WWW Document], n.d. URL [https://www.japantimes.co.jp/?p=2321111&post\\_type=opinion#.XfDf0JP7T-Z](https://www.japantimes.co.jp/?p=2321111&post_type=opinion#.XfDf0JP7T-Z) (accessed 12.11.19).
- Draft Banning of Cryptocurrency & Regulation of Official Digital Currency Bill, 2019 [WWW Document], 2019. . PRSIndia. URL <http://prsindia.org/billtrack/draft-banning-cryptocurrency-regulation-official-digital-currency-bill-2019> (accessed 12.11.19).
- ECCB launches digital currency pilot [WWW Document], 2019. . Dominica News Online. URL <https://dominicanewsonline.com/news/homepage/news/eccb-launches-digital-currency-pilot/> (accessed 12.11.19).
- Emerging Digital Technology for Kenya, <https://ca.go.ke/wp-content/uploads/2019/07/Emerging-Digital-Compiled.pdf> (accessed 12.11.19).
- Europe must wean itself off global payment card schemes, ECB says, 2019. . Reuters. <https://www.reuters.com/article/us-ecb-payments-idUSKBN1Y00YV> (accessed 12.11.19).
- Facebook's Libra Cryptocurrency Plans 'Supercharged' Central Banks' Interest In This Barbados Startup [WWW Document], n.d. URL <https://www.forbes.com/sites/michaeldelcastillo/2019/08/19/facebooks-libra-cryptocurrency-plans-supercharged-central-bank-interest-in-this-barbados-startup/#d98b8a7266b6> (accessed 12.11.19).
- FEATURED: SPENN users in Rwanda reach more than 180,000 | The New Times | Rwanda [WWW Document], n.d. URL <https://www.newtimes.co.rw/news/featured-spenn-users-rwanda-reach-more-180000> (accessed 12.11.19).
- France's Le Maire sees progress on ECB digital currency next year, 2019. . Reuters. <https://in.reuters.com/article/eurozone-france-lemaire-idUSB5N23D02H> (accessed 12.11.19).
- Global Crypto War Is Heating up – Iran Next in Line With Its Own Gold-Backed Coin – RedlionTrader [WWW Document], n.d. URL <https://redliontrader.com/stream/global-crypto-war-is-heating-up-iran-next-in-line-with-its-own-gold-backed-coin/> (accessed 12.11.19).
- Governor Antoine Addresses the ECCU Media on Launch of FinTech Pilot Project | Eastern Caribbean Central Bank [WWW Document], n.d. URL <https://www.eccb-centralbank.org/news/view/governor-antoine-addresses-the-eccu-media-on-launch-of-fintech-pilot-project> (accessed 12.11.19).
- Govt. economic committee approves mechanism for mining cryptocurrencies [WWW Document], 2019. . Tehran Times. URL <http://www.tehrantimes.com/news/438441/Govt-economic-committee-approves-mechanism-for-mining-cryptocurrencies> (accessed 12.11.19).
- IMF Podcasts: Electronic Invoicing Reform in Peru Paying Off [WWW Document], n.d. URL [http://imfpodcast.imfpodcasts.libsynpro.com/electronic-invoicing-reform-in-peru-paying-off?utm\\_medium=email&utm\\_source=govdelivery](http://imfpodcast.imfpodcasts.libsynpro.com/electronic-invoicing-reform-in-peru-paying-off?utm_medium=email&utm_source=govdelivery) (accessed 12.11.19).



Improvements needed in the financial infrastructure [WWW Document], n.d. URL <https://www.norges-bank.no/en/news-events/news-publications/Press-releases/2019/2019-05-23-press-release/> (accessed 12.11.19).

ING's Chief Economist Predicts Central Bank Digital Currencies in 2-3 Years on Stocks News Feed, 2019. . Stocks News Feed. URL <https://stocksnewsfeed.com/cryptocurrency/ings-chief-economist-predicts-central-bank-digital-currencies-in-2-3-years/> (accessed 12.11.19).

Insights, L., 2019. Standard Chartered, HSBC complete Letters of Credit on Voltron blockchain [WWW Document]. Ledger Insights. URL <https://www.ledgerinsights.com/voltron-blockchain-standard-chartered-hsbc-letters-of-credit/> (accessed 12.11.19).

Jasper Ubin Design paper PDF, <https://www.mas.gov.sg/-/media/Jasper-Ubin-Design-Paper.pdf> (accessed 12.11.19)

L'UE va réfléchir à une monnaie numérique publique face à Libra - Reuters [WWW Document], n.d. URL <https://fr.reuters.com/article/businessNews/idFRKBN1XF234> (accessed 12.11.19).

MAS, Temasek, JPMorgan develop prototype network for multi-currency payments, Banking & Finance - THE BUSINESS TIMES [WWW Document], n.d. URL <https://www.businesstimes.com.sg/banking-finance/mas-temasek-jpmorgan-develop-prototype-network-for-multi-currency-payments> (accessed 12.11.19).

Monedas digitales de bancos centrales, 2019. . Foco Económico. URL <http://focoeconomico.org/2019/08/02/monedas-digitales-de-bancos-centrales/> (accessed 12.11.19).

NGO reshapes microfinance via blockchain - Turkey News [WWW Document], n.d. URL <http://www.hurriyetdailynews.com/ngo-reshapes-microfinance-via-blockchain-145836> (accessed 12.11.19).

November 14, R.U., 2019, 2019. Russia says BRICS nations favor idea of common payment system | Ottawa Citizen. URL <https://business.financialpost.com/pmn/business-pmn/russia-says-brics-nations-favor-idea-of-common-payment-system> (accessed 12.11.19).

ON BİRİNCİ KALKINMA PLANI, <http://www.sbb.gov.tr/wp-content/uploads/2019/07/OnbirinciKalkinmaPlani.pdf> (accessed 12.11.19).

(PDF) THAI'S READINESS AND PERCEPTION TOWARD THE REVOLUTION OF THE BANKING TECHNOLOGY: A MIXED-METHOD RESEARCH [WWW Document], n.d. URL [https://www.researchgate.net/publication/333260306\\_THAI'S\\_READINESS\\_AND\\_PERCEPTION\\_TOWARD\\_THE\\_REVOLUTION\\_OF\\_THE\\_BANKING\\_TECHNOLOGY\\_A\\_MIXED-METHOD\\_RESEARCH](https://www.researchgate.net/publication/333260306_THAI'S_READINESS_AND_PERCEPTION_TOWARD_THE_REVOLUTION_OF_THE_BANKING_TECHNOLOGY_A_MIXED-METHOD_RESEARCH) (accessed 12.11.19).

President Erdogan: Turkey to Finish Testing Digital Lira in 2020 [WWW Document], n.d. URL <https://cointelegraph.com/news/president-erdogan-turkey-to-finish-testing-digital-lira-in-2020> (accessed 12.11.19).

Republic of Mauritius- MauCAS to pave the way for new electronic payment options, says PM [WWW Document], n.d. URL <http://www.govmu.org/English/News/Pages/MauCAS-to-pave-the-way-for-new-electronic-payment-options,-says-PM.aspx> (accessed 12.11.19).

Reserve Bank wants to test a digital currency backed by the rand [WWW Document], n.d. URL <https://businesstech.co.za/news/finance/317334/reserve-bank-wants-to-test-a-digital-currency-backed-by-rand/> (accessed 12.11.19).

Ripple CEO Talks xCurrent as an Upgrade of SWIFT 2.0, Global Interoperability and CBDCs, n.d. URL <https://bitcoinexchangeguide.com/ripple-ceo-talks-xcurrent-as-an-upgrade-of-swift-2-0-global-interoperability-and-cbdcs/> (accessed 12.11.19).

Russia's Central Bank to Consider Gold-Backed Cryptocurrencies for Mutual Settlements [WWW Document], n.d. URL <https://cointelegraph.com/news/russias-central-bank-to-consider-gold-backed-cryptocurrencies-for-mutual-settlements> (accessed 12.11.19).

Rwandan Central Bank Studying Ways of Issuing Digital Currency - BNN Bloomberg [WWW Document], n.d. URL <https://www.bnnbloomberg.ca/rwandan-central-bank-studying-ways-of-issuing-digital-currency-1.1305321> (accessed 12.11.19).

Sanctions-hit Iran becoming 'heaven' for bitcoin mining, says govt official — RT Business News [WWW Document], n.d. URL <https://www.rt.com/business/464546-iran-bitcoin-mining-heaven/> (accessed 12.11.19).

Sandhu, M., 2019. How Facebook's Libra fuelled push for central bank-run digital currencies [WWW Document]. Financial Times. URL <https://www.ft.com/content/746808a0-d9f6-11e9-8f9b-77216ebe1f17> (accessed 12.11.19).

Sanguanprasit, C., 2019. [ความคืบหน้า] เมื่อธนาคารแห่งประเทศไทยสร้างสกุลเงินดิจิทัลไว้ใช้เองในโครงการอินทนนท์ | Brand Inside. URL <https://brandinside.asia/cryptocurrency-bot-inthanon-1/> (accessed 12.11.19).

- SEC readies for digital trade amendments [WWW Document], n.d. URL <https://www.bangkokpost.com/tech/1670664/sec-readies-for-digital-trade-amendments> (accessed 12.11.19).
- Second phase of Project Inthanon a success: BOT [WWW Document], n.d. . URL <https://www.nationthailand.com/business/30373172> (accessed 12.11.19).
- SNB and BIS sign operational agreement on BIS Innovation Hub Centre in Switzerland [WWW Document], 2019. URL <https://www.bis.org/press/p191008.htm> (accessed 12.11.19).
- Stablecoins, Central Bank Digital Currencies, and Cross-Border Payments: A New Look at the International Monetary System [WWW Document], n.d. URL <https://www.imf.org/en/News/Articles/2019/05/13/sp051419-stablecoins-central-bank-digital-currencies-and-cross-border-payments> (accessed 12.11.19).
- Taskforce Releases Blockchain Implementation Strategy Report for Kenya [WWW Document], n.d. URL <https://bitcoinafrica.io/2019/08/02/kenya-blockchain-report/> (accessed 12.11.19).
- Thai government to use blockchain for VAT refunds, bonds, procurement - Ledger Insights [WWW Document], n.d. URL <https://www.ledgerinsights.com/thai-government-blockchain-vat-bonds-procurement/> (accessed 12.11.19).
- The Federal Reserve is looking into developing a digital currency in the US, Powell confirms | Markets Insider [WWW Document], n.d. URL <https://markets.businessinsider.com/news/stocks/the-federal-reserve-is-looking-into-developing-digital-currency-us-2019-11-1028705211> (accessed 12.11.19).
- The growing challenges for monetary policy in the current international monetary and financial system - speech by Mark Carney | Bank of England [WWW Document], n.d. URL <https://www.bankofengland.co.uk/speech/2019/mark-carney-speech-at-jackson-hole-economic-symposium-wyoming> (accessed 12.11.19).
- The problems of the global monetary order go deeper than Trump | FT Alphaville [WWW Document], n.d. URL <https://ftalphaville.ft.com/2019/08/27/1566904183000/The-problems-of-the-global-monetary-order-go-deeper-than-Trump/> (accessed 12.11.19).
- Venezuelan oil in storage tanks to back sanctioned cryptocurrency -Maduro | Regina Leader-Post [WWW Document], n.d. URL <https://leaderpost.com/pmn/business-pmn/venezuelan-oil-in-storage-tanks-to-back-sanctioned-cryptocurrency-maduro/wcm/dc967cea-f74e-41f3-8bd2-b3a157df2cd2> (accessed 12.11.19).
- Why China and Russia are reducing their exposure to the US dollar - Opinion - Chinadaily.com.cn [WWW Document], n.d. URL <https://www.chinadaily.com.cn/a/201911/22/WS5dd73f3da310cf3e355793e7.html> (accessed 12.11.19).
- Wipro, R3 Build Blockchain-Based Solution Prototype to Power Digital Currency in Thailand [WWW Document], n.d. URL <https://us.acrofan.com/detail.php?number=104669> (accessed 12.11.19).
- World needs to end risky reliance on U.S. dollar: BoE's Carney - Reuters [WWW Document], n.d. URL <https://www.reuters.com/article/us-usa-fed-jacksonhole-carney/world-needs-to-end-risky-reliance-on-u-s-dollar-boes-carney-idUSKCN1VD28C> (accessed 12.11.19).
- Zmudzinski, A., 2019. European Union Drafts Law Suggesting Consideration of Eurocoin [WWW Document]. Cointelegraph. URL <https://cointelegraph.com/news/european-union-drafts-law-suggesting-consideration-of-eurocoin> (accessed 12.11.19).
- 韩国央行：目前没有发行央行数字货币（CBDC）的计划\_巴比特\_服务于区块链创新者 [WWW Document], n.d. URL <https://www.8btc.com/article/519236> (accessed 12.11.19).

### **Section 1.2.3**

[Back to text](#)

- Facebook in talks with US regulator over digital currency | Financial Times [WWW Document], n.d. URL <https://www.ft.com/content/3b2084fe-83c6-11e9-b592-5fe435b57a3b> (accessed 12.11.19).
- 30 years of central banking - Central Banking [WWW Document], n.d. URL <https://www.centralbanking.com/central-banks/4425151/30-years-of-central-banking> (accessed 12.11.19).
- Bundesbank says Facebook ecurrency is on the money | Business | The Times [WWW Document], n.d. URL <https://www.thetimes.co.uk/edition/business/bundesbank-says-facebook-ecurrency-is-on-the-money-ntd9cdvfs> (accessed 12.11.19).
- Can bitcoin establish itself as a viable asset class? [WWW Document], 2019. . The Malaysian Reserve. URL <https://themalaysianreserve.com/2019/09/26/can-bitcoin-establish-itself-as-a-viable-asset-class/> (accessed 12.11.19).

Central Bankers' Desperate Grab for Power [WWW Document], 2019. . Black Agenda Report. URL <http://www.blackagendareport.com/central-bankers-desperate-grab-power> (accessed 12.11.19).

Facebook boss Mark Zuckerberg in secret meeting with Bank's Mark Carney | This is Money [WWW Document], n.d. URL <https://www.thisismoney.co.uk/money/markets/article-7068219/Facebook-boss-Mark-Zuckerberg-secret-meeting-Banks-Mark-Carney.html> (accessed 12.11.19).

Federal Reserve Chair Jerome Powell should tread cautiously with real-time payments proposal [WWW Document], n.d. URL <https://www.washingtonexaminer.com/opinion/federal-reserve-chair-jerome-powell-should-tread-cautiously-with-real-time-payments-proposal> (accessed 12.11.19).

Keneen luotamme, kun emme enää maksa käteisellä? – Euro ja talous [WWW Document], n.d. URL <https://www.eurojatalous.fi/fi/blogit/2019/keneen-luotamme-kun-emme-ena-maksa-kateisella/> (accessed 12.11.19).

Libra Shows Central Banks' Failure on Cross-Border Payments: Riksbank on Stocks News Feed [WWW Document], n.d. URL <https://stocksnewsfeed.com/cryptocurrency/libra-shows-central-banks-failure-on-cross-border-payments-riksbank/> (accessed 12.11.19).

Mobile technology may serve underbanked with no cryptocurrency [WWW Document], n.d. URL <http://www.rollcall.com/news/policy/mobile-technology-may-serve-underbanked-with-no-cryptocurrency> (accessed 12.11.19).

Noonan, L., Murphy, H., 2019. Facebook in talks with US regulator over digital currency [WWW Document]. Financial Times. URL <https://www.ft.com/content/3b2084fe-83c6-11e9-b592-5fe435b57a3b> (accessed 12.11.19).

People Will Choose A Currency That Government Can't Control: Pompliano [WWW Document], n.d. URL <https://cointelegraph.com/news/people-will-choose-a-currency-that-government-cant-control-pompliano> (accessed 12.11.19).

Sweney, M., 2019. Facebook plans to launch "GlobalCoin" cryptocurrency in 2020. The Guardian. Why Facebook wants to launch its own currency [WWW Document], n.d. URL <https://www.irishtimes.com/business/technology/why-facebook-wants-to-launch-its-own-currency-1.3903033> (accessed 12.11.19).

## **Section 1.2.4**

[Back to text](#)

Bitcoin slides to six-month low as China warns of risks | Financial Times [WWW Document], n.d. URL <https://www.ft.com/content/1fad6628-0f72-11ea-a7e6-62bf4f9e548a> (accessed 12.11.19).

Alibaba, Tencent, Five Others To Receive First Chinese Government Cryptocurrency [WWW Document], n.d. URL <https://www.forbes.com/sites/michaeldelcastillo/2019/08/27/alibaba-tencent-five-others-to-recvie-first-chinese-government-cryptocurrency/#7ab3c1de1a51> (accessed 12.11.19).

Bitcoin hailed as 'success' by China in dramatic shift in attitude | The Independent' [WWW Document], n.d. URL <https://www.independent.co.uk/life-style/gadgets-and-tech/news/bitcoin-china-cryptocurrency-blockchain-price-latest-a9199566.html> (accessed 12.11.19).

Bitcoin plummets to a six-month low on China crackdown - Reuters [WWW Document], n.d. URL <https://www.reuters.com/article/us-crypto-currencies/bitcoin-plummets-to-a-six-month-low-on-china-crackdown-idUSKBN1XW1CO> (accessed 12.11.19).

Bitcoin slides to six-month low as China warns of risks | Financial Times [WWW Document], n.d. URL <https://www.ft.com/content/1fad6628-0f72-11ea-a7e6-62bf4f9e548a> (accessed 12.11.19).

Bitcoin's Virtual Property Attribute Recognized by Judiciary for the First Time-Finance News-CAIJING.COM.CN [WWW Document], n.d. URL <http://m.caijing.com.cn/api/show?contentid=4603403> (accessed 12.11.19).

Central bank scotches digital currency rumors [WWW Document], n.d. . SHINE. URL <https://www.shine.cn/biz/finance/1911136028/> (accessed 12.11.19).

China leaves bitcoin mining out of list of restricted activities | Regina Leader-Post [WWW Document], n.d. URL <https://leaderpost.com/pmn/business-pmn/china-leaves-bitcoin-mining-out-of-list-of-restricted-activities/wcm/c8380ea0-5a5a-46be-8da4-da9423f7b7e6> (accessed 12.11.19).

China to Pilot Financial Innovations Including Digital Currency in Shenzhen | NEWS.8BTC.COM [WWW Document], n.d. URL <https://news.8btc.com/china-to-pilot-financial-innovations-including-digital-currency-in-shenzhen> (accessed 12.11.19).

China's crackdown on cryptocurrencies claims first victims, Banking & Finance - THE BUSINESS TIMES [WWW Document], n.d. URL <https://www.businesstimes.com.sg/banking-finance/chinas-crackdown-on-cryptocurrencies-claims-first-victims> (accessed 12.11.19).

China's Crypto Could Become a Global Reserve Currency: Circle CEO [WWW Document], 2019. . CCN.com. URL <https://www.ccn.com/chinas-crypto-could-become-a-global-reserve-currency-circle-ceo/> (accessed 12.11.19).

China's fintech stocks buoyed by Beijing's digital currency push, 2019. . Reuters. <https://www.reuters.com/article/china-markets-digital-currency-idUSL3N26H1IO> (accessed 12.11.19).

China's Shenzhen Investigates Illegal Crypto Activities, 39 Enterprises Now on the List | NEWS.8BTC.COM [WWW Document], n.d. URL <https://news.8btc.com/chinas-shenzhen-investigates-illegal-crypto-activities-39-enterprises-now-on-the-list> (accessed 12.11.19).

China's State Media Just Headlined Bitcoin to 1.4 Billion People [WWW Document], n.d. URL <https://www.ccn.com/china-state-media-one-billion-bitcoin-headline/> (accessed 12.11.19).

Chinese Authorities Clampdown on Popular ICO Startup GXChain | BTCMANAGER [WWW Document], 2019. . <https://btcmanager.com/>. URL <https://btcmanager.com/chinese-ico-startup-gxchain/> (accessed 12.11.19).

Crypto bourse Binance says no China office amid raid rumours, Banking & Finance - THE BUSINESS TIMES [WWW Document], n.d. URL <https://www.businesstimes.com.sg/banking-finance/crypto-bourse-binance-says-no-china-office-amid-raid-rumours> (accessed 12.11.19).

First Look: China's Central Bank Digital Currency | Binance Research [WWW Document], n.d. URL <https://research.binance.com/analysis/china-cbdc#fn14> (accessed 12.11.19).

HDFH Launches Global Digital Bank Consortium Blockchain Investment Fund at CIIE [WWW Document], n.d. URL <https://www.prnewswire.co.uk/news-releases/hdfh-launches-global-digital-bank-consortium-blockchain-investment-fund-at-ciie-805048353.html> (accessed 12.11.19).

Heavy! The central bank's digital currency is coming out, and the design concept and technical architecture are exposed for the first time. [WWW Document], n.d. URL <https://www.8btc.com/article/462253> (accessed 12.11.19).

New digital currency to launch in near future - Chinadaily.com.cn [WWW Document], n.d. URL <http://www.chinadaily.com.cn/a/201908/20/WS5d5b5d1ca310cf3e35566c01.html> (accessed 12.11.19).

New digital currency to launch in near future - China.org.cn [WWW Document], n.d. URL [http://www.china.org.cn/business/2019-08/20/content\\_75117829.htm](http://www.china.org.cn/business/2019-08/20/content_75117829.htm) (accessed 12.11.19).

PBOC Shanghai HQ says to crack down on cryptocurrency trading - Reuters [WWW Document], n.d. URL <https://uk.reuters.com/article/china-blockchain-shanghai/pboc-shanghai-hq-says-to-crack-down-on-cryptocurrency-trading-idUKB9N251022> (accessed 12.11.19).

RPT-Trade tensions and a weaker yuan drive Chinese crypto demand, market players say - Reuters [WWW Document], n.d. URL <https://www.reuters.com/article/crypto-currencies/rpt-trade-tensions-and-a-weaker-yuan-drive-chinese-crypto-demand-market-players-say-idUSL8N25A6K1> (accessed 12.11.19).

Survey: 89% of Chinese blockchain companies plan to launch their own cryptocurrency [WWW Document], n.d. URL <https://www.wanbizu.com/xinbi/2019112791149.html> (accessed 12.11.19).

The central bank's digital currency is eager to be internationalized, it refers to the digital asset pricing power [WWW Document], n.d. URL <https://www.8btc.com/article/470764> (accessed 12.11.19).

Top Chinese Official: Digital Yuan Will Generally Respect Privacy - OhNo "WTF" Crypto [WWW Document], n.d. URL <https://www.ohncrypto.com/2019/11/top-chinese-official-digital-yuan-will.html> (accessed 12.11.19).

Ward, O., Rochemont, S., Understanding CBDCs Final - disc.pdf, n.d. <https://www.actuaries.org.uk/system/files/field/document/Understanding%20CBDCs%20Final%20-%20disc.pdf> (accessed 12.13.19).

Wanxiang Blockchain Zou Chuanwei: Global stablecoin and central bank digital currency [WWW Document], n.d. URL [http://www.ce.cn/macro/more/201911/27/t20191127\\_33715255.shtml](http://www.ce.cn/macro/more/201911/27/t20191127_33715255.shtml) (accessed 12.11.19).

Xinhua Headlines: China embraces blockchain as next frontier for digital future - Xinhua | English.news.cn [WWW Document], n.d. URL [http://www.xinhuanet.com/english/2019-11/07/c\\_138536845.htm](http://www.xinhuanet.com/english/2019-11/07/c_138536845.htm) (accessed 12.11.19).

中 央 銀 行 數 字 化 幣 幣 , 民 間 公 同 開 發 ... 리브라보다 앞서 발표 - 세계일보 [WWW Document], n.d. URL <http://www.segyefn.com/newsView/20190821511369#0BhL> (accessed 12.11.19).

株式会社インプレス, 2019. 中国人民銀行総裁「デジタル通貨発行時期は未定」フォーブスの報道もデマ認定 ~CBDCは流通する現金の一部を代替。預貯金を置き換えない [WWW Document]. 仮想通貨 Watch. URL <https://crypto.watch.impress.co.jp/docs/news/1209368.html> (accessed 12.11.19).



深国仲案例精选 | 比特币仲裁案 [WWW Document], n.d. . 微信公众平台. URL [http://mp.weixin.qq.com/s?\\_\\_biz=MzA5MTEyNzQwMw==&mid=2650673989&idx=1&sn=7f6ec368683463285cef76a286e4ddae&chksm=880b9841bf7c11578db2c51c04039514dde228f06259ccb1bb4c4b00e2f4a29503d3f608bd14#rd](http://mp.weixin.qq.com/s?__biz=MzA5MTEyNzQwMw==&mid=2650673989&idx=1&sn=7f6ec368683463285cef76a286e4ddae&chksm=880b9841bf7c11578db2c51c04039514dde228f06259ccb1bb4c4b00e2f4a29503d3f608bd14#rd) (accessed 12.11.19).

调查：中国89%的区块链公司计划推出自己的加密货币\_玩币族 [WWW Document], n.d. URL <https://www.wanbizu.com/xinbi/2019112791149.html> (accessed 12.11.19).

## Section 2

[Back to text](#)

Londoners take to cashless payments as north-south gap emerges | Financial Times [WWW Document], n.d. URL <https://www.ft.com/content/e32bf622-abbe-11e9-8030-530adfa879c2> (accessed 12.9.19).

Apple Card [WWW Document], n.d. . Apple. URL <https://www.apple.com/apple-card/> (accessed 12.9.19).

AUB and GCash partnership to boost merchant acquisition in the QR payment space | Inquirer Technology [WWW Document], n.d. URL <https://technology.inquirer.net/89244/aub-and-gcash-partnership-to-boost-merchant-acquisition-in-the-qr-payment-space> (accessed 12.9.19).

Authority, H.K.M., n.d. Hong Kong Monetary Authority - Granting of virtual banking licences [WWW Document]. Hong Kong Monetary Authority. URL <https://www.hkma.gov.hk/eng/news-and-media/press-releases/2019/03/20190327-3/> (accessed 12.9.19).

Bangkok Bank unveils Be 1st Smart Rabbit LINE Pay debit cards [WWW Document], n.d. . <https://www.nationthailand.com>. URL <https://www.nationthailand.com/business/30376763> (accessed 12.9.19).

BUSINESS, B., n.d. Le cash, chronique d'une mort annoncée ? [WWW Document]. BFM BUSINESS. URL <https://bfmbusiness.bfmtv.com/entreprise/le-cash-chronique-d-une-mort-annoncee-1726858.html> (accessed 12.9.19).

Cashing In On Mobile Payments | People Magazine [WWW Document], n.d. URL <https://www.peoplemagazine.co.za/life/money-matters/cashing-in-on-mobile-payments/> (accessed 12.9.19).

Cashless movement picks up steam [WWW Document], n.d. URL <https://www.bangkokpost.com/business/1722559/cashless-movement-picks-up-steam> (accessed 12.9.19).

Cashless : un avantage pour les organisateurs, moins pour les festivaliers [WWW Document], 2019. . L'ADN. URL <https://www.ladn.eu/tech-a-suivre/cashless-festival-pourquoi-agace/> (accessed 12.9.19).

Cocheo, S., Br, E.E. at T.F., 2019. How Bank of America Became a Tech-Driven Powerhouse [WWW Document]. The Financial Brand. URL <https://thefinancialbrand.com/86675/bofa-brian-moynihan-erica-branch-mobile-banking-millennials-fintech/> (accessed 12.9.19).

Contactless payment on Opal system confusing customers [WWW Document], n.d. URL <https://www.news.com.au/technology/innovation/complaints-about-incorrect-fares-using-contactless-payment-on-opal-system/news-story/664490260a1cbfda5b2c5eb102f7a861> (accessed 12.9.19).

Credit Cards and QR Codes: Breakthrough for Financial Inclusion or Too Many Cooks in the Kitchen?, 2019. . PaymentsJournal. URL <https://www.paymentsjournal.com/credit-cards-and-qr-codes-breakthrough-for-financial-inclusion-or-too-many-cooks-in-the-kitchen/> (accessed 12.9.19).

CryptoDavid, 2019. M-PESA Remains Primarily a Payments Tool, a 2019 CGAP Survey Reveals. Bitcoin KE. URL <https://bitcoinke.io/2019/08/m-pesa-remains-primarily-a-payments-tool-cgap-survey-reveals/> (accessed 12.9.19).

E-payment system for S'gor residents | The Star Online [WWW Document], n.d. URL <https://www.thestar.com.my/metro/metro-news/2019/08/22/e-payment-system-for-sgor-residents> (accessed 12.9.19).

Event Genius takes cashless tech to Africa Prolific North [WWW Document], n.d. URL <https://www.prolificnorth.co.uk/news/digital-agency-news/2019/08/event-genius-takes-cashless-tech-africa> (accessed 12.9.19).

Expo 2019: Visitors to buy tickets using Mobile Money | The New Times | Rwanda [WWW Document], n.d. URL <https://www.newtimes.co.rw/news/expo-2019-visitors-buy-tickets-using-mobile-money> (accessed 12.9.19).

February 2019, W., n.d. 2019's three key payment technology trends [WWW Document]. Retail Week. URL <https://www.retail-week.com/retail-voice/2019s-three-key-payment-technology-trends/7031192.article> (accessed 12.9.19).

First Half 2019 results [WWW Document], n.d. URL [http://worldline.com/en/home/newsroom/press-releases-investors/2019/pr-2019\\_07\\_24\\_01.html](http://worldline.com/en/home/newsroom/press-releases-investors/2019/pr-2019_07_24_01.html) (accessed 12.9.19).

Gazin, G., 2019. It's hip to be Square: payment device expanding its reach. Troy Media - Canada. URL <https://troymedia.com/business/square-reader-expands-reach/> (accessed 12.9.19).

GCash and AUB boost partnership [WWW Document], 2019. . MNLToday.ph. URL <https://mnltoday.ph/2019/09/17/gcash-and-aub-boost-partnership/> (accessed 12.9.19).

GCash, Ortigas & Co. deploy QR code payment in Greenhills malls | BusinessMirror [WWW Document], n.d. URL <https://businessmirror.com.ph/2019/08/21/gcash-ortigas-co-deploy-qr-code-payment-in-greenhills-malls/> (accessed 12.9.19).

Global Payments partners with Alipay in the UK [WWW Document], 2018. . Finextra Research. URL <https://www.finextra.com/pressarticle/75732/global-payments-partners-with-alipay-in-the-uk> (accessed 12.9.19).

guyaneseonline, 2019. Rich countries must start planning for a cashless future – The Economist. Guyanese Online. URL <https://guyaneseonline.net/2019/08/07/rich-countries-must-start-planning-for-a-cashless-future-the-economist/> (accessed 12.9.19).

Hastie, H., 2019. Perth Airport goes online to target Chinese tourist dollars [WWW Document]. Brisbane Times. URL <https://www.brisbanetimes.com.au/national/western-australia/perth-airport-goes-online-to-target-chinese-tourist-dollars-20190812-p52ga6.html> (accessed 12.9.19).

Heath, I., n.d. Money troubles on the rise in world of easy payments [WWW Document]. URL <https://www.jerseyeveningpost.com/news/2019/07/08/money-troubles-on-the-rise-in-world-of-easy-payments/> (accessed 12.9.19).

Hong Leong Bank launches Digital Day 2019 cashless campaign [WWW Document], n.d. URL <https://vernonchan.com/hong-leong-bank-digital-day-2019/> (accessed 12.9.19).

How The Real Time Payments Revolution is Pushing Mastercard Beyond Cards [WWW Document], n.d. . Fortune. URL <https://fortune.com/2019/08/31/real-time-payments-mastercard/> (accessed 12.9.19).

<https://fintechnews.sg/submit-a-fintech-singapore-asia-press-release>, T. is a submitted C.A.-R.Y. can submit your own here, 2019. New Wallet in Vietnam: SmartPay Acquires More Than 200,000 Users Since Its Launch [WWW Document]. Fintech Singapore. URL <https://fintechnews.sg/33428/vietnam/new-wallet-in-vietnam-smartpay-acquires-more-than-200000-users-since-its-launch/> (accessed 12.9.19).

Israel Railways starts plan to pay for rides using credit cards - Jerusalem Post [WWW Document], n.d. URL <https://www.jpost.com/Israel-News/Israel-Railways-trials-contactless-card-payments-597045> (accessed 12.9.19).

JD Digits steps up overseas presence with e-wallet app in Thailand - China.org.cn [WWW Document], n.d. URL [http://www.china.org.cn/business/2019-09/15/content\\_75207291.htm](http://www.china.org.cn/business/2019-09/15/content_75207291.htm) (accessed 12.9.19).

Keep Up with the Payments Revolution – Cashless – Cardless – Crypto – CBDCs : Keep Up with the Payments revolution., n.d. URL <https://www.keepuppress.com/> (accessed 12.9.19).

Kids' banking in the age of contactless payments [WWW Document], n.d. URL <https://www.theage.com.au/technology/kids-banking-in-the-age-of-contactless-payments-20190715-p527dc.html> (accessed 12.9.19).

Lao, J., 2019. No-cash transactions accelerating. Daily Tribune. URL <https://tribune.net.ph/index.php/2019/09/19/no-cash-transactions-accelerating/> (accessed 12.9.19).

Les Thaïlandais n'abandonnent pas les espèces, mais les paiements dématérialisés se multiplient, 2019. . Siam Actu. URL <https://siamactu.fr/les-thailandais-n-abandonnent-pas-les-especes-mais-les-paiements-dematerialises-se-multiplient/> (accessed 12.9.19).

Lothian Buses to accept contactless pay with daily capping [WWW Document], n.d. URL <https://stv.tv/news/east-central/1439478-lothian-buses-to-accept-contactless-pay-with-daily-capping/> (accessed 12.9.19).

Maybank lets merchants accept contactless payments on their NFC phones • NFCW inc NFC World, 2019. . NFCW. URL <https://www.nfcw.com/2019/07/03/363426/maybank-lets-merchants-accept-contactless-payments-on-their-nfc-phones/> (accessed 12.9.19).

Metrolink tram users overpaid £78k under contactless system - BBC News [WWW Document], n.d. URL <https://www.bbc.co.uk/news/uk-england-manchester-49734060> (accessed 12.9.19).

Mobile payment adoption just might be on the verge of a breakthrough | Mobile Payments Today [WWW Document], n.d. URL <https://www.mobilepaymentstoday.com/articles/mobile-payment-adoption-just-might-be-on-the-verge-of-a-breakthrough/> (accessed 12.9.19).

Mobile Wallet Integration: A Wellspring of Opportunities and Challenges | PaymentsJournal [WWW Document], n.d. URL <https://www.paymentsjournal.com/mobile-wallet-integration-a-wellspring-of-opportunities-and-challenges/> (accessed 12.9.19).

Moins de cash, plus de recettes fiscales pour l'État [WWW Document], 2019. . L'Echo. URL <https://www.lecho.be/opinions/carte-blanche/moins-de-cash-plus-de-recettes-fiscales-pour-l-etat/10143909.html> (accessed 12.9.19).

Monese launches Google Pay across Europe - AltFi News [WWW Document], n.d. . AltFi. URL [https://www.altfi.com/article/5758\\_monese-launches-google-pay-across-europe](https://www.altfi.com/article/5758_monese-launches-google-pay-across-europe) (accessed 12.9.19).

Nearly two-thirds of UAE retailers see increase in foot traffic and revenue since accepting digital payments: Visa [WWW Document], n.d. URL <https://www.zawya.com/mena/en/companies/story/Nearly-twothirds-of-UAE-retailers-see-increase-in-foot-traffic-and-revenue-since-accepting-digital-payments-Visa-ZAWYA20190630093437> (accessed 12.9.19).

News, B.E., 2019. Razer, Visa announce partnership to transform payments in Southeast Asia. Back End News. URL <https://backendnews.net/2019/07/25/razer-visa-announce-partnership-to-transform-payments-in-southeast-asia/> (accessed 12.9.19).

OCBC Bank offers cash by QR codes | ZDNet [WWW Document], n.d. URL <https://www.zdnet.com/article/ocbc-bank-offers-cash-by-qr/> (accessed 12.9.19).

Paul, M., n.d. Subscriber Only: Paying by card convenient, but it leaves a trail of personal data [WWW Document]. The Irish Times. URL <https://www.irishtimes.com/business/economy/paying-by-card-convenient-but-it-leaves-a-trail-of-personal-data-1.3967405> (accessed 12.9.19).

PayMaya beefs up cashless ecosystem | Philstar.com [WWW Document], n.d. URL <https://www.philstar.com/business/2019/06/30/1930574/paymaya-beefs-cashless-ecosystem> (accessed 12.9.19).

PCCW Global, Mauritius Telecom kickstart island's first mobile payment solution [WWW Document], n.d. URL <https://www.telecomreviewasia.com/index.php/news/technology-news/1672-pccw-global-mauritius-telecom-kickstart-island-s-first-mobile-payment-solution> (accessed 12.9.19).

PDT, A.F. on 06/30/2019 09:35, n.d. JCPenney Starts Accepting Apple Pay Again [WWW Document]. Ubergizmo. URL <https://www.ubergizmo.com/2019/06/jcpenney-starts-accepting-apple-pay-again/> (accessed 12.9.19).

Philippines' \$30bn remittance market lures digital upstarts [WWW Document], n.d. . Nikkei Asian Review. URL <https://asia.nikkei.com/Business/Business-trends/Philippines-30bn-remittance-market-lures-digital-upstarts> (accessed 12.9.19).

Public transit to take contactless debit cards, smartphone payments [WWW Document], 2019. . NL Times. URL <https://nltimes.nl/2019/07/03/public-transit-take-contactless-debit-cards-smartphone-payments> (accessed 12.9.19).

Remittances platform Pesabase launches in Kenya [WWW Document], 2019. . Disrupt Africa. URL <https://disrupt-africa.com/2019/07/remittances-platform-pesabase-launches-in-kenya/> (accessed 12.9.19).

Report: Shadow economy cheats state out of NIS 50 billion annually - www.israelhayom.com [WWW Document], n.d. URL <https://www.israelhayom.com/2019/07/29/report-shadow-economy-cheats-state-out-of-nis-50-billion-annually/> (accessed 12.9.19).

Retail technology [WWW Document], n.d. . Retail Technology Innovation Hub. URL <https://retailtechinnovationhub.com/home/2019/6/28/sia-snags-market-in-payments-deal> (accessed 12.9.19).

Rochemont, S., n.d. A Cashless Society in 2018- The Cashless World in Motion review 105. <https://www.actuaries.org.uk/system/files/field/document/A%20Cashless%20Society%20in%202018%20v7%20-%20disc.pdf> (accessed 12.9.19).

Rodrigues, A., 2019. Take My Cash, You Discriminatory Corporate Buffoons. Vice. URL [https://www.vice.com/en\\_us/article/kzm4yv/cashless-businesses-discrimination](https://www.vice.com/en_us/article/kzm4yv/cashless-businesses-discrimination) (accessed 12.9.19).

SIA enables payment by contactless card at turnstiles in Rome's subway and railway stations [WWW Document], 2019. . SIA. URL <https://www.sia.eu/en/media-events/news-press-releases/sia-enables-payment-by-contactless-card-at-turnstiles-in-romes-subway-and-railway-stations> (accessed 12.9.19).

- Sibs brings cardless cash withdrawals to Portugal's ATMs [WWW Document], 2019. . Finextra Research. URL <https://www.finextra.com/pressarticle/79556/sibs-brings-cardless-cash-withdrawals-to-portugals-atms> (accessed 12.9.19).
- Sillitoe, B., 2019. Total annual UK contactless spending reaches £69bn [WWW Document]. Essential Retail. URL <https://www.essentialretail.com:443/news/total-annual-uk-contactless/> (accessed 12.9.19).
- SmartPay opens financial inclusion wallet in Vietnam [WWW Document], 2019. . Finextra Research. URL <https://www.finextra.com/pressarticle/79003/smartpay-opens-financial-inclusion-wallet-in-vietnam> (accessed 12.9.19).
- So Long, Swiping. The 'Tap-and-Go' Subway Is Here. - The New York Times [WWW Document], n.d. URL <https://www.nytimes.com/2019/07/30/nyregion/metrocard-mta-subway-discontinued.html> (accessed 12.9.19).
- South Korean business pours \$700 million into POS system of Vietnam [WWW Document], n.d. URL <https://vietnamnet.vn/en/business/south-korean-business-pours-700-million-into-pos-system-of-vietnam-571062.html> (accessed 12.9.19).
- Spécial placements - Thierry Laborde : « Nous ne sommes pas des dinosaures ! » - Le Point [WWW Document], n.d. URL [https://www.lepoint.fr/argent/spécial-placements-thierry-laborde-nous-ne-sommes-pas-des-dinosaures-13-09-2019-2335476\\_29.php](https://www.lepoint.fr/argent/spécial-placements-thierry-laborde-nous-ne-sommes-pas-des-dinosaures-13-09-2019-2335476_29.php) (accessed 12.9.19).
- The Number of NIPPON Tablet Terminals Exceeded 80,000 Units! | DMN Newswire, n.d. URL <http://dmnnewswire.digitalmedianet.com/2019/09/20/the-number-of-nippon-tablet-terminals-exceeded-80000-units/> (accessed 12.9.19).
- U.K. pushes for smarter mobile fare payments | PaymentsSource [WWW Document], n.d. URL <https://www.paymentsource.com/news/uk-pushes-for-smarter-mobile-fare-payments> (accessed 12.9.19).
- UnionPay and Tourism Authority of Thailand Deepen Destination Marketing Partnership Ahead of China's Golden Week Holiday | ThaiPR.NET [WWW Document], n.d. URL <https://www.thaipr.net/finance/957655> (accessed 12.9.19).
- Vietnam Rideshare Be Group Adds Delivery, 2019. . PYMNTS.com. URL <https://www.pymnts.com/news/delivery/2019/vietnam-rideshare-be-group-adds-delivery-to-challenge-grab-go-viet/> (accessed 12.9.19).
- VietnamPlus, 2019. Deputy PM: Vietnam wants to follow RoK's cashless model | Politics | Vietnam+ (VietnamPlus) [WWW Document]. VietnamPlus. URL <https://en.vietnamplus.vn/deputy-pm-vietnam-wants-to-follow-roks-cashless-model/160748.vnp> (accessed 12.9.19).
- Vietnam's Viettel Sets up Subsidiary to Drive Digital Services Business - Telecom Drive [WWW Document], n.d. URL <https://telecomdrive.com/vietnams-viettel-sets-up-subsidiary-to-drive-digital-services-business/> (accessed 12.9.19).
- Visa to bring QR payment system [WWW Document], 2019. . The Daily Star. URL <https://www.thedailystar.net/business/banking/news/visa-bring-qr-payment-system-1804258> (accessed 12.9.19).
- Visa unveils QR payment tool for small businesses - Taipei Times [WWW Document], n.d. URL <http://www.taipeitimes.com/News/biz/archives/2019/07/10/2003718380> (accessed 12.9.19).
- Warren, N., 2019. VAT and the cashless society [WWW Document]. AccountingWEB. URL <https://www.accountingweb.co.uk/community/blogs/cricket99/vat-and-the-cashless-society> (accessed 12.9.19).
- Yewondwossen, M., n.d. Public institutions go cashless | Capital Ethiopia Newspaper. URL <https://www.capitalethiopia.com/capital/public-institutions-go-cashless/> (accessed 12.9.19).
- 董志成, n.d. Chinese firms lead e-payment drive in region - Chinadaily.com.cn [WWW Document]. URL <http://global.chinadaily.com.cn/a/201909/18/WS5d81bfe6a310cf3e3556c28c.html> (accessed 12.9.19).

### **Section 2.1.1**

[Back to text](#)

- Africa's Home-grown Cashless Solutions - YouTube [WWW Document], n.d. URL <https://www.youtube.com/watch?v=HxpKBHWktng> (accessed 12.9.19).
- Africa: Afreximbank Announces \$1-billion Adjustment Facility, Other AfCFTA Support Measures as African Leaders Meet - allAfrica.com [WWW Document], n.d. URL <https://allafrica.com/stories/201907090074.html> (accessed 12.9.19).
- African Continental Free Trade Area, 2019. . Wikipedia. [https://en.wikipedia.org/w/index.php?title=African\\_Continental\\_Free\\_Trade\\_Area&oldid=924809152](https://en.wikipedia.org/w/index.php?title=African_Continental_Free_Trade_Area&oldid=924809152) (accessed 12.9.19).



African Continental Free Trade Area (AfCFTA) – An Exposition Of The Proposed Digital Payment System [WWW Document], n.d. . Modern Ghana. URL <https://www.modernghana.com/news/945753/african-continental-free-trade-area-afcfta.html> (accessed 12.9.19).

Africa's Fintech Investment Quadrupled To \$357m In 2018 [WWW Document], n.d. URL <https://www.forbes.com/sites/tobyshapshak/2019/07/30/africas-fintech-investment-quadrupled-to-357m-in-2018/#45dda0162db3> (accessed 12.9.19).

Economic integration: African Continental Free Trade Area agreement [WWW Document], n.d. URL <https://www.designbuild-network.com/comment/africa-economic-integration-2019/> (accessed 12.9.19).

IMFBlog, n.d. Mobile Money Spreads to Asia. IMF Blog. URL <https://blogs.imf.org/2019/09/30/mobile-money-spreads-to-asia/> (accessed 12.9.19).

internationalbanker, 2019. Fintechs Create an Impetus for Enormous Growth in sub-Saharan Africa [WWW Document]. International Banker. URL <https://internationalbanker.com/technology/fintechs-create-an-impetus-for-enormous-growth-in-sub-saharan-africa/> (accessed 12.9.19).

PAPSS to save Africa over \$5billion in payment transaction cost annually | Business & Financial Times Online [WWW Document], n.d. URL <https://thebftonline.com/2019/business/banking-finance/papss-to-save-africa-over-5billion-in-payment-transaction-cost-annually/> (accessed 12.9.19).

### **Section 2.1.2**

[Back to text](#)

GSMA The Mobile Economy 2019 - The Mobile Economy [WWW Document], n.d. URL <https://www.gsma.com/r/mobileeconomy/> (accessed 12.12.19).

Infographic: Smartphone Ownership: The Mobile Disconnect [WWW Document], n.d. . Statista Infographics. URL <https://www.statista.com/chart/16937/share-of-adults-who-own-no-mobile-phone-or-have-a-non-smartphone/> (accessed 12.13.19).

### **Section 2.1.3**

[Back to text](#)

14:00-17:00, n.d. ISO/IEC 18004:2015 [WWW Document]. ISO. URL <http://www.iso.org/cms/render/live/en/sites/isoorg/contents/data/standard/06/20/62021.html> (accessed 12.9.19).

Building Japan's cashless future: Koichi Nakamura [WWW Document], 2019. . Rakuten Today. URL <https://rakuten.today/blog/japan-cashless-future.html> (accessed 12.9.19).

Chan, J., n.d. A Cashless Society- Benefits, Risks and Issues (Interim Paper) 27. <https://www.actuaries.org.uk/system/files/field/document/A%20Cashless%20Society%20-%20QR%20Code%20v2%20-%20final.pdf> (accessed 12.9.19).

Cross-border European mobile payment network in the works [WWW Document], n.d. URL <http://www.qrcodepress.com/cross-border-european-mobile-payment-network-in-the-works/8537033/> (accessed 12.9.19).

European Banks Join to Build Cross-Border Mobile Payment Network - Bloomberg [WWW Document], n.d. URL <https://www.bloomberg.com/news/articles/2019-09-03/european-banks-join-to-build-cross-border-mobile-payment-network> (accessed 12.9.19).

European Firms Form X-Border Payments Network | PYMNTS.com [WWW Document], n.d. URL <https://www.pymnts.com/news/international/2019/seven-european-firms-form-x-border-mobile-payment-network/> (accessed 12.9.19).

FEB 24, A.N.-L., 2019, n.d. PayMaya, PayPal, GCash, and More: Your Guide to Digital Payment Systems in the Philippines [WWW Document]. Townandcountry.ph. URL <https://www.townandcountry.ph/people/money-power/money-apps-guide-a2104-20190224-lfrm2> (accessed 12.9.19).

Japan Launch Digital Currency Without Using Blockchain - Crypto Daily™ [WWW Document], n.d. URL <https://cryptodaily.co.uk/2019/04/japan-launch-digital-currency-without-using-blockchain> (accessed 12.9.19).

NTT DOCOMO Joins Mobile Payment Alliance on Cashless Transactions [WWW Document], n.d. URL <https://mobileidworld.com/ntt-docomo-joins-mobile-payment-alliance-promote-cashless-transactions-070404/> (accessed 12.9.19).

PEPSI: A European payment system to rival Visa and Mastercard? [WWW Document], 2019. . Payments Cards & Mobile. URL <https://www.paymentscardsandmobile.com/pepsi-a-european-payment-system-to-rival-visa-and-mastercard/> (accessed 12.9.19).

- QR inventor calls for security update on code's 25th anniversary : The Asahi Shimbun [WWW Document], n.d. URL <http://www.asahi.com/ajw/articles/AJ201908280010.html> (accessed 12.9.19).
- Reiwa era yen bills -- a speed bump on the road to the cashless future - Nikkei Asian Review [WWW Document], n.d. URL <https://asia.nikkei.com/Opinion/Reiwa-era-yen-bills-a-speed-bump-on-the-road-to-the-cashless-future> (accessed 12.9.19).
- Singtel's VIA mobile payment alliance debuts in Japan [WWW Document], 2019. . Finextra Research. URL <https://www.finextra.com/pressarticle/79317/singtels-via-mobile-payment-alliance-debuts-in-japan> (accessed 12.9.19).
- The State of Cashless Payments in Japan [WWW Document], 2019. . nippon.com. URL <https://www.nippon.com/en/in-depth/d00492/the-state-of-cashless-payments-in-japan.html> (accessed 12.9.19).
- 株式会社インプレス, 2019. Welcome Suicaが示唆する2020年日本のキャッシュレス【鈴木淳也の Pay Attention】 [WWW Document]. Impress Watch. URL <https://www.watch.impress.co.jp/docs/series/suzukij/1205673.html> (accessed 12.9.19).

## Section 2.1.4

[Back to text](#)

- 14:00-17:00, n.d. ISO/IEC 18004:2015 [WWW Document]. ISO. URL <http://www.iso.org/cms/render/live/en/sites/isoorg/contents/data/standard/06/20/62021.html> (accessed 12.9.19).
- Building Japan's cashless future: Koichi Nakamura [WWW Document], 2019. . Rakuten Today. URL <https://rakuten.today/blog/japan-cashless-future.html> (accessed 12.9.19)
- Chan, J., n.d. A Cashless Society- Benefits, Risks and Issues (Interim Paper) 27. <https://www.actuaries.org.uk/system/files/field/document/A%20Cashless%20Society%20-%20QR%20Code%20v2%20-%20final.pdf> (accessed 12.9.19).
- Cross-border European mobile payment network in the works [WWW Document], n.d. URL <http://www.qrcodepress.com/cross-border-european-mobile-payment-network-in-the-works/8537033/> (accessed 12.9.19).
- European Banks Join to Build Cross-Border Mobile Payment Network - Bloomberg [WWW Document], n.d. URL <https://www.bloomberg.com/news/articles/2019-09-03/european-banks-join-to-build-cross-border-mobile-payment-network> (accessed 12.9.19).
- European Firms Form X-Border Payments Network | PYMNTS.com [WWW Document], n.d. URL <https://www.pymnts.com/news/international/2019/seven-european-firms-form-x-border-mobile-payment-network/> (accessed 12.9.19).
- FEB 24, A.N.-L., 2019, n.d. PayMaya, PayPal, GCash, and More: Your Guide to Digital Payment Systems in the Philippines [WWW Document]. Townandcountry.ph. URL <https://www.townandcountry.ph/people/money-power/money-apps-guide-a2104-20190224-lfm2> (accessed 12.9.19).
- Japan Launch Digital Currency Without Using Blockchain - Crypto Daily™ [WWW Document], n.d. URL <https://cryptodaily.co.uk/2019/04/japan-launch-digital-currency-without-using-blockchain> (accessed 12.9.19).
- NTT DOCOMO Joins Mobile Payment Alliance on Cashless Transactions [WWW Document], n.d. URL <https://mobileidworld.com/ntt-docomo-joins-mobile-payment-alliance-promote-cashless-transactions-070404/> (accessed 12.9.19).
- PEPSI: A European payment system to rival Visa and Mastercard? [WWW Document], 2019. . Payments Cards & Mobile. URL <https://www.paymentscardsandmobile.com/pepsi-a-european-payment-system-to-rival-visa-and-mastercard/> (accessed 12.9.19).
- QR inventor calls for security update on code's 25th anniversary : The Asahi Shimbun [WWW Document], n.d. URL <http://www.asahi.com/ajw/articles/AJ201908280010.html> (accessed 12.9.19).
- Reiwa era yen bills -- a speed bump on the road to the cashless future - Nikkei Asian Review [WWW Document], n.d. URL <https://asia.nikkei.com/Opinion/Reiwa-era-yen-bills-a-speed-bump-on-the-road-to-the-cashless-future> (accessed 12.9.19).
- Singtel's VIA mobile payment alliance debuts in Japan [WWW Document], 2019. . Finextra Research. URL <https://www.finextra.com/pressarticle/79317/singtels-via-mobile-payment-alliance-debuts-in-japan> (accessed 12.9.19).
- The State of Cashless Payments in Japan [WWW Document], 2019. . nippon.com. URL <https://www.nippon.com/en/in-depth/d00492/the-state-of-cashless-payments-in-japan.html> (accessed 12.9.19).

株式会社インプレス, 2019. Welcome Suicaが示唆する2020年日本のキャッシュレス【鈴木淳也の Pay Attention】 [WWW Document]. Impress Watch. URL <https://www.watch.impress.co.jp/docs/series/suzukij/1205673.html> (accessed 12.9.19).

### **Section 2.1.5**

[Back to text](#)

Vodafone's India venture under threat after court ruling | Financial Times [WWW Document], n.d. URL <https://www.ft.com/content/9c3130ce-f732-11e9-a79c-bc9acae3b654> (accessed 12.9.19).

87 Payment Apps Face an Uphill Battle to Turn India Cashless - Bloomberg [WWW Document], n.d. URL <https://www.bloomberg.com/news/articles/2019-08-15/india-s-payment-apps-battle-to-catch-china-in-squeezing-out-cash> (accessed 12.9.19).

Going gets tougher for payment banks [WWW Document], n.d. URL <https://www.dnaindia.com/business/report-going-gets-tougher-for-payment-banks-2774810> (accessed 12.9.19).

Reserve Bank of India - Press Releases [WWW Document], n.d. URL [https://www.rbi.org.in/Scripts/BS\\_PressReleaseDisplay.aspx?prid=47045](https://www.rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=47045) (accessed 12.9.19).

Taking The Right Steps Towards Enhancing Financial Inclusion In India, 2019. . Inc42 Media. URL <https://inc42.com/resources/taking-the-right-steps-towards-enhancing-financial-inclusion-in-india> (accessed 12.9.19).

The origins of UPI: Road to a cashless society | Digit [WWW Document], n.d. URL <https://www.digit.in/features/general/the-origins-of-upi-road-to-a-cashless-society-50210.html> (accessed 12.9.19).

Tyagi, G., 2019. Regulations made payments banks business unviable: SBI report. Entrackr. URL <https://entrackr.com/2019/07/regulations-made-payments-banks-business-unviable-sbi-report/> (accessed 12.9.19).

UPI gives tough competition to mobile wallets; trusted more for high value transactions, 2019. . The Financial Express. URL <https://www.financialexpress.com/industry/banking-finance/upi-gives-tough-competition-to-mobile-wallets-trusted-more-for-high-value-transactions/1694934/> (accessed 12.9.19).

Voda Idea to close m-pesa biz, writes off ₹210 cr for payments bank closure [WWW Document], 2019. . <https://www.livemint.com>. URL <https://www.livemint.com/industry/telecom/voda-idea-to-close-m-pesa-biz-writes-off-rs-210-cr-for-payments-bank-closure-1564421551275.html> (accessed 12.9.19).

Writer, S., 2019. State Bank of India waives IMPS, NEFT and RTGS charges [WWW Document]. <https://www.livemint.com>. URL <https://www.livemint.com/industry/banking/state-bank-of-india-waives-imps-neft-and-rtgs-charges-1562932686214.html> (accessed 12.9.19).

### **Section 2.2.1**

[Back to text](#)

Building operational resilience: impact tolerances for important business services [WWW Document], 2019. . FCA. URL <https://www.fca.org.uk/news/press-releases/building-operational-resilience-impact-tolerances-important-business-services> (accessed 12.9.19).

Peachey, K., 2019. Banks hit by dozens of IT shutdowns. BBC News. <https://www.bbc.com/news/business-47280513> (accessed 12.9.19).

### **Section 2.2.2**

[Back to text](#)

5 Updates from PCI SSC That You Need to Know [WWW Document], n.d. URL <https://www.darkreading.com/5-updates-to-pci-dss-that-you-need-to-know/d/d-id/1335874> (accessed 12.9.19).

Biometric payments – bank priorities vs consumer perceptions | Fintech Finance [WWW Document], n.d. URL <https://www.fintech.finance/01-news/biometric-payments-bank-priorities-vs-consumer-perceptions/> (accessed 12.9.19).

Goodin, D., 2019. Busy North Korean hackers have new malware to target ATMs [WWW Document]. Ars Technica. URL <https://arstechnica.com/information-technology/2019/09/busy-north-korean-hackers-have-new-malware-to-target-atms/> (accessed 12.9.19).

Government urges Seven-Eleven Japan to beef up security after 7pay mobile payment fraud, 2019. . The Japan Times Online. <https://www.japantimes.co.jp/news/2019/07/06/national/crime-legal/government-urges-seven-eleven-japan-beef-security-7pay-mobile-payment-fraud/> (accessed 12.9.19).

How to Protect your Contactless Cards - Tech Advisor [WWW Document], n.d. URL <https://www.techadvisor.co.uk/how-to/security/how-protect-your-contactless-cards-3700436/> (accessed 12.9.19).

Request for Comments: Contactless Payments on COTS Standard [WWW Document], n.d. URL <https://blog.pcisecuritystandards.org/request-for-comments-contactless-payments-on-cots-standard> (accessed 12.9.19).

Researchers Crack £30 Limit On Contactless Visa Cards | Silicon UK Tech News [WWW Document], n.d. URL <https://www.silicon.co.uk/workspace/researchers-contactless-visa-274159> (accessed 12.9.19).

Scammers hijack Japan's 7-Eleven payment app, 2019. . BBC News. <https://www.bbc.com/news/world-asia-48878159> (accessed 12.9.19).

Users of 7-Eleven's mobile payment service lose total of ¥55 million after 900 accounts hacked | The Japan Times [WWW Document], n.d. URL <https://www.japantimes.co.jp/news/2019/07/04/business/corporate-business/users-7-elevens-mobile-payment-service-lose-total-%C2%A555-million-900-accounts-hacked/#.Xe5fJpP7T-a> (accessed 12.9.19).

We need protection from card fraud, say retailers - betterRetailing [WWW Document], n.d. URL <https://www.betterretailing.com/news/card-fraud-action/> (accessed 12.9.19).

Why 'SIM swapping' is a growing security nightmare and there is no way to prevent it - The Globe and Mail [WWW Document], n.d. URL <https://www.theglobeandmail.com/business/technology/article-why-sim-swapping-is-a-growing-security-nightmare-and-there-is-no-way/> (accessed 12.9.19).

Why you should reply to this text | Surat Basin Online [WWW Document], n.d. URL <https://www.suratbasin.com.au/news/reply-to-this-text-from-your-bank/3820613/> (accessed 12.9.19).

### **Section 2.2.3**

[Back to text](#)

Bloomberg, J.L., n.d. Amazon, Facebook and Google to Face Another House Inquiry [WWW Document]. Washington Post. URL [https://www.washingtonpost.com/business/on-small-business/amazon-facebook-and-google-to-face-another-house-inquiry/2019/10/01/00803ff0-e42a-11e9-b0a6-3d03721b85ef\\_story.html](https://www.washingtonpost.com/business/on-small-business/amazon-facebook-and-google-to-face-another-house-inquiry/2019/10/01/00803ff0-e42a-11e9-b0a6-3d03721b85ef_story.html) (accessed 12.9.19).

Commissioner (FDPIC), F.D.P. and I., n.d. Latest News [WWW Document]. URL [https://www.edoeb.admin.ch/edoeb/en/home/aktuell/aktuell\\_news.html](https://www.edoeb.admin.ch/edoeb/en/home/aktuell/aktuell_news.html) (accessed 12.10.19).

Defiant Zuckerberg Says Facebook Won't Police Political Speech - The New York Times [WWW Document], n.d. URL <https://www.nytimes.com/2019/10/17/business/zuckerberg-facebook-free-speech.html> (accessed 12.9.19).

Espinoza, J., McGee, P., 2019. EU sets sights on Apple Pay over antitrust concerns [WWW Document]. Financial Times. URL <https://www.ft.com/content/e65c9a76-f039-11e9-bfa4-b25f11f42901> (accessed 12.9.19).

EU antitrust regulators raise concerns about Facebook's Libra currency: sources, 2019. . Reuters. <https://www.reuters.com/article/us-eu-facebook-antitrust-idUSKCN1VB1BQ> (accessed 12.9.19).

Facebook Cryptocurrency Plan Faces Opposition in France - Bloomberg [WWW Document], n.d. URL <https://www.bloomberg.com/news/articles/2019-06-18/france-calls-for-central-bank-review-of-facebook-cryptocurrency> (accessed 12.9.19).

Facebook gets German data probe into voice transcriptions [WWW Document], 2019. . Los Angeles Times. URL <https://www.latimes.com/business/story/2019-08-26/facebook-gets-german-data-probe-into-voice-transcriptions> (accessed 12.10.19).

Facebook Launches News Tab [WWW Document], n.d. URL [https://www.theepochtimes.com/facebook-launches-news-tab\\_3127842.html](https://www.theepochtimes.com/facebook-launches-news-tab_3127842.html) (accessed 12.9.19).

Facebook Probe Into Alleged Antitrust Violations Widens With 47 State Attorneys General Now Investigating [WWW Document], 2019. . www.theepochtimes.com. URL [https://www.theepochtimes.com/facebook-probe-into-alleged-antitrust-violations-widens-with-47-state-attorneys-general-now-investigating\\_3125147.html](https://www.theepochtimes.com/facebook-probe-into-alleged-antitrust-violations-widens-with-47-state-attorneys-general-now-investigating_3125147.html) (accessed 12.9.19).

Facebook should not be trusted with "crazy" cryptocurrency plan: senators - Reuters [WWW Document], n.d. URL <https://www.reuters.com/article/us-facebook-cryptocurrency-senate/facebook-should-not-be-trusted-with-crazy-cryptocurrency-plan-senators-idUSKCN1UB174> (accessed 12.9.19).

Facebook to create privacy panel, pay \$5 billion to U.S. to settle allegations - Reuters [WWW Document], n.d. URL <https://www.reuters.com/article/us-facebook-ftc/facebook-to-create-privacy-panel-pay-5-billion-to-u-s-to-settle-allegations-idUSKCN1UI2GC> (accessed 12.10.19).



Facebook's Zuckerberg grilled in U.S. Congress on digital currency, privacy, elections - Reuters [WWW Document], n.d. URL <https://www.reuters.com/article/us-facebook-congress/facebooks-zuckerberg-grilled-in-u-s-congress-on-digital-currency-privacy-elections-idUSKBN1X2167> (accessed 12.9.19).

FDPIC expects official response from the Libra Association [WWW Document], n.d. URL <https://www.edoeb.admin.ch/edoeb/en/home/documentation/media-information/aktuell.msg-id-75872.html> (accessed 12.10.19).

<http://www.washingtontimes.com>, T.W.T., n.d. 21st century robber barons? Push to break up Big Tech divides conservatives [WWW Document]. The Washington Times. URL <https://www.washingtontimes.com/news/2019/oct/17/facebook-google-amazon-breakup-splits-conservative/> (accessed 12.9.19).

Inc, R., n.d. U.S. lawmaker says still concerned about Facebook cryptocurrency after Swiss meetings | The Guardian [WWW Document]. URL <http://www.theguardian.pe.ca/business/reuters/us-lawmaker-says-still-concerned-about-facebook-cryptocurrency-after-swiss-meetings-345017/> (accessed 12.10.19).

Mark Zuckerberg hosting dinners with conservative leaders [WWW Document], n.d. URL <https://www.washingtonexaminer.com/news/mark-zuckerberg-hosting-dinners-with-conservative-leaders> (accessed 12.9.19)

Securities and Exchange Commission vs Facebook litigation <https://www.sec.gov/litigation/complaints/2019/comp-pr2019-140.pdf> (accessed 12.9.19).

Swiss stocks - Factors to watch on August 19, 2019. . Reuters. <https://uk.reuters.com/article/markets-swiss-stocks-idUKL8N25C1BB> (accessed 12.9.19).

Tech Firms Ramp Up Lobbying as Antitrust Scrutiny Grows - WSJ [WWW Document], n.d. URL <https://www.wsj.com/articles/tech-firms-ramp-up-lobbying-as-antitrust-scrutiny-grows-11572255000> (accessed 12.9.19).

UK data watchdog demands more clarity over Facebook's crypto [WWW Document], n.d. URL <https://www.deccanchronicle.com/technology/in-other-news/060819/uk-data-watchdog-demands-more-clarity-over-facebooks-crypto.html> (accessed 12.10.19).

Will Facebook's Digital-Currency Heighten Cyber-Attacks On Banks? [WWW Document], n.d. . Modern Ghana. URL <https://www.modernghana.com/news/949419/will-facebooks-digital-currency-heighten-cyber.html> (accessed 12.9.19).

Zakrzewski, C., Post, T.W., 2019. The Technology 202: Washington lawmakers tell tech executives trust has "run out" [WWW Document]. Connecticut Post. URL <https://www.ctpost.com/news/article/The-Technology-202-Washington-lawmakers-tell-14101903.php> (accessed 12.10.19).

Zuckerberg attacked over terrorist content, cryptocurrency and civil rights [WWW Document], 2019. . The Independent. URL <https://www.independent.co.uk/life-style/gadgets-and-tech/news/zuckerberg-testimony-congress-libra-cryptocurrency-terrorist-christchurch-a9168476.html> (accessed 12.9.19).

Zuckerberg stumbles over AOC's questions about white supremacy during Congress hearing | The Independent [WWW Document], n.d. URL <https://www.independent.co.uk/news/world/americas/us-politics/zuckerberg-aoc-video-white-supremacy-congress-hearing-ocasio-cortez-a9168666.html> (accessed 12.9.19).

#### **Section 2.2.4**

[Back to text](#)

African dictatorships shut down the internet the most — Quartz Africa [WWW Document], n.d. URL <https://qz.com/africa/1576745/african-dictatorships-shut-down-the-internet-the-most/> (accessed 12.9.19).

As Facebook's Libra looms, Deutsche Bank analyst hails cash's privacy [WWW Document], 2019. . Finextra Research. URL <https://www.finextra.com/newsarticle/34072/as-facebooks-libra-looms-deutsche-bank-analyst-hails-cashs-privacy> (accessed 12.9.19).

Dahir, A.L., n.d. African countries disrupt internet connectivity more than anywhere else [WWW Document]. Quartz Africa. URL <https://qz.com/africa/1468491/africa-internet-shutdowns-grow-longer-in-cameroon-chad-ethiopia/> (accessed 12.9.19).

Despots and Disruptions: Five Dimensions of Internet Shutdowns in Africa | Association for Progressive Communications [WWW Document], n.d. URL <https://www.apc.org/en/pubs/despots-and-disruptions-five-dimensions-internet-shutdowns-africa> (accessed 12.9.19).

- EDITORIAL: A cashless society poses threats to freedom, 2019. . Las Vegas Review-Journal. URL <https://www.reviewjournal.com/opinion/editorials/editorial-a-cashless-society-poses-threats-to-freedom-1700520/> (accessed 12.9.19).
- Gladstein, A., 2019. The Moral Case for Lightning: A Global Private Payment Network. Singularity Hub. URL <https://singularityhub.com/2019/08/11/the-moral-case-for-lightning-a-global-private-payment-network/> (accessed 12.9.19).
- Hong Kong Protests Show Dangers of a Cashless Society – Reason.com [WWW Document], n.d. URL <https://reason.com/2019/07/02/hong-kong-protests-show-dangers-of-a-cashless-society/> (accessed 12.9.19).

## **Section 2.3**

[Back to text](#)

- Russon, M.-A., 2019. The battle between cash and mobile payments. BBC News. <https://www.bbc.com/news/business-47292757> (accessed 12.9.19).

### **Section 2.3.1**

[Back to text](#)

- Access to Cash Review [WWW Document], n.d. URL <https://www.accesstocash.org.uk/> (accessed 12.9.19).
- A half-term trip to the last bank in town | Financial Times [WWW Document], n.d. URL <https://www.ft.com/content/00abbd8a-35e1-11e9-bd3a-8b2a211d90d5> (accessed 12.9.19).
- A very real warning: We must protect the cash ecosystem, 2019. . London Business News | Londonlovesbusiness.com. URL <https://londonlovesbusiness.com/a-very-real-warning-we-must-protect-the-cash-ecosystem/> (accessed 12.9.19).
- Amazon threatens Philadelphia over plan to ban cashless stores [WWW Document], n.d. URL <https://www.cbsnews.com/news/amazon-threatens-philadelphia-over-plan-to-ban-cashless-stores/> (accessed 12.9.19).
- Bank branch closures prompt call for 'banking hubs' – Which? News [WWW Document], n.d. URL <https://www.which.co.uk/news/2019/07/government-rejects-banking-hubs-proposal-to-combat-bank-branch-closures/> (accessed 12.9.19).
- Bank of England welcomes Access to Cash Review [WWW Document], n.d. URL <http://www.bankofengland.co.uk/news/2019/march/boe-welcomes-access-to-cash-review> (accessed 12.9.19).
- Banque : 2 500 distributeurs automatiques ont disparu entre 2015 et 2017 [WWW Document], n.d. . cBanque Actu. URL <https://www.cbanque.com/banque/actualites/72651/banque-2-500-distributeurs-automatiques-ont-disparu-entre-2015-et-2017> (accessed 12.9.19).
- Bpost envisage de faire payer pour le retrait d'argent liquide... avant de changer d'avis [WWW Document], n.d. URL [https://www.rtf.be/info/societe/detail\\_bpost-va-prochainement-faire-payer-pour-le-retrait-d-argent-liquide?id=10140154](https://www.rtf.be/info/societe/detail_bpost-va-prochainement-faire-payer-pour-le-retrait-d-argent-liquide?id=10140154) (accessed 12.9.19).
- Ceeney, N., 2019. We are sleepwalking into a cashless society and it risks leaving millions behind. <https://www.thetimes.co.uk/article/we-are-sleepwalking-into-a-cashless-society-and-it-risks-leaving-millions-behind-03q29nfbs> (accessed 12.9.19).
- Consumers' access to financial services: Government Response to the Committee's Twenty-Ninth Report - Treasury - House of Commons [WWW Document], n.d. URL <https://publications.parliament.uk/pa/cm201719/cmselect/cmtreasy/2530/253002.htm> (accessed 12.9.19).
- Cook, L., 2019. Is Britain ready to go cashless? [WWW Document]. Financial Times. URL <https://www.ft.com/content/61fcee76-38e6-11e9-9988-28303f70fcff> (accessed 12.9.19).
- Digitising Cash: Creating a level playing field [WWW Document], n.d. URL <https://www.g4s.com/443/en-gb/media-centre/our-views/all-news/digitising-cash---creating-a-level-playing-field> (accessed 12.9.19).
- Distributeurs d'argent : le Sénat vote un texte contre les « déserts bancaires » [WWW Document], n.d. . cBanque Actu. URL <https://www.cbanque.com/banque/actualites/70915/distributeurs-argent-le-senat-vote-un-texte-contre-les-deserts-bancaires> (accessed 12.9.19)
- Financial inclusion report 2018-19, n.d. 26. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/789070/financial\\_inclusion\\_report\\_2018-19\\_web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/789070/financial_inclusion_report_2018-19_web.pdf) (accessed 12.9.19).
- Government urged to guarantee consumers' ability to access their cash - News from Parliament [WWW Document], n.d. . UK Parliament. URL <https://www.parliament.uk/business/committees/committees-a-z/commons-select/treasury->

[committee/news-parliament-2017/chairs-comments-consumers-ability-to-get-cash-17-19/](#) (accessed 12.9.19).  
<https://6abc.com/video/embed/?pid=5139968> [WWW Document], n.d. URL <https://6abc.com/video/embed/?pid=5139968> (accessed 12.9.19).  
 Innovation 2.0: ATMs in the 21st Century [WWW Document], n.d. URL <https://www.finextra.com/blogposting/17474/innovation-20-atms-in-the-21st-century> (accessed 12.9.19).  
 Lloyds announces new cashback incentive scheme - Lloyds Banking Group plc [WWW Document], n.d. URL <https://www.lloydsbankinggroup.com/Media/Press-Releases/2019-press-releases/lloyds-banking-group/lloyds-announces-new-cashback-incentive-scheme/> (accessed 12.9.19).  
 Mastercard issuers in the UK to pay retailers for cashback transactions [WWW Document], 2019. . Finextra Research. URL <https://www.finextra.com/newsarticle/34382/mastercard-issuers-in-the-uk-to-pay-retailers-for-cashback-transactions> (accessed 12.9.19).  
 Monzo Debates: Cash is Dead, n.d. <https://www.youtube.com/watch?v=0RGLxh86MS0> (accessed 12.9.19).  
 New PSR boss ready for 'big job' ahead [WWW Document], n.d. URL [https://www.fstech.co.uk/fst/Payment\\_Systems\\_Regulator\\_Speech\\_Sibos\\_2019.php](https://www.fstech.co.uk/fst/Payment_Systems_Regulator_Speech_Sibos_2019.php) (accessed 12.9.19).  
 New York City Bill Proposes Eliminating Cashless Stores and Restaurants - NBC New York [WWW Document], n.d. URL <https://www.nbcnewyork.com/news/local/New-York-City-Bill-Proposes-Eliminating-Cashless-Stores-and-Restaurants-506116331.html> (accessed 12.9.19).  
 Peachey, K., 2019. Barclays U-turn on cash access in post offices. BBC News. <https://www.bbc.com/news/business-50174372> (accessed 12.9.19).  
 Philadelphia City Council votes to ban cashless stores, businesses [WWW Document], n.d. . UPI. URL [https://www.upi.com/Top\\_News/US/2019/02/15/Philadelphia-City-Council-votes-to-ban-cashless-stores-businesses/9111550259443/](https://www.upi.com/Top_News/US/2019/02/15/Philadelphia-City-Council-votes-to-ban-cashless-stores-businesses/9111550259443/) (accessed 12.9.19).  
 Retrait par carte bancaire dans un distributeur d'une autre banque [WWW Document], n.d. URL <https://www.cbanque.com/tarif-bancaire/comparatif/retrait-distributeur-autres-banques.php> (accessed 12.9.19).  
 The future of finance report [WWW Document], n.d. URL <http://www.bankofengland.co.uk/report/2019/future-of-finance> (accessed 12.9.19).  
 The new government must deliver for consumers [WWW Document], 2019. . Which? Conversation. URL <https://conversation.which.co.uk/home-energy/new-government-consumer-priorities/> (accessed 12.9.19).  
 UK Treasury committee chair warns of threat to 'access to cash' – Government & civil service news, n.d. URL <https://www.globalgovernmentforum.com/uk-treasury-committee-chair-warns-of-threat-to-access-to-cash/> (accessed 12.9.19).

### **Section 2.3.2**

[Back to text](#)

BoG grants GCB Bank authorisation to issue electronic money - MyJoyOnline.com [WWW Document], n.d. URL <https://www.myjoyonline.com/business/2019/November-26th/bog-grants-gcb-bank-authorisation-to-issue-electronic-money.php> (accessed 12.9.19).  
 BoG To Issue Digital Currency “e-Cedi” In Future [WWW Document], n.d. . Modern Ghana. URL <https://www.modernghana.com/news/970141/bog-to-issue-digital-currency-e-cedi-in-future.html> (accessed 12.9.19).  
 Gov't to launch universal QR code to make Ghana cashless society - Graphic Online [WWW Document], n.d. URL <https://www.graphic.com.gh/business/business-news/gov-t-to-launch-universal-qr-code-to-make-ghana-cashless-society.html> (accessed 12.9.19).  
 Payment Systems and Settlement Bill finally passed by Ghana Parliament [WWW Document], n.d. URL <https://www.jbklutse.com/payment-systems-and-settlement-bill-passed-by-parliament/> (accessed 12.9.19).

### **Section 2.3.3**

[Back to text](#)

Affordability, accessibility key to digital financial inclusion — David-West, 2019. . Vanguard News. URL <https://www.vanguardngr.com/2019/09/affordability-accessibility-key-to-digital-financial-inclusion-david-west/> (accessed 12.9.19).  
 Airtel to set up payment service bank [WWW Document], 2019. . Daily Times Nigeria. URL <https://dailytimes.ng/2019/03/08/airtel-to-set-up-payment-service-bank/> (accessed 12.9.19).

- An Overview Of The Regulatory Framework Of FinTech In Nigeria - Fin Tech - Nigeria [WWW Document], n.d. URL <http://www.mondaq.com/Nigeria/x/829922/fin+tech/An+Overview+of+the+Regulatory+Framework+of+FinTech+in+Nigeria> (accessed 12.9.19).
- Anthony, L., 2019. Why you can't implement cashless policy yet - Reps member tells FG, CBN. Daily Post Nigeria. URL <https://dailypost.ng/2019/09/24/cant-implement-cashless-policy-yet-reps-member-tells-fg-cbn/> (accessed 12.9.19).
- AS CASHLESS POLICY GOES NATIONWIDE... - THISDAYLIVE [WWW Document], n.d. URL <https://www.thisdaylive.com/index.php/2019/04/08/as-cashless-policy-goes-nationwide/> (accessed 12.9.19).
- Benefits of CBN's cashless policy, 2019. . The Guardian Nigeria News - Nigeria and World News. URL <https://guardian.ng/opinion/benefits-of-cbns-cashless-policy/> (accessed 12.9.19).
- CBN's forex policy working, FG insists - Businessamlive [WWW Document], n.d. URL <https://www.businessamlive.com/cbns-forex-policy-working-fg-insists/> (accessed 12.9.19).
- Correspondent, O., n.d. Economy: Senate On Same Page With PMB – Uba Sani [WWW Document]. URL <https://leadership.ng/2019/09/23/economy-senate-on-same-page-with-pmb-uba-sani/> (accessed 12.9.19).
- CryptoDavid, 2019. [VIDEO] Is Safaricom Looking to Expand M-PESA into Nigeria? Bitcoin KE. URL <https://bitcoinke.io/2019/09/video-is-safaricom-looking-to-expand-m-pesa-into-nigeria/> (accessed 12.9.19).
- Ease the new banking charges [WWW Document], 2019. . Daily Trust. URL <https://www.dailytrust.com.ng/ease-the-new-banking-charges.html> (accessed 12.9.19).
- Ecobank boost financial inclusion with Ecobank Pay at Ariaria market - Vanguard News [WWW Document], n.d. URL <https://www.vanguardngr.com/2019/04/ecobank-boost-financial-inclusion-with-ecobank-pay-at-ariaria-market/> (accessed 12.9.19).
- FCMB Easy Account escalates CBN's financial inclusion – Instinct Business Magazine [WWW Document], n.d. URL <https://instinctbusinessmag.com/2019/04/19/fcmb-easy-account-escalates-cbns-financial-inclusion/> (accessed 12.9.19).
- IMF Executive Board Concludes 2019 Article IV Consultation with Nigeria [WWW Document], n.d. . IMF. URL <https://www.imf.org/en/News/Articles/2019/04/03/pr1999-nigeria-imf-executive-board-concludes-2019-article-iv-consultation-with-nigeria> (accessed 12.9.19).
- Kazeem, Y., n.d. Nigeria's largest mobile operator is about to become a bank [WWW Document]. Quartz Africa. URL <https://qz.com/africa/1679567/mtn-to-kick-start-mobile-money-in-nigeria/> (accessed 12.9.19).
- Nationwide Implementation of Cashless Policy Begins March 2020 - THISDAYLIVE [WWW Document], n.d. URL <https://www.thisdaylive.com/index.php/2019/09/18/nationwide-implementation-of-cashless-policy-begins-march-2020/> (accessed 12.9.19).
- Nigeria recorded \$5bn foreign investment inflows post general elections — CBN Gov, 2019. . Vanguard News. URL <https://www.vanguardngr.com/2019/04/nigeria-recorded-5bn-foreign-investment-inflows-post-general-elections-cbn-gov/> (accessed 12.9.19).
- Nigerians kick against proposed 5% VAT on all online purchases via bank cards - Pulse Nigeria [WWW Document], n.d. URL <https://www.pulse.ng/bi/finance/nigerians-kick-against-proposed-5-vat-on-all-online-purchases-via-bank-cards/0yw9wnf> (accessed 12.9.19).
- Nigerians to Enjoy Seamless Mobile payment and Money Transfer with the m-naira app, 2019. . TechCabal. URL <https://techcabal.com/2019/04/08/nigerians-to-enjoy-seamless-mobile-payment-and-money-transfer-with-the-m-naira-app/> (accessed 12.9.19).
- Nigeria's broadband penetration rises, yet internet remains slowest in the world [WWW Document], n.d. URL <https://nairametrics.com/2019/04/15/nigerias-broadband-penetration-rises-yet-internet-remains-slowest-in-the-world/> (accessed 12.9.19).
- Oludimu, T., 2019. Fact Check: There is no new tax for online transactions in Nigeria. Techpoint.Africa. URL <https://techpoint.africa/2019/08/20/firs-vat-online-transactions/> (accessed 12.9.19).
- PoS transaction failures threaten cashless policy, financial inclusion - Vanguard News [WWW Document], n.d. URL <https://www.vanguardngr.com/2019/04/pos-transaction-failures-threaten-cashless-policy-financial-inclusion/> (accessed 12.9.19).
- SF based African fintech startup Chipper Cash expands to Nigeria – The Huffington Global [WWW Document], n.d. URL <http://huffington-global.com/sf-based-african-fintech-startup-chipper-cash-expands-to-nigeria/> (accessed 12.9.19).

sleek, paschal, 2019. Flutterwave: Payment Gateway in Nigeria [WWW Document]. Medium. URL <https://medium.com/@paschalsleek2k13/flutterwave-payment-gateway-in-nigeria-feba3a2b3df8> (accessed 12.9.19).

Telcos turn to data, mobile money as voice revenue suffers – Punch Newspapers [WWW Document], n.d. URL <https://punchng.com/telcos-turn-to-data-mobile-money-as-voice-revenue-suffers/> (accessed 12.9.19).

The realities of the CBN cashless policy | Ripples Nigeria, 2019. . Latest Nigeria News | Top Stories from Ripples Nigeria. URL <https://www.ripplesnigeria.com/the-realities-of-the-cbn-cashless-policy/> (accessed 12.9.19).



Institute  
and Faculty  
of Actuaries