Fundación Innovación Bankinter

22 ENGLISH VERSION

Revolution technology that is changing currencies

Criptocurrencies: Bitcoin

Future configuration and regulation of currency

The future of currencies

Acknowledgements

Our gratitude to:

Dª. Ana Tudela

Journalist and author of this report. Without their collaboration were not possible the launch of this publication.

Our thanks to all of the Members of the XXI Future Trends Forum (FTF) who made the forum a success, and a special thanks to those who made contributions to this publication:

- For their invaluable support in the composition of this publication:

Mr. Thierry Malleret
Mr. Gred Kidd
Mr. Gerald Brito
Ms. Paola Subacchi
Mr. Eden Shochat
Mr. Joshua Klein

- For their invaluable role in the methodology and organization of the Future Trends Forum:

Mr. Christopher Meyer
Mr. Joel Kurtzman

Mr. Garrick Jones
Mr. Clemens Hackl
Mr. Fernando de Pablo

Finally we would like to thank the members of the Fundación de la Innovación Bankinter team for their commitment and follow through in the development of the content of this publication:

Mr. Sergio Martínez-Cava
Ms. Marce Cancho
Ms. María Teresa Jiménez
Ms. Lara García de Vinuesa
Ms. Dorsey Lockhart
Mr. Pablo Lancry

The views and opinions expressed in this report are those of the author and do not necessarily reflect the position of the experts that participate in the Future rends Forum meeting.

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Thank you so much
Foundation Innovation Bankinter

Summary

Success Cases in Monetary Innovation

Where We Are Headed

Thierry Malleret

Co-founder of the
Monthly Barometer

Foreword

At a time when economics, geopolitics and society are mutating irrevocably, technology is about to amplify these changes and to revolutionize everything in a trend that is inescapable.

In the years and decades to come, the pace of innovation and the disruptive technologies that come with it will profoundly transform life, business, societies and the global economy. This "pronouncement" may sound mundane, but we have barely started to grasp what this really means and its implications. The term "disruption" has both a positive and negative connotations. Negative for those who fail to understand the nature of change and how it will affect their socio-technological "ecosystem", and the legal and regulatory environments associated with it. But disruption can also be very positive for those who embrace it and invest in it. In short, we don't know yet how this will unfold, but innovation

Over the coming years, technology will radically change the shape of our financial system by dismantling barriers to entry and allowing the emergence of virtual currencies and various peer-to-peer platforms

has the ability and potential to generate considerable improvement in the health and wellbeing of communities and countries.

One could go on and on, but the point is this: all these innovations will completely disrupt and "re-design" the economic landscape, with tremendous implications in manufacturing, global supply-chains, trade flows, labour markets, and, of course, finance! Over the coming years, technology will radically change the shape of our financial system by dismantling barriers to entry and allowing the emergence of virtual currencies and various peer-to-peer platforms (P2P) that will alter the mental frameworks and various categories through which we think about finance and regulate it. The chapters that follow shed some fascinating light on some of the major innovations and the way in which they will reshape the entire money ecosystem.

Ready to Change


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The Future
of Currencies
#FTFCurrency

Greg Kidd

Chief Risk Officer at Ripple Labs

Ready to Change

The first and second revolutions of the Internet changed the way we move information and build/use social networks respectively. But until a few years ago, the way we record, send, and spend money remained similar to the pre-internet world.

Granted, the emergence of eCommerce and PayPal meant that users could move their banked money around via the web, but such enhancements represented little more than a mere accommodation of new forms of access by the old guard. Banks, card networks, and supporting central banks were still the "rails" over which money relied. Money still worked via nation state central actors and a few centralized issuers of rewards programs or Facebook credits. Old media successfully killed off the disruptive (but cen-

The argument behind P2P technology was that while sharing copyrighted material might be illegal, other legitimate peer-to-peer use cases could and should exist.

tralized) Napster file sharing business that threatened to undermine control of copyright controlled media. But in its place, peer-to-peer (decentralized) protocols arose that enabled the people at large to continue to share files without the permission of the powers that be.

The argument behind P2P technology was that while sharing copyrighted material might be illegal, other legitimate peer-to-peer use cases could and should exist. The argument was largely theoretical until a P2P solution for the issuance and exchange of money burst forth as part of a novel solution to the "double-spend" problem of issuing digital money on the Internet. The application of cryptography, in conjunction with P2P protocols, resulted in the possibility of a double-spend proof global ledger of value anywhere in the world – all without the need for any central administrator.

Even more disruptive than P2P and cryptographic technology is the proposition that no central government, corporation, or other organizational entity needs to be in charge of the new workings of money. The absence of centralized control is a feature (rather than a bug) in the new internet based forms of digital rather than traditional fiat money.

Of course particular governments can attempt to restrict or punish people for using a new technology – but its very hard to un-invent a protocol that operates without any need for a centralized point of control. A protocol has no profits or bank accounts to be seized or encumbered. A protocol just exists and serves its purpose, either more freely where it is allowed to flourish, or more reservedly where its users are treated as law breakers for not accepting the prerogative to remain with the status quo.

Fredrick Hayke had 40 years earlier envisioned a world without monopoly control of currencies in his 1976 mini-treatise *The Denationalization of Money*. He conceived that a world in which competition for forms of money would result in the emergence of new non-state currencies that the po-

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pulace either embraced or rejected based on performance. Hayek saw little use for nation state monopolies that limited the choice of the people in reaching their own conclusions about the utility of one form of money over another. Like the internet itself, choice of what was worthy by the users themselves could and should determine the winners and losers in a competition to be the future form of money. Though the technology of P2P and cryptography might be unfamiliar to Hayek today, the resulting horse race of innovative forms of money would seem perfectly familiar and appropriate given his prescient view that money doesn't have to be nation state backed to be useful or even superior. We are, of course, just in the starting phases of this experiment – probably equivalent to where the 1990s Internet was before the world wide web even started. Time will tell where the new money can/will take us.

The Digital Revolution Applied to Currencies

In a world redesigned by technology on a daily basis, a global revolution may break out from observing a bicycle delivery business while the US Federal Reserve maintains an obsolete paper check-clearing system using a fleet of private jets.

This is no joke. Bicycle messengers ride the streets fulfilling a function: taking goods from point A to point B in a city, with no central authority that controls their activity or tells them what, when or how to do it. They are free to wear piercings or tattoos; no-one imposes rules on them. As long as they have a device to receive messages, they are connected to a market that demands their services.

In the Beginning There Was the Access

Connection. Access. Revolution. Greg Kidd took part in the XXII Future Trends Forum on the Future of Currency and shared with attendants the stories behind some successful revolutions born from observing a messenger business, the insight that leveraged on technological connection and access. Have you heard of Twitter? And Square?

Greg Kidd

Chief Risk Officer at Ripple Labs

Back in 1996, **Greg Kidd** founded Dispatch Management Services, a bicycle messenger service for urgent deliveries that went on to make a spectacular IPO and today is the largest courier business in the world. In the very beginning, Kidd and his team worked on some software that enabled bikers to receive service requests via text messages and also another piece of software to receive the money from whoever had commissioned the delivery. When Kidd left Dispatch Management Services, he took two programmers with him. One of them went by the name of Jack Dorsey. He was obsessed with the courier industry. He wondered what would happen if the request messaging system designed for messengers were open to the entire society. What would happen if messages could be sent freely to whoever wanted to receive them? Twitter was thus created.

Twitter—Kidd invested in the first financing round of the company—originated from the idea of replacing the usual, previously curated but unsolicited messages bombarded to individuals by messages sent out on the

> This system empowers individuals, hence the reason why some governments, such as China, blocked Twitter.

There is no central control in Twitter, information can be spread freely and is recorded on a public timeline.

Internet; giving individuals the choice of opening their channel to receive it and spread it in turn. This system empowers individuals, hence the reason why some governments, such as China, blocked Twitter (and other social networks) in 2009, a few days before the twentieth anniversary of the Tiananmen Square slaughter. There is no central control in Twitter, information can be spread freely and is **recorded on a public timeline**.

Twitter's game-changing approach to communication and information society is not the only result out of Dorsey's obsession with the courier industry. Kidd and Dorsey found out that messengers rarely had a method to receive pay for their services. Once again, extrapolating their experience in the courier business, they realized that people usually have many payment methods to their avail, but very few methods to receive pay. Dorsey founded Square in 2009. Square accepts card payments on mobile devices (iPhones, iPads or Android terminals) by simply connecting a card reader into the headset input. Anyone can receive payment from a magnetic-stripe card on their mobile phones. "Square really is a revolution of access, since people get more options to pay and most importantly, to get paid". This is a no-brainer for Kidd: "Twitter and Square are among the few groundbreaking milestones in access".

And everything grew from a pedaling industry.

Greg Kidd saw the other side of the coin when working as senior analyst for the Board of Governors of the Federal Reserve. One day, he found out the Fed's software was not exactly what he had imagined it to be: a massive, automated system and a colossal electronic register. He came to work one morning and saw some pictures of people walking among trees with big trash bags. He asked what that meant. So it happened that the Fed, through the end of the 20th century, still did the final clearing of checks physically. Even though much of the settlement procedure was electronic; the original paper checks still had to be returned to the account-holder's bank at the end of the process. To accomplish this, the Federal Reserve Bank and the banking industry itself operated a fleet of more than 100 private jets to transport checks across the country each night after the end of business. One of those jets had an accident, and the Fed had to take care of retrieving the scattered checks it was transferring to finish the clearing process of payments linked to those checks. After 9/11, all flights were shut down for a week and the check delivery system found out its great weakness. It even brought about a small crisis in the financial system, since it

was impossible to send checks to clearing. To prevent a repeat of that situation, in 2003 the US Congress passed Check 21 Act, which required fully electronic clearing using check images, instead of the original paper check.
Kidd is currently working at Ripple Labs, the creator and developer of the Ripple protocol that enables immediate payments at no cost in any currency or unit of value, be them euros, dollars or yens, bitcoins or points in a loyalty card. Twitter and Square have transformed industries from the bottom up, but at the end of the day they are companies building their own platforms. But you can open your scope a little bit more.
The reason why Kidd is involved in digital currencies is because, for the first time, the platform is not the key. Once the revolution of access has taken place, the focus is on the protocol. What is that?
Protocols have made the world today an interconnected world. They are the language everybody understands. No one can control them from the top. There is no permission to join or not. The Short Message System (SMS), connecting all cell phone carriers worldwide is a protocol. Simple Mail Transfer Protocol (SMTP), sending emails between different platforms, is a protocol. What happens when this idea is applied to currencies? It gives rise to the bitcoin phenomenon: a protocol for money, a common language anyone can join. Welcome to the future.

Protocols have made the world today an interconnected world. They are the language everybody understands. No one can control them from the top.

Protocol: In Math We Trust

People understand, or at least accept, the protocol to exchange information. They understand, or definitely accept without reserves, that you can send a short message to the phone number of an individual subscribed to a carrier different from yours

But what about when symbols imply much more? When there is an exchange of wealth, value, behind the symbol? How do you design a protocol linked to money? A system accepted and adopted by the majority to practically exchange value?
Let's start with a story. The protocol to exchange wealth has not been invented by technology. It is as tangible as the huge stone disks with a hole in the middle that were used as symbols of wealth in the Island of Yap, Micronesia. Milton Friedman, Nobel Prize in Economics, discussed them in his paper for Stanford University The Island of Stone Money* (1991).
When Germany landed on the island in the early 20th century, German officials were at a loss to make islanders repair the roads. Becoming desperate, they seized the big stones with the holes in the middle that islanders used as symbol of wealth. They didn't even have to move them; they just crossed them out with black paint and would only erase the black crosses once the roads had been repaired. The apparently meaningless measure was effective.
The value system in the Island of Yap is based on the elderly's knowledge of how much wealth each islander has. Everyone accepts their knowledge: that is the protocol. Even when the stones were thrown to the sea floor, the elderly would still know how much everyone

The motto of money, as reflected by the sentence "In God we trust" on the back of the $100 bill has now evolved into "in math we trust".

* *It makes reference to the eponymous book from 1910 by anthropologist William Henry Furness III.*

The money is the message now. It has been introduced in the world of communications and information, which had already been radically changed by the Internet.

owned. Wealth was not destroyed and the value of stones on firm ground did not increase, so there was no deflation. The aggregate wealth of stones continued to be the same, and the accepted protocol was the elderly's knowledge of who owned each stone.
But the Germans crossing out the stones made evident that stones could change hands: someone else considered the stones their own and just as they had crossed them out, they could take them away or destroy them. That is why the German strategy worked and the inhabitants of Yap repaired the roads.
The protocol of the Island of Yap is based on culture. It is different from cryptocoins in that the cryptocoin protocol is based on mathematics, explained Greg Kidd. The motto of money, as reflected by the sentence "In God we trust" on the back of the $100 bill has now evolved into "in math we trust".
Just as Kidd puts it, "the money is the message now. It has been introduced in the world of communications and information, which had already been radically changed by the Internet. This puts money in the same structure of protocols that led to the foundation of the internet through TCP/IP, the exchange of emails through SMTP and text messaging between different cell phone carriers through the SMS protocol".

Ctrl+V Is Dead, the Double-Spending Issue Is Over

I am sitting on a bench at the park. It is a beautiful day. I have an apple. I hand it to you. Now you have an apple and I have none. You can see it and touch it. You have it. I don't. Very simple, right? We do not need a third person to tell us I gave you an apple. You clearly have it in your hands. And I cannot give you another one because I don't have any more. You can do with it as you please.

Moe Levin uses this image to explain a digital revolution behind the surge of cryptocoins, the end of the double-spending issue and digital duplication.

Suddenly virtual ledgers become a reality and can record who owns what in the digital world at every point in time.

Moe Levin

Director of European Business Development at Bitpay.

If you try to replicate the example of the apple in the digital world, the simple exchange on the bench at a park turns out to be more complex, filled with possibilities and questions. How could you possibly know that the digital apple is yours and only yours? They might have made copies of it before sending it over to you. They might have uploaded it to the Internet and a million people may have downloaded it already. They may have sent it to ten other people besides yourself and now you all have the same copy of the digital apple.

Easily obtainable copies are something that has disrupted the concept of ownership in the digital world. For a long time, this has been the hitherto unsolved problem of digital contents. Suddenly virtual ledgers become a reality and can record who owns what in the digital world at every point in time. If I have

Facebook applied this to its attempt at a virtual currency: credits. They were launched in the social gaming boom led by Farmville

a digital apple and I give it to someone, the ledger will show they have the apple now and I don't. Technology has finally solved the double-spending problem and truly enables the exchange of units of value. If I send a digital dollar to someone, I can no longer send that same dollar to another person or save a copy in my computer.

Facebook applied this to its attempt at a virtual currency: credits. They were launched in the social gaming boom led by Farmville, although the social network finally discarded them in favor of payment in local currencies, given their low acceptance and added value. But the important point here is that Facebook had a record, a ledger that said how many credits each user had. In this case, the problem was that Facebook could create credits at will. This made it once again impossible to replicate the exchange of the one apple at the park, the one I have until I give it to someone else without being able to duplicate it. How can you eliminate that centralized power so that no-one can control the amount of units and therefore provoke inflationary or deflationary movements? You need to eliminate the middleman. That has been bitcoin's achievement.

Block Chain, We All Are the Supervisor

Let's say that the list, ledger or record formerly controlled by Facebook exclusively is now distributed to all users in the interconnected system.

The record hosted in each computer is updated—thanks to cryptography and the huge computing power accumulated in the system—to include all exchanges and each bitcoin's record of exchanges since its creation. This is why you cannot fool the system: all records must balance out. It is impossible to send digital apples without making it known to everyone on the Internet—that is, all computers hosting the record. Any tampering would unbalance the information, so **everybody knows what everybody has at all times.**

Now we can say the digital apple belongs to someone and only them. As opposed to Facebook's case, we do not need third parties in the process; we only need to verify that transactional information balances out. It is as effective as seeing an apple deposited on your hand and it also involves just two people. However, since it is digital, you can send one, one thousand or a million apples between any two given points in the world. And you can also attach a message, an ID card, a security certificate or a contract to the apple.

This network of records is the foundation of a trusted system. It is known as the block chain: a custodian that constantly crosses data to verify the supervised system has not been tampered.

Now that is truly revolutionary. Regardless of what might happen with bitcoin and the likes and the value they may reach in dollars, regardless of the heated discussion between different schools of thought in economics, policymakers and programmers on the subject of what to make of cryptocurrencies, the onset of block chains marks the before and after.

So the discussion is not about the bitcoin. "Why are we always discussing

This network of records is the foundation of a trusted system. It is known as the block chain.

Jerry Brito

Executive Director at Coin Center

Regardless of what might happen with bitcoin and the likes and the value they may reach in dollars, the onset of block chains marks the before and after.

bitcoin when we are actually talking about cryptocoins?" asks **Gerald Brito**. Because bitcoin was first. It was the cryptocoin that introduced the original, decentralized block chain technology to transfer an exclusive bit of digital property to another user without making a copy or involving a third party.

This transfer and control procedure is the real technological revolution. It could expand well beyond the sphere of money. The bitcoin token represents current money, reminded Brito. But "there is no reason why that token could not represent something else. Bonds, shares, gold, a home, a car..." There are endless possibilities. **You only need stakeholders in the system to agree that the token is equivalent to something specific, just as they have agreed on the value of bitcoin.**

This is a major discovery for digital copyright. The American first sale doctrine included in Title 17 of the US Federal Code determines that any individual who acquires a copy of IP-protected material is entitled to sell it, show it or make use of it without violating the copyright. This right is waived once the copy is sold. However, the first sale doctrine privileges were reviewed and clarified as the digital world evolved. The first sale doctrine now is not applied when you acquire a license to reproduce or use the copyrighted material instead of a physical copy, as is the case with software or digital contents purchased on iTunes or Amazon. You can gift, resell and do as you wish with a book you purchased on a bookshop because there are a limited number of units. A movie sold by Bestbuy on a DVD is tangible property. However, that same movie can be purchased on iTunes, the same way you would buy a Kindle edition of a book on Amazon. In these cases, you are not purchasing the movie or the book, but

That is called smart property, a concept that combines something tangible, such as a car or a house or something intangible, such as shares in a company or the right to use a computer, with the digital representation of such property.

acquiring a license to use them, as opposed to reselling or gifting such license. If the contents are sent to someone, our equipment saves a copy. The block chain technology has solved this problem. Applied to copyrighted material it would entail the following: when you own a license to listen to a song and you have the key to prove it, you will be the only one who can listen to it. If you transfer it, the entire system may check the ledger where the transaction is posted and see the license is then in someone else's hands and you will not be able to reproduce it any more.

Another use involves embedded metadata in each unit or subset of bitcoin to establish that each unit or subset represents property, such as a house or a car. Transferring property deeds is now as easy as transferring bitcoins. Transferring property will be more efficient, transparent and probably cheaper. It even opens the door to receiving loans backed by bitcoin guarantee or collateral, since the bitcoin units represent the owned asset.

That is called smart property, a concept that combines something tangible, such as a car or a house or something intangible, such as shares in a company or the right to use a computer, with the digital representation of such property. Combining both ideas has led to systems whereby a car engine can only be started by the rightful owner, as identified by the appropriate token. They will not be able to use it if the token is transferred to someone else. This can be applied to hotel room doors, security boxes... as Brito explained, the point is that the new decentralized function enables recording property and transferring it over the Internet safely and visibly.

P2P. A World without Intermediaries

Electronic payments are usually made from a bank account. The first step to make the payment is your interaction with a financial institution.

Let's say the payment is a shipment. The sender goes to an agent (the financial institution) entitled to use the network, the lane connecting with other financial institutions to transfer the funds to the receiver.
This was taken for granted, and then came peer to peer, the technological exchange of information between peers, bypassing the agent and cutting out seemingly unavoidable steps in the exchange process. Originally, this was a big nuisance to copyrighted materials, and then went on to disrupt the universe of money and payment systems a long while ago already.
Iker Marcaide introduced both the current and potential relevance of P2P in payment methods to the discussion at the XXII Future Trends Forum. He mentioned how the assets or information exchanged or the device used are not the point of P2P. The point is the relationship between the parties involved in the transaction, the way the exchange of value takes place.
Traditional exchange methods are both diverse and complex. The exchange may take place through the Fedwire network in the USA, Automated Clearing Houses (ACH), the Single Euro Payments Area (SEPA) or the Society for Worldwide Interbank Financial Telecommunication (SWIFT). Besides, money flows through the lines of communication between

Iker Marcaide

Founder of PeerTransfer

Peer to peer, the technological exchange of information between peers, bypassing the agent and cutting out seemingly unavoidable steps in the exchange process.

Some initiatives focused on one link of the value chain have emerged as well. Such is the case of P2P lending platforms, which visibly show who lends and who borrows. Their process is no different from that of a bank. The difference is that the bank will not let you peek inside.

banks. And not so long ago it was even transported in paper checks aboard the Fed's private jets.

In any case, what is being transported is simply information, value. However, the cost of a standard, international transaction is between 2% and 6% of the transferred amount; or $25 to $30 when done through Fedwire and 2-3% when using your card in Europe. These terms have been established by the members of the network. A SWIFT message costs a few cents, so the retail price is arbitrarily set by the network intermediaries. Neither the issuer nor the receiver of the transaction can otherwise access the networks.

The surge of P2P involves cutting out many currently unavoidable steps in the value chain of a standard transaction. In practice, they have not been used yet to suppress the intermediary, but rather, to create payment platforms between end-users (Popmoney would be one example) or change the type of intermediary (that is the case of some new companies in the business of netting positions between users and then going to the market to find the liquidity needed to balance out transactions—basically performing the task of a bank). Some initiatives focused on one link of the value chain have emerged as well. Such is the case of P2P lending platforms, which visibly show who lends and who borrows. Their process is no different from that of a bank. The difference is that the bank will not let you peek inside.

What is truly revolutionary about P2P? Its ability to disintermediate. It enables greater connectivity among members by cutting out steps in the process—the very steps that make the process so expensive. This value is then captured by others: the network or the stakeholders.

Paypal and Paypal Wallet are an interesting case. Paypal Wallet enabled immediate payments within the platform at a very small fee. However, Paypal is a case of centralization. Other models, Ripple being

What is truly revolutionary about P2P? Its ability to disintermediate. It enables greater connectivity among members by cutting out steps in the process

one of them, are decentralized. P2P is the way to disintermediate, bypass some rules that affect what matters to end-users. However, the system must be trusted and understood for it to work properly. P2P is "exchange-agnostic", be them cryptocoins, euros or yens. Flow and connectivity are what matter most.

Current Flaws, Future Challenges

There is No Currency without Liquidity

This is a world of open economic systems that interact without barriers to trade or flows of capital.

Liquidity is the money that fuels the machinery. The economy does not work without it. Without it, severe complications arise. Therefore, monetary authorities have taken many orthodox and heterodox measures to safe keep it during the crisis, even though the mechanisms to influence liquidity are not risk-free.
Undoubtedly, **a currency must be liquid to be internationally relevant, be it a traditional currency or a cryptocurrency**.

Paola Subacchi cited a wide range of cases when monetary institutions have acted to influence liquidity over the last few years—unconventional policies that prove the extreme relevance of this factor.
The Federal Reserve came up with Quantitative Easing (QE) in order to inject into the global monetary system the liquidity needed to fuel trade. The decision required navigating unchartered waters. The Bank of Japan and the Bank

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Paola Subacchi

Director of the International Economics Research at Chatham House

of England joined as well. The latest decisions by the ECB go in the same direction. They are an attempt to overcome the liquidity trap in the euro zone, tied to the risk of deflation.
The need for liquidity requires creating safety nets. The Fed has established liquidity swaps with monetary authorities in other regions to provide dollars and other currencies where needed. During the financial crisis that started in 2008, swaps increased exponentially. At the height of the crisis, short-term liquidity swaps between the Fed and partnered countries went from 8-to-30-day periods to over 60 days; evidencing the thirst for liquidity in the system.
Countries without access to the Fed's liquidity swaps have used their traditional safety nets to guarantee liquidity: simple accumulation of reserves. China has accumulated colossal amounts of dollars and other Asian countries continue to do so. They are persuaded they must accumulate as much liquidity as possible to overcome any financial crisis.
As it accumulates dollars, China is well aware of the role of liquidity to elevate its currency, the renminbi, to the international playing field. That is why they have been building up the renminbi's liquidity since 2010. They are using two methods: creating markets (basically Hong Kong but also Singapore, Taipei and London); and signing liquidity swaps with key central banks, as was signed in June 2013 between the People's Bank of China and the Bank of England.
Even though the renminbi is still rarely used in trade, it is picking up speed: 15% of trade in China is already billed and cleared in renminbis. It is not widely used for payments because there is not enough liquidity to make it fully convertible. Besides, China controls flows of capital, although not as tightly as it used to.
Subacchi mentioned that bitcoin does not have enough liquidity because this is just

the beginning. However, it is obvious that we are no longer navigating a single-currency system, she believes, even if the dollar continues to be the overwhelmingly dominant currency. The world is shifting towards a multi-currency system, where several traditional currencies will hold their ground simultaneously. Besides, the system may potentially diversify into instruments other than the traditional currencies, admitted Subacchi.

The world is shifting towards a multi-currency system, where several traditional currencies will hold their ground simultaneously. Besides, the system may potentially diversify into instruments other than the traditional currencies.

Anonymous but Traceable

Based on the work for the Cashless Journey project of MasterCard Advisors*, 85% of transactions worldwide are still conducted in cash. There are billions of people who do not use electronic payment systems for several reasons.

One is financial exclusion, but also, cost, speed, reliability, convenience, trust in the national financial system, and confidentiality (not sought exclusively for unlawful reasons, there is a broad market for lawful, but private, transactions). And then there are the users' concerns about the risk of hacking or theft when using a cell phone or computer to carry out their transactions. End-users ponder all these factors when deciding on a payment system, explained **Nikos Passas**.

But security is not the exclusive concern of end-users. The major security concern of banks is the consequences that unlawful actions (money laundering, corruption, financing terrorism, tax evasion) may bring upon themselves.

Passas considers security will be the key factor in the future of money from the perspective of end-users, states and banks. The three players have deeply intertwined interests. The electronic payment systems demanded by billions of people around the world will be affected by the governments' concern to control illicit flows of capital and the banks' concern to comply with regulatory requirements while heeding the risk of non-

Nikos Passas

Professor of Criminal Justice at Northeastern University

There are billions of people who do not use electronic payment systems for several reasons.

** http://www.mastercardadvisors.com/cashlessjourney/)*

compliance. The anonymity demanded by users has an impact on banks, who are not doing their share, and states, who do not receive the information they want from banks to analyze suspicious transactions and detect illicit flows.
There are new technologies that have not been included in any regulatory regime and any future developments are unknown. On the other hand, not all countries regulate the same. An operator or end-user might find it hard to establish a unique, globally lawful behavior. Complying with the many rules against money laundering has become nightmarish after the 9/11 attacks. Where is the balance between innovative banking systems and a more relaxed regulatory environment, where regulators refrain from banning everything they do not understand and/or control?
Passas has studied corruption, illicit flows of capital, terrorism, white collar crimes and organized crime. He has also studied informal transfer systems going back to the early 20th century, including low-tech transactions (i.e. courier services or more sophisticated technologies). His point is that he has never seen an illegal network that uses one single and exclusive method to transfer money. They always combine several methods. Unless you are familiar with each method, understand their mechanics and can follow the trail of transactions; you will not be able to monitor, stop or penalize the members of the network.
The traceability or ability to follow the trail is an innovative feature of digital currencies, the key to weave together conflicting interests regarding security.
The evidence is a centuries-old payment system: Hawala, an informal money transfer method from point A to point B through intermediaries or providers, known as hawaladars. This system is not transparent. Anonymity is an essential feature of the Hawala system; no-one knows who is on the receiving end. It could be anyone, and that drives regulators crazy. Besides, Hawala makes a lot of sense for end-users in Afghanistan, for example. It is reliable, efficient, fast, extremely cheap (costs range between 0.1% and 0.2%, depending on the exchange rate applied), it offers the best exchange rate, it is safe (the money is successfully transferred), it is the most convenient service

The traceability or ability to follow the trail is an innovative feature of digital currencies, the key to weave together conflicting interests regarding security.

If digital currencies become a useful source of information for authorities, the existing doubts about their regulatory framework will be dispelled.

(door to door) and culturally accepted. Money can be traced, and that is what must matter to regulators when choosing not to ban it. Money is traceable in the Hawala system because everyone can access records. Otherwise it would be impossible to correct mistakes and the trail would be lost. Traceability is actually better in Hawala than it is in formal money transfer systems. It was useful to investigate the Bombay attacks in 2008, drug trafficking in Dubai or the attacks on the Indian Parliament.

Passas suggests focusing on the mechanics of bitcoin and other digital currencies to find out to what extent the existing information can be used to cooperate with authorities to solve crisis of the type mentioned above.

If digital currencies become a useful source of information for authorities, the existing doubts about their regulatory framework will be dispelled, stated Passas. Regulators often act out of fear. When they do not understand something, they tend to overregulate or ban it altogether. Once they understand it and identify opportunities that fit their purposes, they allow their growth. Otherwise, Passas considers security will continue to be an unmet need and banks, being risk-averse, will not embrace this phenomenon, just as they have not embraced Money Service Business (MSB) or bitcoins.

Passas sees another big challenge ahead of the regulators. Their actions often shoot themselves in their foot as they push a substantial amount of transactions out of the official system, where they are unable to monitor them. They should define their objective, make an informed decision about their policy of choice, define the product object of the regulation, the benefits of the regulation and how the risks implied are minimized. Then, they must implement the regulation across the board. The USA must implement it state and nation-wide and look for a mid-term solution to extend it abroad.

The Myth of 100% Secure

Trust. Money. Technology. How reliable is a decentralized system such as bitcoin's, based on a block chain where each participating node has its own data base of transactions and trust relies on every node having the same information so that the system can verify it? Besides, do weaknesses multiply when everyone and anyone can join the system? Could the software supporting the traditional, centralized financial system be more secure, less vulnerable to outside attacks?

Ben Laurie and **Gerald Brito** agree that the likelihood of an ironclad, attack-free IT system is zero, be it an alternative cryptocurrency or a traditional banking system. So what can we trust? Is it actually a matter of trust?

Based on the definition of 'trust' in the Oxford English Dictionary (the firm belief in the reliability, truth, or ability of someone or something), Laurie does not believe the human concept of trust can be applied to the digital world. He believes the equivalent of trust in a universe of ones and zeros is vulnerability. The point is there are mechanisms in place to mitigate the vulnerability. The digital signature and cryptography are the weapons brandished by computing on the digital frontier in order to avoid undesired entries to critical zones.

Laurie guarantees that, at the risk of letting down "in Math we trust" enthusiasts, "there is nothing demonstrable in cryptography, no absolute certainty, despite the mathematical foundation. There are no cryptoguarantees". Bitcoin and

The likelihood of an ironclad, attack-free IT system is zero, be it an alternative cryptocurrency or a traditional banking system.

Ben Laurie

Programmer, Protocol Designer,
Cryptographer at Google

Bitcoin and the other cryptocurrencies are based on presumably effective shields, but history teaches us nothing lasts forever.

the other cryptocurrencies are based on presumably effective shields, but history teaches us nothing lasts forever. Quite the contrary. "The history of cryptography is basically a string of things that failed and were replaced by others", he says. Taking into account that there are no guarantees or certainties, Brito believes the key is "that you trust cryptography because you trust it will enable a stable system for a long period of time". You trust "cryptographers, who understand mathematics and can state something is quite secure", even though there is no guarantee of invulnerability.

Bitcoin


Mr Moe Levin
Bitcoin
REAL ... OR
VIRTUAL
Apple
IT'S
SCARY?
CURRENCIE
VALUE
BALANCE ???
KENYA
4million BANK ACCOUNTS
BUT...
10million MLESA
ACCOUNTS

Jerry Brito

Executive Director at Coin Center

How to control Bitcoin?

Bitcoin is a fundamental computer science breakthrough as well as a revolutionary new tool for exchanging money, property, and—most basically—trust on the Internet.

Essentially, Bitcoin is an Internet-wide distributed ledger. It's an online protocol for establishing and memorializing trusted relationships—ownership, credits, debits, and exchanges. Unlike preexisting services for transmitting value or authoritative records, Bitcoin allows individuals to provably send and receive assets over wire without resorting to third-party intermediaries such as VISA, Bank of America, or the US Government.

The first use-case for that technology is, as we've seen, sending money, but the promise of Bitcoin and related blockchain technology extends well beyond mere cash on the Internet. An authoritative distributed ledger can be a tool to exchange keys to virtual

An authoritative distributed ledger can be a tool to exchange keys to virtual as-well-as physical property to memorialize property ownership to resolve disputes.

as-well-as physical property—think selling a car and sending the keys online—to memorialize property ownership—think indelibly recording a real estate deed with your smartphone—to resolve disputes—think handing disputed assets to a neutral intermediary for safekeeping during a complicated exchange.

Until recently these services were the exclusive province of large institutions that are trusted by their consumers or citizens because of tradition, faith, signaling, repeat play or aligned incentives. Now, with Bitcoin, complex governance can be had and trust established with mathematics and communications technology. The speed, automation, geographic independence, and openness of these technologies reduces transaction costs, opening up entirely new markets and enriching us all. Without centralized intermediaries to lean on, however, regulators are faced with a tough question; how can we police activities that take place purely on a person to person level without stifling a promising, innovative new technology?

What Is Bitcoin and Why Is It Different

Greg Kidd pulls out a $100 bill. "What can you read on the back of this bill?" he asks. Several attendants to the XXII Future trends Forum on the Future of Currency organized by the Bankinter Foundation reply in unison: "In God we trust".

"You do not write that on a piece of paper unless you need to generate trust in that piece of paper. But, all you need to know about the bitcoin algorithm is that 21 million units are going to be created. No more and no less. This is a concept for a new world, where the creation of money is set, as opposed to the traditional world, where the creation of money is variable".
Bitcoin enables the digital transfer of value and checking who owns what, thus avoiding the double-spending issue and disintermediating third parties that would otherwise verify the transaction. That changes the game… The system constantly checks that information in all great ledgers, the records connected to the Internet,

balance out. Bitcoin is the real-life expression of the digital apple metaphor. An exchange system originated in cryptocurrencies, consisting of a great ledger in each block of the system that contains the history of all transactions, a protocol or common language for these blocks to communicate, and the block chain that balances out information on all great ledgers.

Bitcoin enables the digital transfer of value and checking who owns what, thus avoiding the double-spending issue and disintermediating third parties that would otherwise verify the transaction. That changes the game…

How are digital protocols applied to money different from other digital protocols? **Bitcoin's protocol comes from an algorithm designed by an anonymous individual, not an authority or corporation.** "It is beyond neutral. It was a gift. No licensing fees, no patent, no copyright. It works based on belief, the same way someone once believed that the Earth was not flat and went on a journey to find out what was on the other side of the known world. It is based on faith, believing it is possible to create a ledger, a secure, trustworthy record", described Greg Kidd. And it did not materialize just at any time, quite to the contrary: precisely when there was a competition and discussion about the future global reserve currency for the first time in decades—the global reserve currency position has been held by the dollar uninterruptedly since the 20th century and is now challenged by other currencies, such as the euro, or more significantly, the yuan or renminbi. Kidd guarantees that bitcoin "offers the potential of having an alternative, decentralized reserve currency". The reason being that currencies tend to converge and he believes one currency will prevail in the future.

Money is not challenged in the Stark Trek saga of episodes because two things are obvious about the future, in the words of Kidd: that captain Spock can easily communicate with the native inhabitants of all planets (they all speak English) and everyone uses Credits, the currency of the United Planet Federation. There might be wars on Star Treck but everyone agrees on an interplanetary payment sys-

Precisely when there was a competition and discussion about the future global reserve currency for the first time in decades—the global reserve currency position has been held by the dollar uninterruptedly since the 20th century and is now challenged by other currencies.

tem. Just as Spain integrated from a national currency into the euro, the same path will be followed around the world to build a common registry, a global great ledger. The difference between bitcoin and Star Trek is that there is no Federation; no-one is in charge.

The Origin of Bitcoin and Nakamoto's Timer

A self-published report sprouted on the Net on October 31, 2008 (6 weeks after Lehman Brothers went bankrupt) to announce the advent of a revolutionary cash system: bitcoin. Nakamoto's name is the pseudonym of a person or group of people who shared their legacy on the Internet.

The paper was linked to an email published on The Cryptography Mailing List on metzdowd.com, where Nakamoto says he's "been working on a fully peer-to-peer electronic cash system that makes a third party unnecessary for verification purposes". He goes on to explain the main properties, such as "the double-spending issue is prevented in a P2P network; no third parties are needed and participation is anonymous".
In the introduction of the paper, Nakamoto explains that "commerce on the Internet has come to rely almost exclusively on financial institutions serving as trusted third parties to process electronic payments. While the system works well enough for most transactions, it still suffers from the inherent weaknesses of the trust-based

The cost of mediation increases transaction costs, limiting the minimum practical transaction size and cutting off the possibility for small casual transactions.

model. (...) The cost of mediation increases transaction costs, limiting the minimum practical transaction size and cutting off the possibility for small casual transactions. (...) What is needed is an electronic payment system based on cryptographic proof instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party".

In January 2009, Nakamoto sent another email to the list "announcing the first version of Bitcoin", and this time he added a link to download the software. On this email, he explains how the timer works; **how production is scheduled to reach a limit of 21 million units.** Production growth is halved every four year, so 10.5 million bitcoins have been created in the first four years, 5.25 million more will be created in the next four years; 2.65 million in the following four, and so on.

The steps to run the network are the following:

1. Every new bitcoin transaction is broadcasted to all nodes.
2. Each node collects new transactions into a block.
3. Each node works to solve a proof-of-work (a very difficult mathematical verification) for the benefit of its block. This process is known as mining, and miners are rewarded in bitcoins for offering their CPU power to the process.
4. When a node finds a proof-of-work, it broadcasts the block to all nodes.
5. Nodes accept the block only if all transactions in it are valid and not already spent.
6. Nodes express their acceptance of the block by working on creating the next block in the chain. This is currently taking place every ten minutes, roughly.

Speculation vs Usability

How can bitcoin achieve critical mass and become widespread among users? There was some consensus about how bitcoin or any other cryptocurrency might reach success through usability.

Eden Shochat

Founder of Aleph & Bankinter Foundation Trustee

Eden Shochat mentioned that if you use bitcoin to save value, it will be harder to maintain trust in the currency for a long period of time as you watch it fluctuate. However, if you use it as an exchange method in a brief transaction, it will inspire greater trust, as the client achieves what they need in a limited time span. The problem lies in trying to replace all currencies and all their functions, as bitcoin is attempting to do, instead of focusing on one function. What is bitcoin used for? Iker Marcaide reminded us that most current activity

He stated that until all these innovations are not extremely simplified for everybody to understand, they will not become widespread.

Ángel Cabrera

President of George Mason University & Bankinter Foundation Trustee

involving cryptocurrencies is speculation. "What is the most important point for users?" he asked. "We are discussing technology lightly. At the end of the day, it works if it adds value to people. Any emerging system must take into account cost and convenience to really become widespread. Accepting that paying is not fun for most people is necessary to reach beyond the early adopters, who actually get a kick out of this type of thing. People don't wake up in the morning thrilled at the prospect of making a payment. He stated that until all these innovations are not extremely simplified for everybody to understand, they will not become widespread".

In the meantime, are they a vehicle for speculation? **Ángel Cabrera** contributes that his main doubt about bitcoin comes out of the lack of information about what drives its value. Cabrera shared with attendants that he had purchased $20 worth of bitcoins that very morning and he had made 10 cents on it in one hour. At that rate, his return could hit 4,000% in one year, he said. Does this mean the decision to invest was correct? "I really have no idea of what affects the value of bitcoin", said Cabrera. "Taking into account that the evolution of bitcoin is not linked to any national economy or asset, this much-discussed romantic concept of transparency is not real and I have no idea of what drives the value. I don't know if I just made the smartest operation of my life, or quite the opposite, whoever sold me the bitcoins came out the winner. I don't know what happened".

Where is bitcoin specifically accepted as a payment method? There is a wide range of companies, including some big players, who accept payments in bitcoin: the technological company Dell, the travel agency Expedia, Wordpress' Woocommerce platform, the retailer Overstock, the gaming platform Zynga, Tesla cars or Virgin Galactic future spaceflights. And Braintree, eBay's

payment processing company, has announced it will introduce bitcoin shortly, which could lead to some of its customers using it too, such as Uber, Airbnb or Task Rabbit—the advantage of introducing bitcoin among communities the likes of Uber is that their users are open to adopting technological innovations.

Braintree, eBay's payment processing company, has announced it will introduce bitcoin shortly.

The (Nearly) Indestructible Protocol

Bitcoin's market fluctuations aside, is this a secure system to which society can massively entrust the bulk of transactions and savings? Nakamoto's paper addresses this right on the abstract: "As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers".

And then he insists "**The system is secure as long as honest nodes collectively control more CPU power than any cooperating group of attacker nodes".**

Ángel Cabrera opened the discussion about the chance of an attack to bitcoin with the question "What is this? Some sort of Cold War or nuclear weapon? Some open door for whoever decides to control enough nodes so as to destroy the economy?"

Eden Shochat offered an answer. "The current CPU power in the bitcoin network is the equivalent of 256 times the combined capacity of the 500

supercomputers there are in the world right now. Attacking the net would involve having the combined capacity equivalent to 128 times those 500 supercomputers". It is

"The current CPU power in the bitcoin network is the equivalent of 256 times the combined capacity of the 500 supercomputers there are in the world right now. Attacking the net would involve having the combined capacity equivalent to 128 times those 500 supercomputers".

not 100% guaranteed—such guarantee does not exist in the digital era—but it does prove that the chance of an attack right now is merely theoretical, in the words of Shochat.
Gerald Brito pointed out a fact. There have been thefts of bitcoins, and security breaches (MTGox is one example) but these are failures in the exchange platform. "The bitcoin protocol has never been compromised".
Japan-based MTGox was the biggest bitcoin exchange until it closed in February 2014. It came to a sudden end when hackers attacked it and MTGox users could not withdraw their balances. This led to its bankruptcy. Similar attacks had taken place at a smaller scale in June 2011, when a hacker attacked the exchange and stole $500,000. But in none of these cases was the protocol affected.
What fosters trust in a system such as bitcoin, according to Greg Kidd? The possibility of reversing the damage of an attack. **The bitcoin protocol is written in open source software. This means it is decentralized: everyone can see it, good or bad.** This does not mean the system can be compromised, but if it happens, you can retrace the steps back and check what changed.
Governmental or corporate systems, on the contrary, are similarly based on software and therefore susceptible to attacks, but their information is not public. There are sufficient illustrative cases of centralized systems. Target, for instance, suffered a malware attack a few days before Thanksgiving 2013 and their users' credit card information was stolen. All alarms failed in that case. There was a breach to eBay users' personal data in early 2014, when the company delayed warning about the risk. Corporations are trusted to protect balances and private data that end

The bitcoin protocol is written in open source software. This means it is decentralized: everyone can see it, good or bad.

up in the hands of the NSA or some governments. The only difference is the hushed reviews carried out in these systems. Kidd says he tends to trust better something he can see, rather than something hidden inside a black box.

Regulators and the Future Challenge of Money


Julia Li

Paola Subacchi

Director of the International Economics Research at Chatham House

"Regulators and the challenge of decentralized, virtual systems"

Payment systems have evolved to reflect different needs and different transaction networks. The concept of means of exchange has changed too.

Money no longer needs to be physically moved around; information can be sent instead. The widespread use of 'plastic' – debit and credit cards, store cards and pre-paid cards – has eased out cash in many transactions. Compared with a few decades ago, cash is now a sub-optimal means of exchange: it is bulky, can be counterfeited and can be lost or stolen. In addition, innovations such as phone-based tools offer

As our monetary future looks more fragmented, and offers more choices, the world of currencies has become more fluid and possibly more uncertain.

alternative ways to pay bills, buy and sell goods, send and receive money and make bank transactions.

The demand for alternative instruments is surely there. The bitcoin has increased its circulation and has become more used as both store of value and means of exchange – the key functions of money. Not being backed by any government makes the bitcoin attractive to many who distrust central banks and governments – libertarians, techno-anarchists, post-modern hippies and criminals. This has raised concerns among some governments, but the response so far has been confusing, possibly reflecting the fact that 'alternative' money is poorly understood by monetary authorities.

As our monetary future looks more fragmented, and offers more choices, the world of currencies has become more fluid and possibly more uncertain. And it is due to continue to evolve. Different instruments – from physical to electronic money – will serve different types of exchanges and needs. And people will use many different instruments to reflect the complexity of their transactional networks. Inevitably this will trigger a regulatory response, but not yet. New monetary instruments have always developed in a regulatory limbo, before getting on the monetary authorities' radar. They have to develop extensive circulation and effective network externalities before becoming relevant to regulators. And when this happens, this becomes a measure of success for the means of payment.

"Money is universal. Everybody knows what it is and everybody uses it. Its future will depend on the intersection of economy, technology, society and their point of convergence but it will also depend on policy to a great extent. Speaking about the future of currencies means discussing the essential role to be played by policymakers" (...).

Thierry
Malleret

Co-founder of the Monthly Barometer

"We can progress towards disintermediation, but as we do so, we are provoking a strong reaction from regulators and everything that has to do with money in the future will greatly depend on their decisions". These words by **Thierry Malleret** started one of the most heated discussions of the sessions: the challenge faced by regulators and the risk regulators themselves can represent to alternative currencies, given their strong motivation to control them in order to collect tax or other purposes.

Dan Schatt

Chief Commercial Officer at Stockpile

Michael Schrage

MIT researcher Sloan School

The role of regulators is important because of what they are doing now, but also because of what they will decide in the future and have done so far.

There is a wide range of measures taken by regulators regarding bitcoin: some have effectively banned them (Russia), others have gone back and forth while sending numerous warning signs (China) and yet some others have accepted their existence without planning an intervention yet. According to **Dan Chatt**, there is a marked tendency to empower consumers and grant universal access. This unstoppable tendency will grow, and as it becomes widespread, regulators will have to oversee its use. **Centralization vs decentralization. Obscurity vs transparency. Monopoly vs competition.** A set monetary base or expansive monetary policies that multiply money and thereby reduce its value, generating inflation. In the words of **Michael Schrage**, who facilitated the discussion, there is a "huge battle field" in the future of currency, with regulators lined on one side and markets on the other in many issues.

The role of regulators is important because of what they are doing now, but also because of what they will decide in the future and have done so far.

Some attendants consider that the complex algorithm behind bitcoin holds back trust and therefore massive adoption. However, others added that the behavior of central banks, especially since 2008, is not easy to understand either, and that is actually one of the reasons innovation in currencies and payment systems has flourished in the private sector of late.

Malleret believes bitcoin plays at a disadvantage vis-à-vis

"Monetary policy continues to be necessary, but that does not exclude the emergence of many currencies that may find very active markets without replacing in any case the need for a traditional banking system".

currencies backed by an official authority in order to build trust. It will take more than a fun experience for early adopters. "If you do not understand the nature of mathematics behind the algorithm, you might feel you lack control and decide not to trust something you cannot understand", he said. However, he added "we know most of what central banks do because they publish it and we base our investment decisions on their actions. This does not mean central banks are easy to understand, they are obscure in many ways, but everybody is investing based on the liquidity volume generated by the Fed at present". Philip Lader pointed out that "monetary policy continues to be necessary, but that does not exclude the emergence of many currencies that may find very active markets without replacing in any case the need for a traditional banking system".

Michael Schrage, Félix Moreno, Greg Kidd or Eden Shochat are among those who believe that the recent management of monetary authorities is no more understandable than a mathematical algorithm. Michael Schrage boiled it down to "central banks find incentives to be obscure, but innovators and entrepreneurs find incentives in offering money-exchange architectures that encourage transparency, such as bitcoin". Schrage called a vote to ask if the future of money will be based on transparency or obscurity, and the show of hands overwhelmingly backed transparency.

The Tireless Money-Making Machine

Eden Shochat considers that "the US Federal Reserve has basically printed massive amounts of money over the last few years; therefore the dollar currently involves significant risk". As a result of this policy, "the world is sitting on a monetary ticking bomb that compromises the continued existence of the dollar as the world's reserve currency", said Bernard Lietaer.

What has happened over the last few years to question the actions of regulators and even undermine trust in them?

Since 2008, the Fed has been using Quantitative Easing (QE)—that is, issuing dollars massively into the economy by buying US Treasury debt. The Bank of England and most recently the Bank of Japan followed suit. The ECB announced it will adopt a version of QE in 2014 as well. It is not a new strategy; history has documented many cases of how institutions with a money-printing machine can create money to pay their debt, effectively handing the bill over to citizens as the value of their

money diminishes. A system with so powerful institutions entails obvious disadvantages, said Amar Bhidé. Basically, the chance of overproducing money, that the government may use at will its power to make citizens accept a broad extension of credit, thereby undermining the currency's strength.
It is not the only consequence. In a globalized world where capital flows freely, overproducing money brings about other undesired effects. Over the last five years, increased liquidity and its counter-measures have led to many a new situation, said Paola Subacchi. When you create liquidity, you are potentially eroding the value of that particular currency. This, in the case of currencies of systemically important economic areas or countries (USA, China, Japan, the euro zone and the United Kingdom) in an open economy, carries impact on the currency itself and on the salaries, productivity, prices and national economic conditions. This type of policy has led to positive consequences, said Subacchi, but also spill-overs that affect one emerging country after another. Brazil, for one, was in trouble in 2010 because of its sudden strength vis-à-vis the dollar and it lost competitiveness. In 2013, Brazil experienced an asymmetric monetary impact: its currency depreciated strongly, forcing the country to act and stop it.
Is there too much liquidity as a consequence of the measures adopted? Subacchi believes so. If you look at the indicators, there may be potential bubbles in several areas and assets: the European bond market, several national real estate markets... they are signs of excess liquidity, not because of the sheer quantity but because of the destination of such liquidity—which quite logically tends to seek profitable investment opportunities in an institutional framework and regulatory stability.

Bernard Lieater

Economist , Currency architect and Author

history has documented many cases of how institutions with a money-printing machine can create money to pay their debt, effectively handing the bill over to citizens as the value of their money diminishes.

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History has tried once and again to curb the power of money-printing institutions, and scholars offer several proposals to tackle this problem. Friedrich Hayek, Nobel Laureate in Economics, defended the private sector's competency to print money. Milton Friedman, another Nobel Laureate in Economics, following the line of thought of John Taylor, championed establishing rules to limit the production of money. These rules have been implemented myriad times, but governments have broken them once and again when they were in need of financing; in the lack of a supranational authority that prevents the over-production of money.

As explained by Bhidé, the history of the US monetary system is the history of its governments' financing needs, met once and again by freshly printed money; followed by historical periods when private players have competed to print money. Even before the USA was founded, the American revolutionary Government leading the fight for independence against Great Britain printed massive amounts of paper money—the continentals. Since it could not collect taxes, it needed to pay soldiers fighting for independence somehow. Because it had a tendency to do so by creating money, continentals were worth close to nothing by the end of the conflict.

This led to a citizenship repulsed by how governments used the paper money machine for self-financing purposes, so much so that the American Constitution forbids the States from printing money (article I, section ten).

As in many other occasions, this cautionary tale warns about how the over-production of money creates poverty. This leads me to Hayek's paradise theory, where private banks can print their own currency and grant loans. History has tried this recipe too.

During the American Civil War, there were 7,000 different notes in circulation, issued by 1,600 banks, along with 5,500 fake notes. Each transaction entailed going to a given bank's ledgers to find out the value of a given note.

At the peak of the war, the government went bankrupt and decided to withdraw from circulation all notes issued by private banks. They were exchanged for US Government

notes, in which you had to trust and have faith.
What did banks do? Replace physical notes with current accounts. The bank was no longer printing $1,000 in its back-office and lending to customers, it simply posted the amount on their account's balance. That is how banks came back into the money-making business, so much so that they created 90% of existing money. They created money by lending. Instead of panic and frozen bank deposits to exchange the notes for the gold they allegedly represented, the panic took the form of wanting to withdraw account balances in cash.
There have been many attempts to prevent runs on banks. The boldest such attempt in the US was the creation of the Federal Reserve as lender of last resort, combined with a system to regulate deposits and investments in order to put an end to bankruptcies and runs on banks. A quite stable money-printing private-public system was achieved whereby 90% of money was produced by private players—lenders who knew their borrowers and were granted the privilege of creating money under strict regulation.
Bhidé explained how this control-based system has been gradually bent over the last two to three decades in such a way that banks can abuse their power to create money by granting loans. When money does not go where it needs to go, it is not granting credit as it should and traditional monetary policy becomes useless. Take the euro zone as an example: banks have lost their capacity to create money by granting loans. As a result, the ECB has limited measures to its avail, no matter how much it reduces interest rates.
In order to replicate the effect of traditional monetary policy, the system has been centralized and the money produced by central banks has increased while diminishing the natural money-making cycle of private banks via loans. The financial system has shifted from being a money-making system via loans to becoming an intermediation system.
Bhidé opposes the idea followed by Hayek enthusiasts. He believes they are defending the return to the first half of

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The best method to create money is via private banks who know their borrowers and grant them loans. This process must be controlled by regulators that oversee the banks.

the 19th century in the USA, when non-regulated private currencies flourished without legal support. He thinks that, as far as we know, some anonymous individual boasts being the only one who knows the recipe to create bitcoins.
Bhidé considers the best model is not complete de-regulation and freedom to create currencies or the authorities' macro-monetary policy. He believes the best method to create money is via private banks who know their borrowers and grant them loans. This process must be controlled by regulators that oversee the banks. The privilege of creating money must be restricted to those who abide by effective regulation. He believes banking freedom to be a historic mistake. It does not avoid fraud or contagion when a bank goes bankrupt. That is why he recommends letting cryptocurrencies the likes of bitcoin flourish, provided they are maintained outside of the banking system and banks do not accept them as collateral and loans are not granted against balances in bitcoins. They must be considered an asset, a choice of investment, and the profit must be taxed as is the case with any other asset.
In fact, that is how the USA is treating bitcoin since early 2014: it is property; it is not a currency for tax-paying purposes. Besides, the Securities and Exchange Commission (SEC, i.e., the American stock market referee), has issued several warnings against the potential risk of investing in bitcoin and other virtual currencies.

The Keys to the Success of Something New: Regulators Yes, But Also…

There is no trouble-free recipe to guarantee a new currency or means of payment will become widespread. Liquidity, security and trust requirements are just the starting point in a currency's path to grow. There are many other forces involved in the process of accepting a new token or system as trusted means of exchange and/or deposit of value.

It is not even true that money-related innovations are much easier to accept in developed countries, where technological developments are greater in most fields, than in emerging countries, where far less individuals use banking services. Regulators have much to say in emerging economies too. Governmental activism in the form of backing or rejecting innovations carries great impact on the market. South Korean regulation is an interesting case. After the Asian crisis at the end of the 1990s, it decided to favor credit card payments in order to make the majoritarily cash-based economy flourish, encourage consumption and increase tax

collections too.
As a result, South Koreans have shifted from being largely savers to becoming indebted consumers. It was very hard for Korean families to access credit in the 1990s

Regulators have much to say in emerging economies too. Governmental activism in the form of backing or rejecting innovations carries great impact on the market.

because financial institutions would rather lend money to businesses. Koreans now hold the largest number of credit cards per capita in the world! The solvency of credit card users was so low at a certain point that LG Card, one of the main providers, had to be bailed in by its shareholders. Last year, however, the dominating position of credit cards among financial cards was threatened by several factors—one being the government's renewed policy to favor debit cards in order to avoid a default crisis. The massive theft of 20 million credit card holders' personal data in early 2014 may have influenced the situation too.

It is interesting to watch trends such as economic colonialism: the stance of some governments in emerging countries is to believe payment systems are linked to national security, so they protect and incubate their own systems to then try to expand into other countries—colonization.
There are several cases, such as China UnionPay (CUP), the tricolor credit card association founded in 2002, present today in ATMs in Madrid, New York and many other cities across the globe.
Likewise, Vladimir Putin passed a law in May 2014 to establish the Russian credit card payment system (NSPK) following US sanctions on several Russian banks, whereby Visa or MasterCard cards drawing from accounts in those banks were blocked in the aftermath of the crisis in Ukraine. India has its own national system too.
But there are many other factors beyond the authorities' clout, such as the investment made on a specific technology's infrastructure. A case in point is the surprise experienced by many Americans traveling to Europe who see a waiter bring a POS terminal to their table, ask for a PIN code and charge the bill. Europeans, seeking to curb fraud and increase trust in the card system,

There are so many vested interests around the inefficiency of money (from central banks to banks and intermediaries), so many forces aligned against the success of new ideas, that wherever these forces are lacking newcomers will find the greater chance of success.

embraced chip technologies sooner than others. The US has spearheaded means of payment for many years and POS terminals were not implemented there precisely because billions of dollars had already been invested in payment infrastructure. A strong bet on a given technology may become a barrier to adopt something new. There are many other powerful factors, such as demography. Kenya or Brazil's largely young populations are behind their openness to new ideas and technologies.
The existing competition is also a factor. There are strong monopolies in payment systems fighting to maintain their status quo. There are so many vested interests around the inefficiency of money (from central banks to banks and intermediaries), so many forces aligned against the success of new ideas, that wherever these forces are lacking newcomers will find the greater chance of success. The existence of a large black or grey market or a basically open economy are also important factors. Another important factor is cultural affinity: some cultures embrace innovations more easily than others, and there is not one formula that works for all. This all leads to many paradoxical situations. Being an emerging economy, the development of means of payment in Brazil, for instance, is expected to be lower. However, it enjoys one of the most advanced interbanking systems in the world: you can jump from one bank to another over the internet when shopping online. Their development in this area is far more advanced than in Europe or the USA. Annual growth of online payments is above 20% and they have their own payment methods, such as the "banking ticket", enabling card-less online shopping.

The Risks of Virtual Currencies (Fraud, Tax Evasion…)

The emergence of alternative currencies poses a great challenge to regulators because they fit so well with the black market, especially when a currency such as bitcoin embraces anonymity.

As **Joshua Klein** reminded us, many bitcoin transactions take place in the black market, the so-called **deep web or invisible Internet**, who many believe to be the second global market. Taking into account that two thirds of the planet will only gain access to the Internet in the next 5 to 20 years, and that this population is using unlawful payment systems in many cases, what will happen when they become connected?

The oft-cited example of what happens with bitcoin on the other side of the law is Silk Road, a meeting place on the Internet to sell everything forbidden. The eBay of illegal products and services was shut down in 2013 and many of its promoters were arrested.

Success Cases in Monetary Innovation


José García Montalvo

Eden Shochat

Founder of Aleph & Bankinter Foundation Trustee

The Cases and Keys to Success in Monetary and Payment System Innovation

The financial world is undergoing major changes.

Mobile peer-to-peer payments implemented in Kenya, PayPal becoming the primary payment processing system for the Web, and the establishment of Hawalas alternative money transfer to avoid anti-money laundering regulations all evolved naturally in response to external stimuli. Change is on-going, with some of the recent drivers being:

Bitcoin is also inherently a settlement system, negating the requirement for symmetric trust between banks which at a minimum cause regular delays in money transfers.

- Credit card numbers becoming an increasing security liability, as in the case of the Target breach which released the details of over 100 million credit cards.

- The need to minimize the cost of transactions, especially for micropayments commonly required via mobile phones.

- The financial crisis, globalization and the need for instant, trust-less relationships between financial entities.

The blockchain is nothing less than a disrupting innovation for payment systems. Being a highly secured, distributed, low-cost ledger means it can be used as an in-place replacement for the $1B per annum interbank SWIFT messaging system. Bitcoin is also inherently a settlement system, negating the requirement for symmetric trust between banks which at a minimum cause regular delays in money transfers. Additionally, by allowing close to zero cost transactions, bitcoin can be used for anything from enabling micropayments to addressing email spam.

Despite its benefits, for it to innovate the monetary system, bitcoin needs the opportunity to demonstrate a concrete, objective advantage over traditional currencies to become a mainstream currency. This could happen bottom-up or top down: A central bank could decide to use bitcoin to implement the Chicago plan (i.e. the separation of money from credit) in an attempt to avoid future financial meltdown or future looking consumers could use bitcoin as a replacement for gold. Such adoption will have a domino effect - adoption will drive adoption.

Bitcoin emerged with no specific purpose; simply as a potential replacement for all uses of existing currencies (means of exchange, unit of account, deposit of value…).

There is another possible evolution. Some believe it is most likely to succeed. Bernard Lietaer is the architect of the euro through his work for the Bank of Belgium and author of great works such as The Future of Money: Creating New Wealth, Work and a Wiser World. He champions the creation of a monetary ecosystem, a tree of complementary currencies where each currency fulfills a specific goal and offers specific features in each function. For instance, a social currency will be stronger under a transparent system, where you can see the money flowing from one account to another. But the rules of competition render such transparency impossible in a B2B setting.

From a Single Currency to a Monetary Ecosystem: the Success of Miles

One space, one currency. For 5,000 years, from Athens to our current times, we have maintained this paradigm, based on the criterion of market efficiency, ultimately to maintain the monopoly of a single currency.

Bernard Lietaer believes we must shift from the current monetary mono-culture towards a monetary ecosystem. He challenges the theory of the single currency from a merely scientific perspective—definitely not personal, he says. On what grounds? On the grounds of his considerable expertise and the wide range of successfully co-existing complementary currencies. Have you ever used your airline miles or points to purchase a plane ticket, make long-distance calls, pay a hotel or some product of an airline catalogue? What are those miles or points but a unit of account, a means of exchange… a complementary currency, in short?

Lietaer argues that in an era of single currencies, a huge sacrifice is being made by focusing our economic theory on efficiency. We have sacrificed stability. According to Lietaer,

In an era of single currencies, a huge sacrifice is being made by focusing our economic theory on efficiency. We have sacrificed stability.

one clear example is the euro and the forcefully replaced national currencies, which countries could not maintain as an additional means of payment upon embracing the single currency. He believes we must balance efficiency and stability; they are the yin and yang of the economy. A "monetary ecosystem" or minimum diversity is needed to strike such balance.

So what happens when efficiency weighs more? Lietaer offers the example of the black-outs in Ontario (Canada) and eight American States in August 2003 that affected 50 million people; or the black-outs in Germany in 2006, affecting 10 million Europeans. This concentration in time of blackouts was not incidental or random, but rather, the consequence of efficiency prevailing over stability.

Going back to money, all needs have been entrusted to financial capital—but there are other capital needs and many other ways of establishing simultaneous systems with different types of currency. Lietaer said that the world has started to consider withdrawing the money-making monopoly from banks.

The definition of money necessarily includes fulfilling the functions of unit of account, deposit of value and means of exchange. "Why?" asked Lietaer. Why not a currency that fulfils the function of deposit of value exclusively? He believes bitcoin is currently fulfilling this function by becoming a speculative tool. Why not a currency that fulfils the function of means of exchange exclusively?

We live under the idea that creating a currency generates inflation and that oversight is needed to control this risk. But the case of a commercial currency, such as the well-known miles, has operated for forty years and it would not have worked under strict surveillance. Miles have met a need of airlines: locking the loyalty of their users and using free seats. When managed correctly, it does not generate inflation. Of course there are "black-out" periods, to continue with the same metaphor. Don't even try to use your miles on Christmas (but it must be this way).

The good thing about miles is that their only purpose is to serve as miles. They followed the same philosophy before

and after the crisis, which refutes the idea of the crisis multiplying the currency phenomenon.
Lietaer has developed the idea of a currency called Terra, based on the value of a basket of goods and services. It is a potentially global currency, similar to the one in place under the Egyptian dynastic system or in the European Middle Age, when a currency with a negative deposit rate existed—a fee for parking your money to make it flow constantly. This currency would only operate as means of exchange. Because of the negative rate, it would not be used as deposit of value. According to Lietaer, precisely because it is based on the value of a basket of goods and services, it would mitigate another big risk of currencies and their issuance: generating inflation.

All needs have been entrusted to financial capital-but there are other capital needs and many other ways of establishing simultaneous systems with different types of currency.

Time Banks and the Dreamed Currency

Einstein is given credit for discovering that time is money. According to Bernard Lietaer, Edgar Cahn, the Law professor who wrote Bobby Kennedy's speeches, is better known for promoting and implementing the time bank--currently operating in 22 countries. Cahn came up with the idea during a hospital stay as he recovered from a heart attack. He realized that he depended on others for the first time in his life, and he could not pay for the services of health-care professionals.

In economics, global flows of money, small and big businesses and the economy as a whole co-exist with people who just do not have enough money but they do have instead unused resources, such as time. Complementary currencies create a link between both, explained Lietaer.

American authorities, led by New York, are encouraging the use of time banks because they solve social issues that would

In economics, global flows of money, small and big businesses and the economy as a whole co-exist with people who just do not have enough money but they do have instead unused resources, such as time.

otherwise cost many taxpayers' dollars.
There is a slightly different version of this model in Japan, the country with the oldest population in the world, in relative terms. In 1995, there were 1.8 million people in Japan who needed daily care other than medical care. Meeting this need under the standard monetary system would bankrupt the country. Insisting on doing so with the same all-purpose currency leaves two options: you either spend increasingly less money per capita (in the words of Lietaer: "If there are more people feeding from the same pie, you must cut smaller pieces"), which has been the choice of Anglo-Saxon countries; or you keep your promise and allocate the same amount per person, ultimately going bankrupt.
However, there is another option outside the single currency system. Japan created a national currency that uses time as the unit of account: the Fureai Kippu. You can do something for your neighbor and earn credits that can be then used when you are sick, so that someone will pick up your children from school, or care for your ailing elderly mother faraway. Lietaer mentioned how we will all unavoidably face that problem. It is a matter of time.
Lietaer experienced himself another successful case of complementary currencies. In 2010 he became the head of a project to improve a very conflict-prone community in Ghent (Belgium). Some 7,000 families, out of which close to 50% were first generation Turkish immigrants, had been neighbors in a conflict-prone Flemish community for two decades. Throwing trash on the street was one basic problem. What did they do? They asked the neighbors what their dream was; what really mattered to them and just could not become true in that neighborhood. This is what they answered: a small garden. These people came from Anatolia, from 20 generations of small land-owners, and they now lived in the tenth floor of a social-housing project with no space to see their children grow up amidst nature. Lietaer and his team found some land nearby that once belonged to a currently bankrupt manufacturing plant and was

"If there are more people feeding from the same pie, you must cut smaller pieces"amount per person, ultimately going bankrupt.

now public property. They divided it in 4-sq.-meter plots. The only way to get hold of a plot of land was renting it. The rent could only be paid in an ad-hoc created currency: toreke. "How could they get hold of torekes?" was their first question. And of course Lietaer's team provided them with a list of ways to earn torekes, which was the very list of problems that had to be solved. Putting a label on your mailbox asking not to leave publicity earned you one toreke. Putting a flowerpot on your window, 10 torekes. Keeping your neighborhood clean, many more. The only way to legalize their work was to sign them up as volunteers, since they were paid in a non-legal currency. The demand was so high that the projects initially devised were completed and they had to come up with more.

WIR, the Other Swiss Currency

Financial crisis may be the perfect time for the emergence of complementary currencies—the key to stability, as time has told us. Lietaer presented the case of WIR, the Swiss complementary currency created in 1934 by businessmen Werner Zimmerman and Paul Enz to avoid the credit crunch of the Great Depression.

The WIR is exchanged one for one with the Swiss franc. Initially, it was created for business exchanges exclusively, but a few years ago the WIR Bank started to let retail customers open deposit accounts—first in Swiss francs, but then the account holders were offered the chance of opening accounts in WIR.

The WIR is not printed; there is no paper or coin in circulation. It is a fully virtual currency used in credit-card or bank account transactions. Lietaer believes it is "the secret weapon of the Swiss economy, the reason

The WIR is not printed; there is no paper or coin in circulation. It is a fully virtual currency used in credit-card or bank account transactions.

it has been more stable than the neighbors' for the last 80 years". Articles mentioning the WIR are published regularly, but its existence and weigh in the Swiss economy are not generally known, basically because it breaks the paradigm of the single currency. However, the WIR Bank is a dual-currency bank taking part in one in every four Swiss businesses. Unlike traditional currencies, the WIR goes against the cycle of liquidity, acting as a stabilizer of the Swiss economy. WIR has successfully achieved what central banks have only attempted and more quickly, since it is a space restricted to corporate exchanges only.
The other side of this experience is the adoption of the euro as the single currency in part of Europe. Lietaer believes some countries (Greece, for instance) should be able to maintain their national currency or use a complementary currency now, despite having signed into the euro in 2003. He wonders why can't Greek citizens accept euros and use a local, regional or national currency at the same time. When the euro zone was formed, the UK picked the smartest option: it is "in it but assumedly out of it". A company that earns most of its revenue in euros can file its reports to official British bodies and pay taxes in euros. Your choice. Therefore, this is a dual system.
Why haven't central banks contributed to the existence of complementary currencies? He asked during the sessions. The answer is clear to Lietaer: the goal of central banks is not to support the economy or society, but rather, to defend the banking system and its monopoly of money. As the alternative is not big enough, they are not concerned. However, as it gains weigh, they intervene.

M-Pesa: Kenya's Mobile ATM

There are other successful recipes that have nothing to do with Lietaer's ecosystem, but rather, with an unmet need in geographies with low banking services. A useful, multi-purpose payment system can become strong and outpace the growth of others in a given region. Only four million Kenyans hold bank accounts, whereas ten million Kenyans use M-Pesa mobile money transfer systems.

M-Pesa (Pesa means money in Swahili) is the mobile money service offered by Safaricom, a formerly state-owned company (the Kenyan Government still holds equity) where Vodafone currently holds a 40% stake.

Through M-Pesa, money is increasingly becoming mobile money in Kenya—the leading country in financial inclusion through mobile phones in Africa. In Kenya, money is exchanged through mobile phones when making wire transfers or paying bills.

Until M-Pesa was created, in-

Only four million Kenyans hold bank accounts, whereas ten million Kenyans use M-Pesa mobile money transfer systems.

dividuals living in big Kenyan cities sent money to relatives in rural areas through the bus service or any other informal route, for instance, hiring companies that did not have a license to transfer money. As you can imagine, it was a risky practice. M-Pesa opened the door to financial inclusion nation-wide, and the banking landscape is now changing in Kenya. The system is increasingly bringing more people into the financial system and opening the door of banking services to more individuals. Besides, it is quite a lucrative business. Safaricom billed $303 million in 2013 basically thanks to M-Pesa.

Because of the successful implementation, Michael Joseph, CEO of Safaricom since the launch of M-Pesa until November 2010 and currently non-executive advisor to the company, led within Vodafone an initiative to launch the service in Romania. This decision marks a milestone: a successful technological innovation develops in Africa and is then applied in Europe, instead of the other way around. It is also interesting that it is believed it will work anywhere, once it has demonstrably worked in Africa.

So why did M-Pesa work in Africa? A key answer is efficiency. Another successful case of innovative means of payment illustrates how important efficiency is. In this case, the scenario is Nigeria, although once again it is a Kenyan player, the subsidiary of Cellulant, who strikes a deal with the government of Nigeria to send to farmers nation-wide the aid to buy fertilizers through virtual mobile wallets. The system eliminated the cost of corruption—much more expensive for the Government—and provided 1.2 million farmers with access to aid. The goal now is to get to 2 million. The lesson to be learnt is that a mobile money system can be very useful in an agricultural society, since there are efficiencies obtained when the money is sent to the right person.

Another area that has proven the effectiveness of mobile money is small businesses. **Juliana Rotich** presented Nairobi's ToyMarket in a video clip. It is well known among tourists for its hundreds of second-hand clothing stores opening every Saturday. Companies such as KopoKopo have

found success in the numerous small transactions taking place in one location—the business model of KopoKopo is such that the company has received significant funds from Silicon Valley. KopoKopo offers the service Pay by M-Pesa, so that small purchases or café orders are paid through M-Pesa. KopoKopo—the name comes from kobbohkobboh, which means money in Sierra Leona—incubated in Nairobi's iHub. It has grown into a great business and opportunity.

Another interesting point are integrators. PesaPal offers online transactions with mobile money using MPesa but also Airtel and other systems.

And finally, what role did the Kenyan government play in the success of initiatives the likes of M-Pesa? Quite a significant one, according to Rotich. Kenya allows innovation to go a step ahead of regulation. When mobile operators started offering banking services and payment systems through mobile phones, they were in a regulatory vacuum. The government did not think of requesting banking licenses to operate. This is not the case at all in other countries. Take South Africa, for example. It is slightly more difficult to enter this market basically because the government has regulated mobile banking. Rotich believes that innovative systems work when governments allow mobile operators to develop innovations in user services. "If a country's government is committed with financial inclusion and tolerates liberalization, a system's chances of success increase exponentially", said Rotich. "That was essential for Safaricom, which is partly owned by the Kenyan government". Other countries should learn that it is best not to regulate until the usefulness of a service becomes apparent to users.

These innovations around mobiles have shifted the strategy of a major bank, Equity

Juliana Rotich

Executive Director for Ushahidi and Bankinter Foundation Trustee

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Bank. It has recently launched a virtual mobile operator in Kenya based on two previous attempts in 2010 and 2011 respectively. It is a way of saving money and transferring money from Equity Bank accounts to mobile wallets, which didn't work very well in the past. Equity Bank is giving it another go along with Airtel at much lower fees, starting at 1%.

In any case, this is yet another case in a lively competitive environment, showing how things are bound to change radically in a couple of years. Kenya is a case of what has worked in emerging countries. M-Pesa could evolve towards a truly virtual currency, explained Rotich, because at the current pace, physical coins might be rendered unnecessary. If your salary goes to the virtual wallet you use to pay all sorts of services (staples), money will no longer exchange hands physically, but rather, over the phone. It might take some time, but services will become increasingly ubiquitous and this situation will become more likely.

When asked about the possibility of bitcoin making a strong entrance into Kenya based on M-Pesa's success, Rotich said that there are actually some people analyzing that in Kenya already, but more interestingly, she said: Kenyans choose brands because they make them feel secure, comfortable. Branding campaigns should explain thoroughly how bitcoin works before widespread adoption is achieved.

Gerald Brito said that interestingly bitcoin, as opposed to M-Pesa, does not need a mobile carrier, (in this case, Safaricom). You do not need to convince a company. Unlike the launch in Romania of Vodafone's Kenyan success, all you need is Internet connection, because the bitcoin protocol works with any operator. But there is another interesting point for Brito: interest rates. As you could see in M-Pesa's presentation, Kenyans trusted the system mainly because they went to a physical store with Safaricom agents, where they would exchange their cash for money sent elsewhere at a given exchange rate. "That is the challenge of bitcoin: creating trustworthy agent posts" that apply the right exchange rate. According to Rotich, agents

"If a country's government is committed with financial inclusion and tolerates liberalization, a system's chances of success increase exponentially".

Kenyans choose brands because they make them feel secure, comfortable. Branding campaigns should explain thoroughly how bitcoin works before widespread adoption is achieved.

have been essential to M-Pesa's success. They started with 17,000 agents in 2007 and they now have over 78,000 agents. It is a huge distribution network. Equity Bank, for one, is now replicating that strategy as part of its plan to launch a virtual mobile operator with Airtel.

88 chapter 5

Where We Are Headed


Garrick Jones
BEZOYA

Joshua Klein

CTO at IMAX Labs

"Where We Are Headed"

Disruption is hard to analyze, understand, or predict. It's even moreso when it occurs across multiple markets, technologies, policies, and geopolitical lines very quickly and all at once.

But that is where we are headed. The good and bad news is that it's a future fraught both with significant risk and great opportunity. From the rise of cryptographic currency alternatives like Bitcoin to growing problems with capital and financial restrictions in places like South America, a huge variety of commercial disruptors are poised to change finance across the globe.

In many ways this represents challenges which are seemingly insurmountable. The rise of the black market globally, potential new systemic financial crisis, and the increasing competition between corporatebased exchange systems vs governmental ones are all viable risks presenting few obvious preventive or mitigating

In terms of technological innovation, it is that we can only find success through ongoing adoption, experimentation, and adaptation.

strategies.
But with great risk comes great opportunity. As an example, emerging economies often have huge challenges in terms of corruption and infrastructure, but are simultaneously unprecedented circumstances for leapfrogged technological progress. A massive appetite for convenient, reliable, and flexible exchange services means that the right player providing the right combination of services could enter and secure the pole position while unlocking a tidal wave of commercial exchange.
Similarly, cryptocurrencies are plagued with unanswered questions about consumer adoption, regulatory response, and sustainability. Yet at the same time, a plethora of new services, altcoins, and blockchain technologies are rocketing forward based on what appears to be an unprecedented market fit for the technology.

What is important to remember is that these many dynamic elements cannot be circumvented through a policy of retreat or consolidation.
If we have learned anything from the last few years, particularly in terms of technological innovation, it is that we can only find success through ongoing adoption, experimentation, and adaptation.
That's actually good news. We don't know where we are headed, but we know it will include significant changes towards a more diverse, complex, and interrelated future. What follows are some indications of where to begin understanding that future. Let's get started.

Threats, Opportunities and the Role They Will Play:

The future of currency may be analyzed through the eyes of each player. What are they expected to do? What threats will they encounter down the road? What are their opportunities? Who will support them? Who will challenge their intentions? The attendants to the sessions on the Future of Currency worked in groups first and then all together to analyze all angles. These are their conclusions:

Commercial Banks

Digital platforms are playing an increasingly larger role in financial services. Amazon, for instance, will most likely be granting loans in five years. These companies will provide personal services through alternative currencies—such as the WIR in Switzerland—in order to stand apart from traditional banks.
The risks of bitcoin's evolution are a threat to this model. If alternative currencies become a tool of speculation and end up in fraud the day of tomorrow or collapse for some reason, the entire alternative currency system will be affected, thus reinforcing the position of the traditional system and closing the door to the arrival of alternative currencies.
What opportunities are there? Banks must start offering new services and alternative currencies will boost trade transactions.
An example of innovation in payment methods among banks is Bankinter's recently launched virtual mobile card (VMC), one single smart-phone app to enable the use of debit and credit cards without carrying them on you. Usability, simplicity and security have been essential in its design. There are just four steps to take: download the app to your phone, install it, request the card at Bankinter.com and link it to the desired credit and/or debit cards and sign up. Once the four steps have been completed, you may make payments over the Internet or contactless payments in stores with the mobile app using a unique PIN code for all linked cards. The VMC is renewed for each new payment, making the system extremely secure.

An example of innovation in payment methods among banks is Bankinter's recently launched virtual mobile card (VMC), one single smart-phone app to enable the use of debit and credit cards without carrying them on you

Central Banks

Monetary authorities are predicted a future far from glamorous, rather somewhat risky. The counterparty and payment system will be brought up to par with XXI century standards, but there will be less transparency. This will distort

The biggest threat of all for central banks is the possibility of a new systemic financial crisis.

the actions of market players who watch for signals sent by the Fed when they become too obvious to make business decisions.

The biggest threat of all for central banks is the possibility of a new systemic financial crisis, because of the unpredictable actions of monetary authorities, now that all available tools have been used already and the willingness to cooperate among countries is no longer the same as in 2008. A new crisis would therefore become harder to manage.

Even if it does not materialize, another big threat is how to undo Quantitative Easing (QE), undertaken by both the Fed and the Bank of England: how to solve a problem stemming from the billions of dollars created and (for the most part) unused out there—just deposited with banks or the Fed. For the time being, there is no known plan, which is a challenge in and of itself. Amar Bhidé, however, considers this might play to the advantage of central banks: their hands may be so full undoing QE that they will sweep everything else under the carpet so as not to be distracted from this task.

The huge gap currently existing between political parties in Washington is also a threat for central banks, as is the rise of extreme right and left wing parties in Europe that argue in favor of breaking the euro. The fact that the USA cannot ask for the same level of collaboration from China as it did in 2008 is also a threat.

The harmony that existed in the world in 2008 has now vanished.

Retail Trade

The group working on this forecast contributed with groundbreaking insight—notwithstanding the immediate, initially minor impact of alternative currencies on retail trade, focused on reducing transaction costs and facilitating international payments. Their insight, inspired by Bernard Lietaer's remarks on miles, revolves around the possibility of setting up a new loyalty program based on an

alternative, liquid currency that can be saved, valued and exchanged. These characteristics would increase the value and the opportunities of the program exponentially compared with traditional loyalty programs—including mileage programs, where you can only gift miles to a third party by donating or acquiring them under the terms of the airline. By way of example, they described a pet food company

Paying in a currency such as bitcoin would offer immediately available capital, ultimately leading to much more efficient businesses.

that would create the petcoin. You could save it, gift it to a third party, exchange it for products and services and it is valued outside the program. Eventually, the more people with petcoins, the more valuable they would become, thus offering users an incentive to bring in more users.

Along this line, Eden Shochat said that paying in a currency such as bitcoin would offer immediately available capital, ultimately leading to much more efficient businesses. For example, in advertisement networks and supply chains, there sometimes are so many links in the chain from the advertiser to the editor (and lack of trust among them) that the payment from one end to the other may take 180 days. Using bitcoin would improve the margins of this business.

Moe Levin pointed out two advantages: bitcoin (and the rest of cryptocoins) offers the choice of accepting borderless payments (and transferring the savings to the consumer) and creating intragroup currencies.

Michael Schrage believes Amazon will launch its own currency in the next five years (it already has, but as Félix Moreno noted, for the time being it is more of a point system than a means of exchange) and will overhaul the market, being a company very keen on disruptive innovation. The delivery drones are proof of their disruptively innovative nature: a signal for markets to see how Amazon intends to become the game-changing player. Because of their abilities, he considers this type of players a short-term threat for traditional retail sellers.

Walmart or Amazon may generate trust in their brand, but Levin considers as well that knowing the company will not print money and destroy the value of the existing mass is partly behind such trust. The

big US technological companies are taking steps in payment methods lately, such as the recently announced Apple Pay. It is not about a new currency, but rather, a way to pay over the Internet and in brick-and-mortar stores using Apple devices.
By the way, **any foreseeable contributions to this revolution from European companies? Silence.**

Card Systems

The group working on this subject concluded that payment systems won't change much on the front-end over the next five years. The back-end, however, unseen by end-users, will radically change protocols and point-to-point connections. Transactions will become more transparent and—as mentioned above—new players will come to take over the banks' game: telecom and technological companies (take Kenya's example) will extend to other areas services hitherto reserved to banking, thus posing a threat to the banking system.

Transactions will become more transparent and -as mentioned above- new players will come to take over the banks' game: telecom and technological companies

Greg Kidd mentioned a short-term opportunity in this regard: we are now used to owning the phone number we take from one carrier to another. Something similar could happen in the financial industry if the user becomes the owner of their banking identity and accounts. "People wish to do whatever they want with their money, instead of being told what to do". Given this scenario, private data would no longer be controlled by corporations—users today ignore where these data are or what they are and how they are used, they are forced to trust they are being treated correctly "as if it were an ideology". Corporations will manage the minimum data necessary to perform transactions. We will experience a truly user-centric environment with privacy à-la-carte.
Portable personal data owned by the users create a very different landscape from the latest developments in the crisis-ridden world of big data,

first because of security breaches like eBay's, and second because of the EU measures against Google to protect user privacy.

There will be opportunities in education, investment in ideas such as AirB&B or Uber and a business opportunity for hackers.

Consumers

There will be over 5 billion people online in 5 years, equipped with smart phones and profiles on social networks. This is a massive social-network driven online market on the rise in financial services, healthcare and educational systems, which need to overcome a basic hurdle: interconnection among different platforms.

Threats may become business opportunities. Therefore, when security is a threat to consumers, insurance and other services may jump in to this new growth area.

Considering the fear of new technologies a threat (an evident barrier to innovation), the opportunity for financial services lies in educating policymakers online. Google or Facebook can be seen as financial services providers, but they will need to educate.

Besides, there will be opportunities to reduce wire transfer costs, a wealth of new products and their (much cheaper) online payment.

In order to achieve this, consumers, that is, citizens, can act now to demand as soon as possible more financial services from companies and use their voting power in favor of innovation-promoting—instead of overregulating—politicians.

Educating through actions as the Bankinter Foundation of Innovation does also contributes to a more innovative society. There will likely be public-private associations to promote change as well.

there will be opportunities to reduce wire transfer costs, a wealth of new products and their (much cheaper) online payment.

Tell Me Where You Are from and I'll Tell You How You Pay

Developed economies vs. Emerging economies. Europe vs. United States. China vs. Rest of the world. Geopolitics. Globalization. Controlled vs. Open Markets. The world—and its currencies—is a chess game and its current trend and situation may contribute to shape out a different future, based on the geographical area and area of influence in question.

A future for currencies and alternative payment systems, with their advocates and detractors, foreseeable and unforeseeable milestones leading change and business opportunities for whomever is ready. The XXII Future Trends Forum on the Future of Currency analyzed as well the potential evolution of currency from a geographical perspective.

Asia

The demand from billions of consumers in Asia, especially online, may plant the seed of some type of alternative currency. However, the idiosyncrasies of Asian (particularly Chinese) leaders are massive geopolitical powers to bear in mind. There is general interest in Asia to level the playing field and dominate currencies and Western economies—this growing interest will advance its agenda as the Asian economies grow. Therefore, they are not likely to reject cryptocoins or embrace a universal, global [cryptocurrency] either that may escape their area of influence, but rather, encourage a regional cryptocurrency kept under their own control.

Chinese -and Russian- authorities will find much less resistance to use information for greater control and influence when monitoring transactions.

Technological companies, Alibaba and the likes, will be driving this movement as well as the big regional authorities, such as the Bank of China. And probably the ECB too, given its flair for structured solutions—radically different from American open market solutions.

And on the other side of the tug of war, against the emergence of a strong, Asian cryptocoin, the US will simply oppose any alternative that may upstage the dollar as the world's reserve currency; positioned alongside the established payment systems, such as Visa, MasterCard or Swift.

In their progress towards their own model, China, India and others will most likely seek a fusion between currencies, economies, social networks and—in their own version of Big Data—they will use analytical forecasts to foresee economic and currency-related changes. A Google-like evolution to deploy a broad strategy where big data and analytics are useful to boost growth.

The success of this model in Asia—precisely when it is being questioned in Europe and the USA—is feasible because of the cultural and institutional difference regarding privacy in Europe (privacy dominates the discussion), the USA (the issue is on the table) and Asia (not so important). Chinese—and Russian—authorities will find much less resistance to use information for greater

control and influence when monitoring transactions.
This scenario of an alternative currency in Asia may receive the final boost from a crisis in china itself, a burst euro bubble or yet another crisis in the USA.

Latin America

Among the needs to be met in this region, a solution must be found to the endemic instability, inflation and currency devaluation: the scourge of countries such as Venezuela and Argentina. Because they have grappled with these problems for so many years, they have generated an urgent need to transfer and save wealth securely.

Controls on capital and financial restrictions are also the rule in Latin American banking systems, namely, Brazil, Peru and Guatemala.

Controls on capital and financial restrictions are also the rule in Latin American banking systems, namely, Brazil, Peru and Guatemala.
The remittance market and foreign investment in countries such as Mexico, Ecuador, Bolivia, Chile, Peru and Guatemala open a massive market to alternative currencies and new international transfer systems.
The fact that millions of people without access to banking services are accessing the world online adds up to the already existing opportunities. Brazil is a clear example of an increasingly broader market where it is very hard to open a bank account... so much more than having a mobile number. Colombia and Bolivia are other examples.
Given this situation, it is noteworthy that other factors, such as financial privacy, are gradually disappearing, as everything is transitioning to the online world. The FATCA in the United States and similar laws emerging in other OECD countries will play an important role in the future.
Property rights are also a need to be solved: they open a window of opportunity to alternative currencies, since in Latin America, for political reasons or lack of infrastructure to record them, it has historically been very complicated to exert such property rights.
Both cryptocurrencies and wealth-recording block chain

Over the next five years, the greatest change looming in the horizon is ubiquitous Internet access. Millions and millions of individuals without access to banking services and people with little property rights will connect to the Net over their mobile phones.

technologies may play a very relevant role in Argentina, Brazil, Venezuela or Colombia.

Over the next five years, the greatest change looming in the horizon is ubiquitous Internet access. Millions and millions of individuals without access to banking services and people with little property rights will connect to the Net over their mobile phones, Google's Loon Project (seeking to connect people in rural and remote areas around the planet with a network of high-altitude balloons) or new satellite technologies. A new market is opening up for the adoption of cryptocoins and experimentation and bitcoin is in the pole position. It is the most popular cryptocurrency, which multiplies its chances of playing a leadership role in this change.

The first champions will be consumers: this is a bottoms-up movement. Migrants and telecommunications companies in search of new markets and lacking the political contacts to do so—despite having the services—will join them. Most likely, retailers and service companies will also opt for this approach. Broadly speaking, all players with a clearly defined market niche will.

The stark leading opponents will be governments. It would not be unheard of for members of Latin American governments to use cryptocurrencies to get money out of the country, instead of going for the traditional suitcase packed with notes in the next currency crisis, while their official discourse casts off alternative currencies just because they are beyond their control.

We infer Honduras will act of its own volition. It has already mentioned its intention to launch city-wide projects with legal virtual currencies. Honduras has been defending a common urban development model in the region for years. The initially named RED and then ZEDE (Spanish acronym for Areas of Employment and Economic Development) seeks to bring together low tax regime, free trade and regulation for its citizens. The Honduras Congress has even modified some articles in its Constitution to move forward with this

Innovation might also be helpful to avoid the trap of lawlessness faced by business people in certain countries, such as Venezuela

project, which has encountered the stark opposition of the national Supreme Court. The first attempt at Start-up Cities failed, but the reformers in Honduras have not yielded.
We will most likely witness another monetary collapse in Argentina or Venezuela in the next five to ten years, and the Brazilian economy may collapse, which will have an impact on the exports market and therefore, international capital transfers.
The discussion contemplated monetary innovation in Latin America, brought by outlawed players—the black and grey markets looking for alternatives. The question is, how will new systems comply with the informational requests of governments without offending their users?
Nevertheless, innovation might also be helpful to avoid the trap of lawlessness faced by business people in certain countries, such as Venezuela, where if you want dollars to make payments, you will only get them via outlawed companies. The possibility of paying with a cryptocurrency such as bitcoin will make dollars in Caracas unnecessary.

West Africa

Change in Africa is not led by banks, but rather, companies from other industries, namely telecommunications. The first level needs that will boost alternative systems are security, stability and reputational issues, seeking international, local and multinational interoperability.
There is also a need for a currency backed by some type of product, such as cocoa, to deter the capital drain, one of the biggest problems in West Africa. The moment it is harder to take capital out of the country, national economies will benefit. Hence considering the potential development of dual monetary systems in countries where there is an international currency but also a local currency basically used for local needs in order to accelerate development.
Conflict between regulators and alternative currencies is likely to increase over the next

five years. Integration among all new systems may be necessary. Besides, identity linked to the mobile phone is likely to gain significance.
And 99% of society will favor change, while 1% (the governments) will be against it.
Existing instability in current financial systems will coexist with the widespread access to cryptocurrencies and alternative payment systems.
Let's take the case of Nigeria, the biggest economy and the most populated country in West Africa. The current mobile penetration rate (6%) holds great opportunity and potential. Besides, according to some statistics, a high percentage of the population (58%) is in favor of virtual currencies in countries such as Kenya. Africa seems to be fertile ground for the future of money.
However, not just any innovation will do. In times of high volatility due to inflation or deflation, society may embrace some version of user-friendly virtual currency. In this case, it will be interesting to see if maintaining the system's secrecy (the possibility of sending money without linking the name of the sender to the remittance or the reputational gain) prevails or not. In highly corrupted places, secrecy will be initially requested, but if the new systems are used to create a reputation, they might be useful precisely to reduce corruption.

Besides, according to some statistics, a high percentage of the population (58%) is in favor of virtual currencies in countries such as Kenya. Africa seems to be fertile ground for the future of money.

Europe

Thinking about the future of the Old Continent and applying forecasts to the world of currency offers opportunities, even though Europe seems to be in a low-employment, low-economy environment right now.
Precisely in this environment, consumers will try to monetize their illiquid resources through alternative economic alternatives in order to surmount the scarcity of jobs.
Nevertheless, when economic activity is low and credit is scarce—as is the case in Europe—companies need a more

efficient payment system.
Mobile banking will push innovation in the right direction to meet this need.
In five years time, we may very well see some monetary systems (limited in scale) growing to reach a global scale supported by a social network that adds it to their business.
This possibility is very real especially when applied to the young population, which is very much inclined to use social networks.
Consumers, companies, social networks and Internet companies will favor change in Europe.

When economic activity is low and credit is scarce companies need a more efficient payment system. Mobile banking will push innovation in the right direction to meet this need.

The ECB and other financial regulators will be against it, and quite unwelcoming towards the development of virtual currencies, along with tax authorities, that will oppose collaborative economy initiatives and alternative currencies by and of themselves because they are not a means of change but an investment rather, and therefore need to be taxed.
The banking system might also oppose change if they see their leading role dwindle.
On a positive note, there will be local bottoms-up initiatives meeting a top-to-bottom movement promoted by some player(s) trying to coordinate different initiatives as they arise. Negative scenarios that might come into place may basically be the result of hostile regulators and the fraud and security risks of the new systems.
The milestone that will turn around it all might be in the hands of citizens and their behavior in an environment of low employment and poverty. There might be a point where their trust massively shifts towards alternative currencies, given their lack of trust in traditional currencies. And this might be a decentralized effort.
However, as mentioned in the discussion, it could come from a new crisis of the sort of what happened in Cyprus (the very moment when the adoption of bitcoin in Europe multiplied, or at least, when the cryptocurrency has received the most publicity in the Old Continent). In a similar scenario, the boost might be even greater.
Europe was also seen as the location where local currencies might be taken up more easily in specific locations alongside the single currency, rather than big-scale adop-

The milestone that will turn around it all might be in the hands of citizens and their behavior in an environment of low employment and poverty.

tion of a full replacement, such as bitcoin or litecoin. Focusing the block chain on this scenario with a specific currency might make it negotiable and generate multiple local currencies from the bottom-up. The example of a shared building where there is a high-speed currency that cannot be used outside the building, but rather only in the workplace, increases the financial activity. The next step would be for this currency to be exchangeable in a different building. Interestingly enough, these parallel currencies might work as stabilizers, as was the case in Switzerland with the WIR. In ten years time, after an initial coexistence, they might even replace the current currency.
Bernard Lietaer considers that bitcoin (which is not a complementary currency) has no chance in Europe, where no European government might accept it. There are other models of actual complementary currencies, including those referred to conventional currencies—a potential new Drachma.

USA

Who will lead the change in the USA, where the monetary authority is stable; the payment infrastructure is ubiquitous, convenient, works fairly well and is fairly efficient?
The pressing needs we have described among customers in other geographies are not experienced by consumers in the world's first economy. Therefore, change towards the new monetary scenario will most likely be led and unleashed by companies; even if the next step is making sure a critical mass of consumers adopts freshly marketed innovations.
The natural path to growth lies in the many retailers with operations in the United States seeking to tap into new markets, such as Nigeria or other African countries. These retailers face multiple hurdles nowadays, in the form of expensive cross-border payments. Innovation could cut the price of such payments and thereby enable trade with currently avoided areas.
The possibility of some mi-

lestone or crisis occurring to accelerate the shift towards a new monetary and payment system in the United States might happen—say, a liquidity or credit crisis—but in this case the analysis focused on currently unmet demand needs that would facilitate the evolution without going through a disruptive process as a result of a crisis.

Of course there is ample room for innovation in the black market, be it in gambling or pornography, but the strongest areas of demand must not be necessarily illegal. Micropayments are one example. Historically, electronic payment methods have not met this demand before basically because it is too expensive.

Another evident trend will emerge from the opportunities offered by online trade. Currently, only 8% of US trade is done online.

Another evident trend will emerge from the opportunities offered by online trade. Currently, only 8% of US trade is done online. The remaining 92% is offline. The shift is evidently looming in the horizon, since everybody carries a phone in their hands, and it will likely extend the use of alternative currencies and new payment systems too.

Silicon Valley will advocate for this change and provide strong financial support to an ecosystem of cryptocoins, as well as retailers, because of the above-mentioned possibility of accepting cross-border payments while reducing current costs (at 5 or 6% of the transaction) down to 1% of the transaction value.

Traditional money transfer systems, such as Western Union, capturing 10% approx of the transaction value they intermediate will be on the other side, since they clearly have much to lose with this new scenario. And big banks, which make business on the currency exchange, will join their ranks.

Card networks (basically banking networks as they are today) might open up to other types of large volume issuers, regardless of the currency used.

The role of the Government will be twofold, and they will need to find the exact measure in between. On the one side, their obvious interest in maintaining control over payments, and on the other, legislating for the good of companies bringing wealth to their countries—that is, the innovative companies.

We take for granted that the benefits of trading under the new systems will be publicly discussed shortly, increasing the readiness of retailers to adopt cryptocurrencies such as bitcoin. The question remains of what customers will do. As mentioned above, the potential demand is not great, basically because there are no big problems to solve and force the rise of cryptocurrencies, as foreseen in Latin America or possibly Africa.

We take for granted that the benefits of trading under the new systems will be publicly discussed shortly, increasing the readiness of retailers to adopt cryptocurrencies such as bitcoin.

The question in the USA is, what value does the bitcoin wallet add to consumers? If a big US technological company with a billion consumers accepts bitcoin, creates its own cryptocurrency or a new payment system, there is huge potential to encourage the use of these currencies globally; so much so that they could become the great, game-changing milestone.

Futurology. The Monetary World We Leave to the Next Generation

What could happen over the next 20 years? What changes in trade, financial markets, governments, society or other milestones may shape a timeline leading to the monetary universe and payment system of the future generation?

With the help of the experts at the forum, let's look forward up to 2025 and imagine the change that could in turn modify the future of currency. Some shifts are complementary, others are excluding, and sometimes the same foreseeable event may happen in different scenarios, depending on who predicted it. It is about exploring the possibilities in an ever-changing world and being prepared for whatever might come.

2014

- eBay starts accepting bitcoins (which in fact has already been announced through Braintree).

2015

- bitcoin is no longer anonymous.
- The first bank accounts in bitcoins are opened.
- Fingerprint-signed mobile payments become widespread.
- The price of bitcoin reaches $5,000.
- China announces it has gold reserves above 5,000 tons.
- Massive migration towards countries that encourage the use of bitcoin.
- Foundation of an international organization bringing together alternative social currencies.

2016

- The bitcoin wallet is embedded into iPhone and Android terminals.
- Slovenia accepts tax payments in cryptocurrencies.
- The price of bitcoin reaches $10,000.
- The first bonds in bitcoins are issued into financial markets.
- The bitcoin is declared illegal in most jurisdictions.
- Euro crisis.
- Facebook becomes a financial service provider and a trade platform that accepts bitcoins.
- Alternative currencies enable exchanging education for employment.
- The largest commercial chains adopt alternative currencies for their intra-border trade.

2017

- The Chinese bubble bursts.
- Big social upheaval in Europe and the USA.
- The Fed and the ECB restrict alternative currencies.
- The biggest financial institutions acquire and accept bitcoins.
- Bank alliances based on bitcoin.

2018

- Amazon accepts payments in bitcoin.
- There are over 100 million bitcoin users.
- The IMF issues a billion dollars in SDR (reserve asset in substitution of national reserves).
- USA moves to defend the dollar.
- Currencies from big commercial brands abound and are widely available through exchange networks.
- Russia lifts the prohibition on bitcoin.

2019

- Financial crisis in China.
- The Fed cannot change the rates and the US Treasury cannot sell long-term bonds. International trade and capital flows dwindle.
- People become used to living with less income. The demand for highly remunerated jobs falls.
- A social cryptocoin promoted by new generations fully rejects traditional currencies.

2020

- Big Data enables the perfect vision of trade and financial flows in order to fight against corruption and increase the growth of the world's GDP.
- Massive tax evasion through cryptocurrencies provokes regulatory change.
- The Satoshi Foundation surpasses the Bill and Melinda Gates Foundation in donations

- A new non-deflationary cryptocurrency appears.
- Big banks accept deposits in bitcoins.
- A majority of companies opt to allow payments through
- Facebook based on the trust of their users.
- Investment and insurance products in cryptocurrencies.
- A non-decentralized, verifiable great ledger appears globally.
- Cryptocurrencies are introduced in mobile banking in Africa.
- Alternative trade in Europe with currencies other than the Euro surpasses trade in Euros.
- LinkedIn becomes the tool of choice for companies to accept cryptocurrencies.
- Bitcoin collapses and is replaced by a new cryptocurrency.

2021

- Central Banks inject massive liquidity, provoking inflation and therefore, the population massively accepts cryptocurrencies.
- Micropayment methods based on geolocation systems make it unnecessary to carry money or any payment support system.

2022

- Everyone is assigned an IP address at birth to record their every move on the internet from that moment onwards.
- First shares issued in cryptocurrencies.

2023

- Global tax reform because of the changes in borders and States.

2024

- Western Union goes bankrupt.
- The majority of global trade takes place in cryptocurrencies.
- The ECB accepts alternative currencies to stabilize the euro.
- Greece is out of the recession.

A cryptocurrency may be chosen as reserve currency and the lesser of two evils, when policymakers cannot reach consensus that leads to choosing any other currency.

At some point in this series, China overflows the market with false dollars, indistinguishable from authentic dollars, according to forecasts by one expert. And, also at an undefined moment, the dollar is no longer considered the international reserve currency, said other experts. Heather Schlegel, producer of the TV series The Future of Currency, challenged attendants to answer the question: what new scenario is brought about by the dollar's demotion—which most people considered quite likely? It could be a gradual change, where different reserve currencies are accepted and gain significance in international trade, or an abrupt change, provoked by some sudden event. Could the dollar's position as reserve currency be possibly taken by a cryptocurrency? Greg Kidd believes so, just like the TCP/IP protocol was accepted on the Internet as a more neutral—and therefore better—option, a cryptocurrency may be chosen as reserve currency and the lesser of two evils, when policymakers cannot reach consensus that leads to choosing any other currency. Bernard Lietaer, far from considering possible the option of maintaining the monocultural idea of a single currency, believes the world will evolve towards the monetary ecosystem he advocates, where cryptocurrencies will play a role as part of a mix.

Glossary

Airbnb

The online platform created in the USA in late 2008 has become a massive community-based marketplace to rent places around the world. Based on their website, there are local hosts in 190 countries and more than 34,000 cities. Some regional Spanish authorities, such as Catalonia, have fined the website because their system is considered tantamount to renting illegal tourist apartments.

Block Chain

It is a data base including all transactions carried out with each bitcoin since its creation, shared by all nodes connected to the system. Each transaction creates a block, and each block has a unique code to identify the previous block, thus building a chain from the very first block to the very last. It is the reason why bitcoin does not need intermediaries: information from all nodes must balance out before a new block is accepted and the next is built. This way, all nodes are the supervisor of the system.

Continental

It is the currency issued by the American revolutionary government during the War of Independence against Great Britain. Since they could not collect taxes yet, the currency became an early tax collection of sorts used to pay soldiers fighting for independence. Because of the sheer quantity of paper money printed, units were basically worthless at the end of the conflict.

Deep Web

Or invisible internet, are the Internet sites that are not registered by any search engine. The deep web is at least several hundred times the size of the surface web. Because it is opaque, it has become a formidable refuge for unlawful activities. Tor is the most popular software to enter the side of the Internet hidden from search engines.

Early adopters

It is a widely accepted English term that defines people who use technological innovations before the rest out of personal curiosity or professional interest.

FATCA

It stands for Foreign Account Tax Compliance Act. This federal law was passed in the US and obliges all US citizens—including those living abroad—to file their financial accounts outside of the US, and foreign financial institutions must report to US authorities regarding their American customers.

First Sale Doctrine

The First Sale Doctrine is included in Title 17 of the US Federal Code. It determines that any individual who acquires a physical copy of IP-protected material is entitled to sell it, show it or make use of it without violating the copyright. The first sale doctrine is not applied to digital contents (sold on iTunes or Amazon, for example). In this case, you acquire a license to use the copyrighted material; otherwise there are countless copies available.

Hacker

An expert in IT security.

Peer to peer (P2P)

Or network between peers. It is a group of interconnected computers where the roles of servers and clients are not set, but rather, there are nodes that simultaneously operate as clients and servers of the other nodes. By enabling the direct, disintermediated exchange of information between two users, it is now used to exchange IP-protected materials. It has become the #1 enemy of copyright advocates.

POW

It is a verification algorithm. It follows a similar philosophy to the distorted alphanumerical codes we often find on the Internet before accessing a specific area. These are called CAPTCHA codes. They are intended for the human eye and are easy to solve. The POW, on the other hand, is a highly complex mathematical test that computers must solve.

Quantitative Easing

It is a heterodox monetary policy used by central banks when they cannot impact the amount of money in circulation through conventional policies. They effectively overflow the economy with new notes by buying private or public debt. Ben Bernanke, former chairman of the US Federal Reserve, will enter the annals of history for using this formula extensively to mitigate the effects of the financial crisis that started in 2008. The Bank of England and the Bank of Japan have also used it. In 2014, the ECB announced its intention to use a similar formula.

Smart Property

It is a practice whereby property is ascribed to a digital token or unit of account. It may be physical property (a house or a car) or shares in a company. Whoever owns the token owns the asset.

Startup Cities

An initiative to reform used by small, highly independent

municipalities that can try out socioeconomic changes. The Honduran Congress has been famously promoting one such project for years now (it was first called RED and then ZEDE, and even the Constitution has been amended for its benefit). It seeks to create a low tax, free trade region where laws are passed by the citizenship.

Swaps

A binding contract between two parties to exchange money at a certain date. Central banks use them between each other to ensure liquidity in different currencies.

Token

It is an individual unit or element that represents value. It may be a coin (such as bitcoin); it can be used to authenticate the users of a system or as certificate of ownership of a value or asset (real estate, cars or shares).

TCP/IP

TCP stands for Transmission Control Protocol and IP for Internet Protocol. Their acronyms are used because they were the first to be designed and enable the transmission of data between computers. And they are widely used within the family of TCP/IP protocols. This family is made up by more than one hundred protocols, including http, which enables access to websites.

TPV

It stands for Point of Sale. It includes all hardware and software needed to manage a retail store. However, POS is a misnomer that over time has come to represent the dataphone—whereas a dataphone is the terminal that reads credit or debit cards in a store.

Uber

An online platform created in San Francisco, CA, to connect registered passengers and drivers through an app. Using private cars in the car-sharing system has met the stark opposition of taxi drivers in the cities where Uber is now functioning.

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