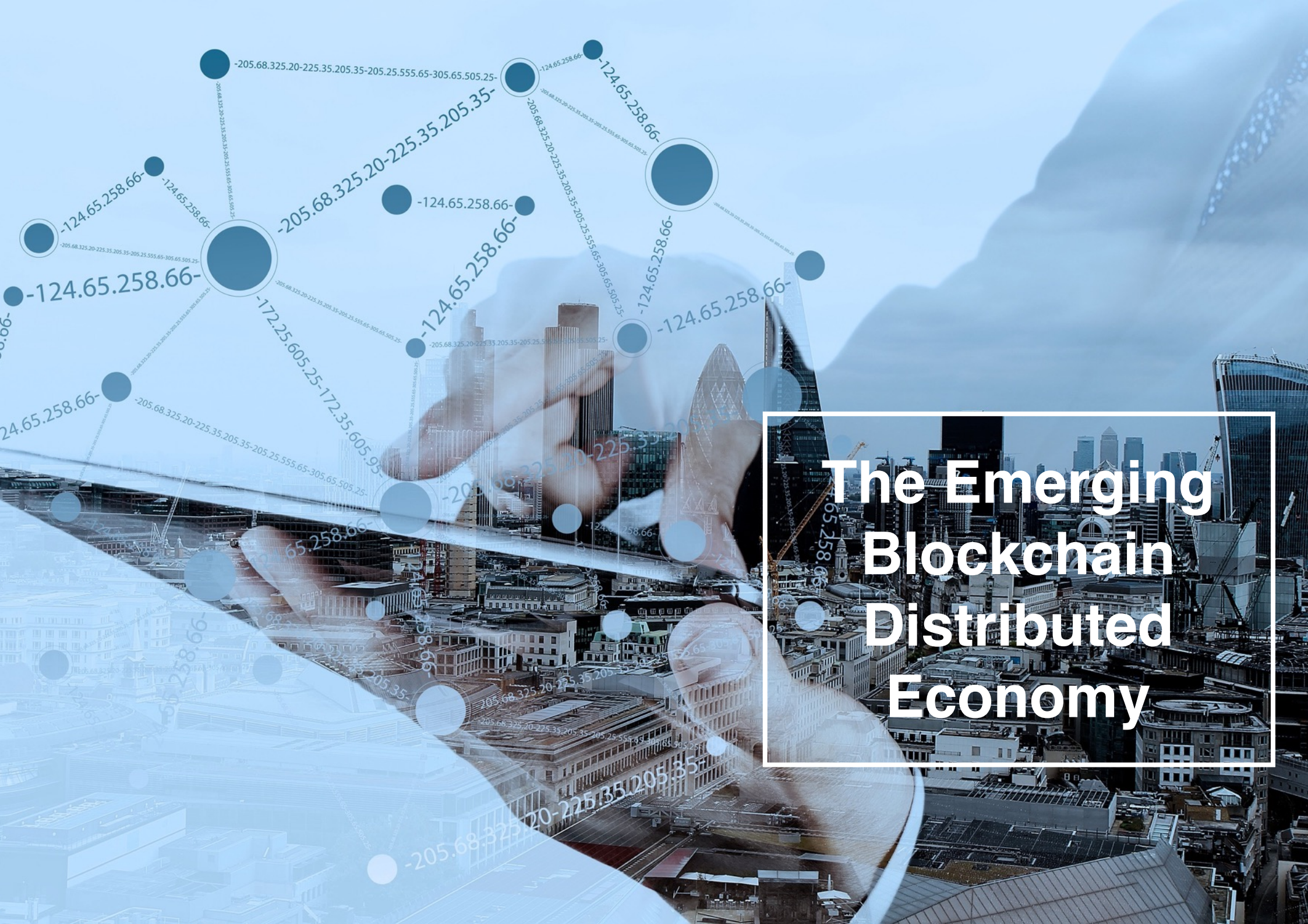

The Emerging
Blockchain
Distributed
Economy

Overview

A central question facing any economic system is how to harness all of the resources available within the society towards productive ends and then distribute the returns in an equitable fashion. Within just the past couple of years, the topic of inequality has moved to the forefront of public discourse within developed economies, where the returns going to the very wealthiest have risen while those going to the middle and lower income have stagnated or declined, leaving many to fundamentally question whether the current economic model is really sustainable.

At the same time with the rise of mass automation and smart systems employment has also moved to the forefront of public attention as many jobs are set to be automated in the coming decades. The fallout of these changes is seen as a key factor in current political disruption in the form of the rise of populism.

As technology becomes more powerful, being able to do more and more with less and less resources and people, the bizarre picture of a future economy that simply does not need or incorporate the mass of people looks like an ever growing possibility. A world where there are centralized highly efficient organizations with few people - vast empires of technology generating huge revenue streams for few - while the majority are left outside disenfranchised, unproductive and disengaged in economic activity. This trajectory, that we seem to be currently on, has already created huge divides and disparities that feed through too many social problems.

A central question to developing a sustainable economy and society will be answering the question of how to engage the mass of people in the economy; how to harness their resources and effectively distributed the revenue so that it flows to all areas of society. Traditional mechanisms of state redistribution are far from idea, they can be seen as artificial in that they do not match the underlying flow of resources within the economy, in fact quite the contrary they are designed to manipulate that flow and redistribute it so as to solve the problem. Political redistribution of revenue is a method that at best can be seen as dealing with the symptoms, at worst a method for buying social peace, but ultimately it is not a solution to the problem.

The current issues of inequality are at their core issues of centralized organizational structure; systems that have evolved to concentrate resources at the center and reduce those at the edges thus resulting in a state of inequality and division. A good example of this can be seen in urbanization within developed nations, where the flow of people and resources into cities over the past century has created a concentration of economic activity and reduced opportunities outside of this in the countryside which has, in turn, fed through to divisions in today's politics.

At the same time that we see this massive centralization of wealth and capabilities, information technology is holding out the possibility for more decentralized forms of economic activity. Given the new possibilities of this technology, the question should not be how can we redistribute resources within the current system - by imposing some regulatory framework onto it - but more how can we leverage information technology to develop distributed systems where resources and capabilities can flow to the edges of networks by design. How can we use the technology we have - and will increasingly have more of - to create platforms and environments where the average person can participate in value creation and exchange, thus binding them into the overall economy and ensuring social stability.

"As the world is challenged with tackling the current global environmental and economic crises, many have come to question whether or not the current economic systems can meet global needs while remaining sustainable. The current system has largely been driven by a concept called 'Economies of Scale', the idea that production costs per unit declines as output increases, thus making larger industrial production more attractive and profitable. The belief in this approach has created an industrial production system that is largely dominated by mass production and concentrated industrial cores" *- The future is distributed by Lund University*

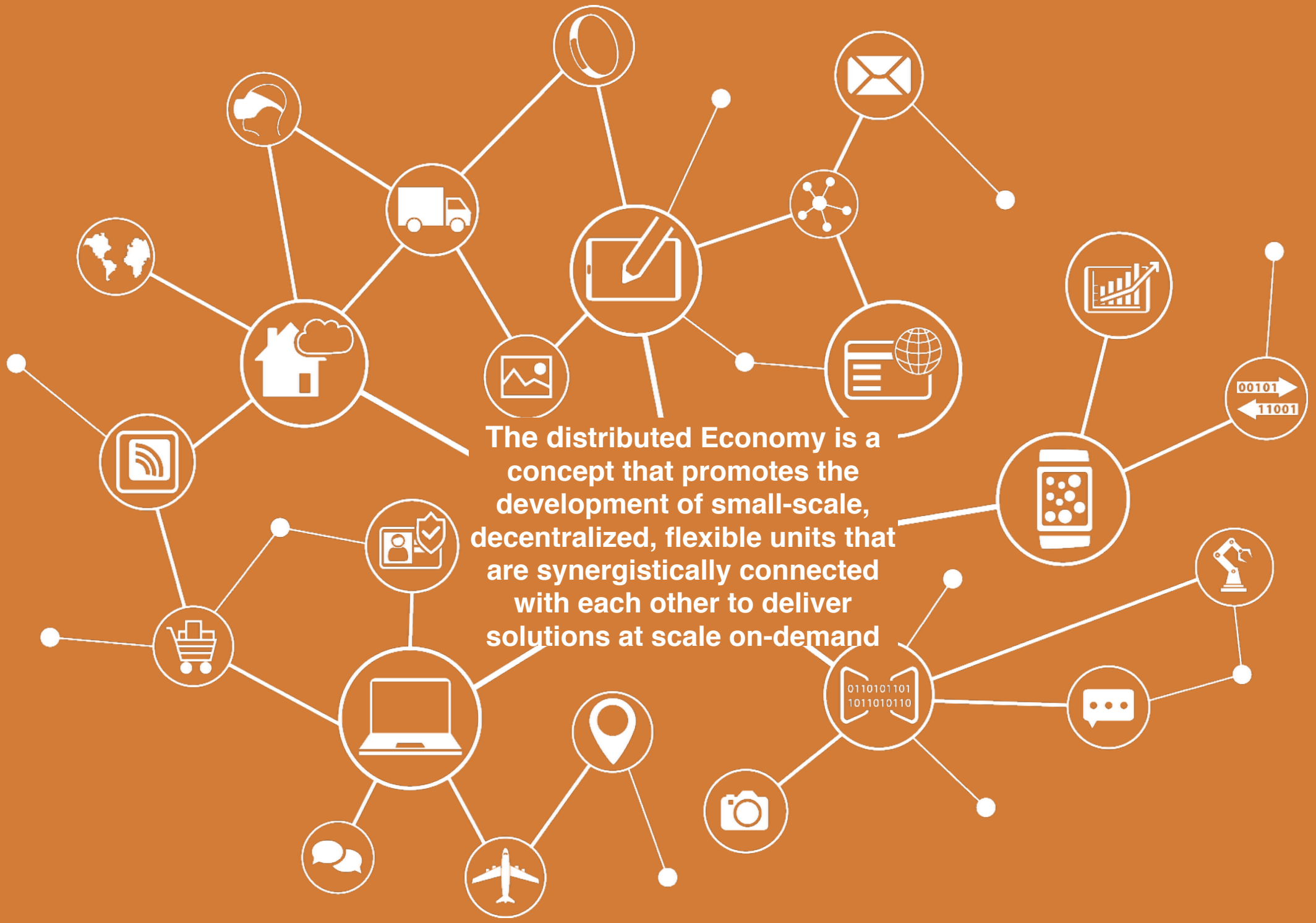
"There are many many other technologies that are being built which if on a stand alone basis may not be disruptive but when you hook them up to that digital ecosystem they become profoundly disruptive, think about 3D printing the technology for 3D printing has been around for several years but when you connect it up to that digital ecosystem is suddenly become very very disruptive" *- Patrick Forth BCG*

Centralization - Decentralization

Industrialization drove the formation of centralized formal and closed systems of organization. These closed systems - such as governments, corporations, universities etc - that are the product of centralization have created optimal solutions internal to organizations but very much suboptimal solutions outside of them. For example, whereas the centralized model has created very efficient organizations it has also created very complicated supply chains outside of these. A supply chain that takes any resource to market requires a complicated landscape of legal, regulatory, financial, manufacturing and logistics organizations. It will travel along many intermediaries - government officials, lawyers, dealers, banks, retailers etc - many different closed proprietary systems speaking different languages with inefficiencies at every interaction and stage in the process.

The industrial model created very efficient closed centralized organizations but very limited forms of effective organization outside of this, what the technology of today enables though is much greater capacity for coordination outside of formal organizations. Loosely coupled distributed organizations can now be set up at low cost, greatly increasing the efficiency of coordinating loosely associated individuals and organizations. Indeed, whereas the technology and thinking of the industrial age systematically selected for closed formal organizations and worked to optimize them at the expense of informal distributed systems, the technology of today does quite the opposite leveling the playing field as it makes the coordination between unassociated, widely distributed members greatly more efficient and effective.

Whereas the technologies of the industrial age promoted concentration, the technologies of the information age promote decentralization in many ways. This is not to say the world is about to become fully decentralized but what is happening is a rebalancing of power and capabilities as decentralized systems become greatly more viable in delivering solutions at a mass scale, something that was not previously possible.



The distributed Economy is a concept that promotes the development of small-scale, decentralized, flexible units that are synergistically connected with each other to deliver solutions at scale on-demand

Distributed Technologies

A central technology enabling this emerging distributed economy is the blockchain and distributed ledgers more generally. Distributed ledgers will fundamentally change how we exchange value from a centralized high friction model with many intermediaries, to a distributed fluid one without intermediaries. In the same way that with the advent of computing and the internet, information went from being expensive centralized and slow, to ubiquitous, cheap and fluid, blockchain will do the same for the defining and exchanging of value and this will change the nature of business and business models as they become more democratized.

A distributed ledger is a ledger that keeps track of all of the transactions that have ever been made within the value system. This information is encrypted and held on many different computers. Whenever two individuals wish to conduct a transaction, one of these ledgers is randomly selected in order to verify the transaction. Once it takes place, all of the other ledgers will be updated with the new information. This is an open system in that the information is distributed out, but this information is of course still encrypted. The ledger is then simply a list of all the transactions that have taken place. The process of verification is distributed out among many different computers. Distributed ledgers are essentially value exchange protocols and databases. You can exchange any value with them, the deeds to some property, any currency, claims to a parking spot for a car, likes on a social network, points in a computer game. They can all be encoded and securely exchanged.

Blockchain can transform all areas of value systems from recording and tracking ownership to creating monetary systems, to exchange, to creating smart contracts. By using mathematics and IT blockchain provides an open decentralized database of any transaction involving value, of money, goods, property, votes or even, ratings and likes, thus creating an open ledger or distributed record which can be verified by all members of the community.

With blockchain everyone has ownership of the record; as a resource cycles through a supply chain or any other system everyone during the process can have a record of every event and nothing can be added to the blockchain without the consent of everyone else. This makes it highly resistant to tampering and fraud. At every point along a supply chain, a record can be made of the object and registered in the ledger. At the end there is a complete and indisputable record of every aspect of the product or process. Blockchain gives us the possibility to transform a great many different industries, from the mining industry to organic farming, to finance and insurance, to all forms of deeds and contracts.

Blockchain will do for business what the internet did for information having a radically democratizing effect as it enables us to measure and exchange even very small little bits of value in a very fluid fashion that was not previously possible. Whereas previously the production and exchange of value required formal business organizations and other institutions that had minimum limitations on their scale - you could not set up a business renting out one room, or renting one car, or cooking a meal for someone every now and then. But with the internet and blockchain, it will be possible to monetize on very small interactions, creating a much more granular economy of "micro-transactions." When the whole transaction can take place in a very fluid fashion one can, for example, easily rent one's car out while one is not using it. Thus all sorts of assets become capital, capable of generating revenue streams. With blockchain technology, it will be possible to monetize on virtually anything from one's power drill, to a few minutes of spare time at the bus stop, to all of the data coming from one's mobile phone.

Functions of Distributed Ledgers

Recordation

Define ownership and track its exchange

Value

Define, quantify and exchange any form of value

Contracts

Create secure distributed contracts on the fly

"Potentially the blockchain could be the tool to bring down the transaction cost of human collaboration to a level where civic self-organization can become the dominant way of value creation in our societies"

- Michel Bauwens P2Pfoundation

One of the key elements holding our current economic system in its centralized model it the issue of trust, people have to trust each other before they will engage in economic activity and until recently this trust was only achievable - at the large scale of modern organizations - through centralized institutions. Distributed ledgers offer the possibility of changing this whole architecture in that this technology has the capacity for "trustless" security, which simply means that people do not need to trust each other or even a centralized authority.

In order to facilitate a financial transition, you have to have two identifiable parties who wish to make that exchange, and you need some impersonal system to verify their identities if needed, and keep track of the transition in some form of ledger as a record of what happened and who owns what. These third party organizations need to be seen to be legitimate, enduring, authoritative and all those things that enable people to place their trust in them so that the transaction can be facilitated. This is largely what the financial system does. Of course, it serves other important functions, but this is in many ways the center of its function. Within the industrial model, this whole framework was and still is built on a centralized system. Within the industrial model, these ledgers are managed and verified by centralized organizations such as banks. But the assets on these ledgers can be of any form. Thus there are many different institutions but these institutions are typically backed and regulated by the government, the ultimate centralized authority within this whole national system.

With blockchain technology, trusted exchanges can take place without a centralized authority. It is a technical system. The trust and faith are in the mathematics and technology, not people or institutions as it currently is. Whereas the current peer-to-peer platforms are centrally owned and operated blockchain technology holds out the possibility for the next generation to be managed in a distributed fashion. Peer-to-peer markets like that of eBay still require centralized management but applications built on the blockchain may not. One example of this is OpenBazaar which is like eBay except that there is no central intermediary as users list their products on their computers and transactions are cleared by a decentralized consensus system; payment is through Bitcoin and reputation is provided by some anonymous third party rating system. La'Zooz is another example of a completely decentralized peer-to-peer ride-sharing application that does not require a centralized organization - a potential competitor to Uber.

"The future global economy will move towards one of distributed property and trust where anyone with internet access will get involved in blockchain based transactions and third party trust organizations may no longer be necessary" *- World Economic Forum*

Distributed Organizations

This new wave of technologies offers truly revolutionary possibilities to build effective distributed organizations. Reduction in collaboration cost and increased connectivity outside of formal organizations makes it much easier to set up loosely coupled organizations, that is to say, organizations that do not require centralized control and coordination. The sharing economy allows people to share property, resources, time and skills across online platforms. This can unlock previously unused, or underused assets – helping people make money from their empty spare room or the tools in their shed they use once a year. It allows people to go from owning expensive assets, such as cars, to paying for them only when they need them. Individuals can potentially make more from their skills, and work more flexibly.

Peer-to-peer is really a relational dynamic it is the capacity that people now have for permissionless communications with each other directly, but more importantly to organize themselves, to create huge transnational common goods. Availing of the possibilities engendered in this technology revolution requires people to take greater initiative, to build relationships and organize themselves. It is now possible to build truly autonomous distributed organizations, the project Backfeed being one example. Backfeed develops a distributed governance system for blockchain-based applications allowing for the collaborative creation and distribution of value in spontaneously emerging networks of peers. Their stated goal is to enable the setting up and operating of decentralized organizations on top of the blockchain as easily as one would deploy a website today.

"We see the power of what this blockchain can become. Venture capitalists see this but even more exciting is the disruptive minds of entrepreneurs are seeing the power of this and they are building new businesses, new paradigms that are going to change the shape and face of all industries"

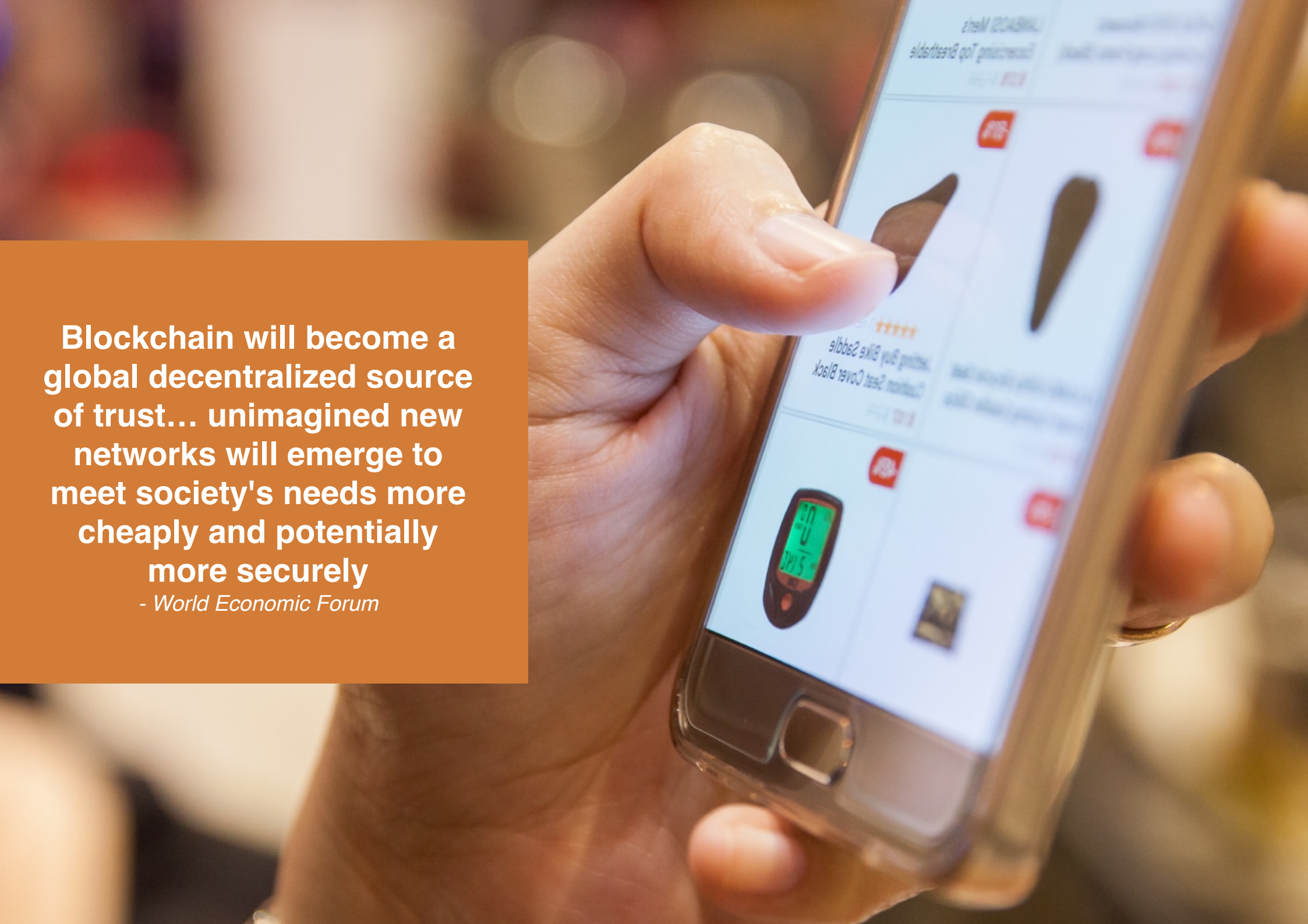
- Derek White of Barclays Bank

Unbundling

Across all domains, the proliferation of networks works to have an unbundling effect where previously homogenous and monolithic systems are unbundled and distributed out into small modules that can be recombined, on-demand, through networks. As connectivity and software solutions for the distributed economy evolve this unbundling process will happen to value production, value exchange, business, and work. For example, the idea that your workforce is a set of people who work for one company and receive a salary is a 20th-century idea, the 21st-century workforce is going to be in a much greater way a group of entrepreneurs rather than a group of salary workers that are distributed out and then aggregated on-demand through networks, the staffing website Upwork being one existing example of this.

The greater the connectivity, the greater the fluidity of exchange. The more effective and automated the systems for coordination the smaller more granular the resources we can afford to coordinate. With blockchain, transactions will be cheap and fluid, and on top of this technology will be built platforms that automate the exchange and allocation of resources. This will allow for ever smaller granules of value to be combined and delivered as integrated solutions. Solutions at scale will no longer require homogeneous organizations to deliver them but may become the product of swarms of small modules being rapidly and fluidly aggregated to meet demand. For example, the operating system of Windows in the 90s took the homogeneous organization of thousands of people bound within one overall closed organization to build, but the average size of a team working on Linux is four people and the average size of a team working on Wikipedia is one person.

Networks enable a new form of loosely coupled organization where unassociated parts can be drawn together into networks to meet end needs, the blockchain will greatly enable these new forms of distributed organizations as value producers and members do not need to know each other or be part of any formal organization to be coordinated, the network automatically does the coordination. Equally, the blockchain and the distributed loosely coupled systems of organization built on it will enable a more event-driven world, a shift from organizations that are static as they push out products to end-users to more dynamic forms of organization that pull resources together on-demand.



Blockchain will become a global decentralized source of trust… unimagined new networks will emerge to meet society's needs more cheaply and potentially more securely

- World Economic Forum

Conclusion

Web 2.0 created the means for effective massive distributed collaboration on projects and we have seen what this has done with Wikipedia, open source software, all forms of user generated content etc. However, the exchange of monetary value was still constrained within the old centralized model and these projects were largely outside of the monetary system. The blockchain will though provide the infrastructure to enable the same sort of distributed production but this time it will move more into the mainstream of economic activity as it will be possible to monetize on it all within the same internet based platforms. The blockchain will become a pervasive technology built into the internet and in so doing enable a blurring between formal and informal organization, production and consumption, mainstream and alternative.

As the current centralized model to economic organization continues to develop it is appearing more and more unsustainable, both in terms of inequality and employment opportunities. This new set of information technologies hold out the possibility of developing distributed forms of economic organization where resources can flow to and from the edges of the network, thus enabling a more overall effective and sustainable model to economic development. However, the distributed economy should be seen as only a potential that is inherent in these new technologies and certainly not guaranteed.

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