The Business of Blockchain

Building a Better Future on Blocks of Trust

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CMM CONVERGENCE MITIGATION MANAGEMENT

STELIOS VOGIATZIS
MAZARS

MARK COLEMAN
CMM

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By

Stelios Vogiatzis, Director, Business Consulting, Technology & Sustainability Services at Mazars Greece

Mark Coleman, President, Convergence Mitigation Management (CMM)

Technology has always had philosophical & moral repercussions. Digital or not, it changes radically the way we perceive reality and sometimes, creates a reality of its own. But no matter how we judge its application, it has always been an enabler. Initially for the few but eventually reached the masses with unprecedented consequences. It took a little more than 50 years from the first flight to the conquest of space. And the pace seems to grow exponentially.

From the first days of web until we have a fully interconnected globe took much less than a decade. Mobile telephony expanded even faster. But what about the moral effect on those harvesting the benefits? In this case, nothing spectacular to report about. The impact on the fundamental values such as trust, reliability and accountability has not been equally impressive – to say the least. Of course, it would be reasonable to think that one should not expect bits and bytes to elevate our moral values and succeed where major philosophical & religious movements failed while trying for the last 2,500 years. Truth well told.
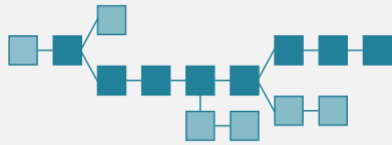
Taking a closer look, seems that the fundamental problem lies not in technology but within the human nature. The notorious ghost in the machine was absent. The use of technology merely reflected human behavior patterns and seldom imposed them. It would take an inherently moral technology to improve the matter in question, sounding like a very optimistic, non-Orwellian AI version of future reality. It would take a technology in which we can put trust "inside", being trustworthy by design and at the same time shield it well enough to perpetuate its immunity no matter how often and harsh are the malicious attacks. Unimaginable.

Unimaginable until blockchain entered the scene.

Unblocking the chain

Blockchain was introduced as a platform for creating what is called a digital currency, namely the bitcoin (also known as cryptocurrency). Bitcoin today is getting more and more famous, while its structural element, its foundational layer, only lately attracts the eyes and funds of the digital world. But what a kind of thing a blockchain is? Blockchains are surprisingly simple and effective. Imagine that you build and maintain a kind of open-end ledger. But contrary to a commonplace ledger, you can record transactions creating a list of them in a way that prevents dishonest use ad infinitum. They allow any computer to

keep track of this list by compiling them into a block, which is then powerfully encrypted to form a key-number called a hash. To cut the (very) long story short, blockchain is a new data structure combining some old ones, such as the tree or the linked list, but at the same time has some completely novel qualities attached. The beauty of the idea is that by storing blocks of information that are identical across its network, the blockchain cannot be controlled by any single entity (without alerting the rest of the connected entities) and has no single point of failure (due to its distributed design).

A blockchain is a decentralized and distributed digital ledger that is used to record transactions across many computers so that the record cannot be altered retroactively without the alteration of all subsequent blocks and the collusion of the network.

Source: https://en.wikipedia.org/wiki/Blockchain

For the many, most of the details will be somewhat incomprehensible. Not everything will be easily understood but honestly, *who really needs the details*?

You can drive a car without ever opening the hood not to mention knowing its engineering principles. Much like the web and its use. It is transparent to its users. You only need to understand the potential and while you're doing so, amazingly enough behind the somewhat hazy technical descriptions and grainy jargon, the true beauty arises: For the first time in the history of digital technology, trust is embedded into the system. Not required, not presupposed. Embedded. Trust becomes a compositional feature. Giving new meaning to what we knew as trusted technology and by that we could say that a (benevolent) ghost entered the machine.

Having accomplished that, applications are numerous. It started as we mentioned with the digital currency which is already a ground-breaking feat, a small financial revolution per se.

Yet the – digital - cornucopia holds an endless world of possibilities: from eliminating tampering & double spending during web transactions to smart contract management (which needs no intermediaries involved whatsoever!) and making amendments on a document by having many users working concurrently, without exchanging the document back and forth for keeping track of the changes. Another major blockchain application is the management and tracking of digital identities.

The effort to maintain adequate security has risen "defensive" costs to millions – alas, in vain. Hackers reign supreme and their intrusions result to the embarrassing loss of data containing names, addresses, phones numbers,

passwords etc. not to mention the reputation damage and regulatory fines which the corporate victims pitifully enough have to sustain. By using a blockchain structure, digital identities can at last gain their lost credibility. Traditionally, our digital personal image (passports, certificates, ID documents of any kind etc.) was protected by a password moat. Not necessarily bad, but passwords, were more or less our only significant weapon in the digital arsenal. Security policies, procedures and software were built and updated on how we must select, change and improve our passwords.

A tough daily test for our memory and security systems alike. Hopefully, all signs indicate that this was the past. With blockchain, all transactions, including digital identity verification, are carried out without engaging a password. Cryptography entered the game which means that by having a unique private key (the hash), authentication is achieved in an irrefutable and indisputable manner. Is this the ultimate trustworthy, no small print method? Is this the 21st century definition of trust? For the time being yes - until someday quantum computing will enter the scene.

Blockchain: The brave and new trust-based marketplace

As illustrated in the examples below, Blockchain technology is rapidly being deployed by industry, and in partnership with universities and research collaboratives, to optimize efficiency, foster trust, and create business value. While Blockchain is often thought of in the financial sector, industries as far reaching as global supply chain management, real-estate and energy are working on Blockchain technologies as described below.

Enabling global real-estate transactions – Propy

Blockchain provides mature industries (i.e., banking/finance, energy, healthcare, energy/utilities and government) the means to embolden information security while creating more efficient operations and meaningful experience for customers. Blockchain also opens the door for new enterprises to emerge and potentially disrupt traditional models of doing business. The global property registry and marketplace startup, Propy, Inc., is an example of a new-age company leveraging blockchain to create and capture sustainable value in an industry, literally as old as dirt. According to its website "Propy.com is dedicated to solving the problems of purchasing property across borders." But don't let the simplicity of Propy's business proposition fool you. Behind the scenes the company is facilitating global real-estate transactions using Ethereum blockchain, an open software platform based on blockchain technology that enables developers to build and deploy decentralized applications. Leveraging Ethereum blockchain, Propy integrates a blockchain ledger for governments and international real-estate firms to provide issuance and assurance of title deeds for properties instantaneously accessible online and in a manner that is secure and cost-effective[1]. Propy's unique approach to unlock the accessibility of global real-estate has proven to be of high interest to investors. In September 2017 Propy successfully raised more than $15 million U.S. by selling virtual currency tokens as an investment vehicle into the company. Propy also announced agreements with the government of Ukraine and the Chinese real-estate company, Leju Holdings Limited, to which enable Propy's global digital real-estate service in those respective countries.

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[1] Source: Propy, https://propy.com/

Enabling decentralized, local energy trading – LO3 Energy and Siemens

In 2016 Siemens and LO3 Energy, a New York startup company, joined forces to create a solution that would empower decentralized and local energy trading using blockchain as the honest broker. Together, Siemens and LO3 Energy are working using blockchain technology to store and validate energy transactional data between energy producers and consumers operating within an energy microgrid ecosystem. The solution has potential to create a decentralized energy marketplace for energy producers and users, as well as reinforce the reliability of the larger energy grid and infrastructure.

By enabling transparent and efficient energy trading, blockchain technologies could, as example, enable decentralized microgrids to communicate in a trusted manner with centralized power grids to utilize existing resources as efficiently as possible during power outages caused a natural disaster or emergency event, while power is restored to those in need. The significant impacts of Hurricane Harvey in Houston and Hurricane Maria in Puerto Rico are recent examples of the need for more robust and resilient infrastructures. Blockchain is not an end-all solution for energy security, but can be, as demonstrated by Siemens and LO3 Energy, one of the next generation opportunities to support the clean, distributed, efficient, and reliable generation, delivery and use of energy.

Addressing Materiality – Fostering Trust and Traceability in Global Supply Chains with Blockchain

As global food supplies have become more integrated, risks associated with foodborne diseases (*i.e.,* those stemming from bacteria, chemicals, viruses, parasites and toxins) present new challenges and risks for ensuring public health, safety and sustainability. In 2017 IBM[2] announced a significant partnership with global food retailers and supply chain leaders including Walmart, Nestle, Costco, Golden State Foods, McCormick and Co., Tyson Foods and others, an integrated effort to "strengthen consumer confidence" in the foods that they purchase and consume. To date IBM and partners have launched pilot food safety programs to evaluate the efficacy of blockchain applications to ensure food traceability and to protect human health.

In other sectors ranging from aerospace/defense, pharmaceutical, chemicals, fashion and electronics, companies ranging from Air France, Hitachi, Unilever, Maersk, SAP, Oracle, and others have invested in or are testing Blockchain solutions for supply chain risk management.

Incentivizing the Future – Blockchain Research, Credentialing, and Seed Funding

Blockchain research, academic and professional credentialing, and seed funding have expanded rapidly in the past 12-months building momentum and prominence to Blockchain technology and solutions for government and industry. For example:

- <u>Early-Stage Funding is Cultivating a New Generation of Enterprise Development</u> - In October 2017, SparkLabs Group (http://www.sparklabsgroup.com), a network of accelerators and venture capital funds, announced that it had launched a new $100 million early-stage fund, SparkChain Capital (http://www.sparkchaincapital.com), focused on innovations in blockchain and cryptocurrencies. According to SparkLabs, the early-stage fund will be focused on innovative companies in the cryptocurrency and blockchain sectors across the globe, and leveraging their extensive network in Asia.

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[2] Source: Aitken, Roger. August 22, 2017. Forbes Magazine. "IBM Forges Blockchain Collaboration With Nestlé & Walmart In Global Food Safety." https://www.forbes.com/sites/rogeraitken/2017/08/22/ibm-forges-blockchain-collaboration-with-nestle-walmart-for-global-food-safety/#6e1217e3d361

- <u>Academic Curricula and Research is Expanding</u> - Prominent universities including Arizona State University, Columbia University, Duke University, Massachusetts Institute of Technology, Stanford University, York University, UC Berkeley, University of Edinburg among others investing substantially in Blockchain academic programming, research, and laboratory assets.

- <u>Leading Corporations are Supporting and Stimulating the Blockchain Ecosystem</u> - Global companies including IBM, are working with select University partners to expand and enhance the blockchain ecosystem within and across the academic, research, and start-up community. In the case of IBM, they have consistently funded research grants, supported the development of curricular, and hosted workshops and hackathons with universities such as Fordham University, University of Arkansas, University at Buffalo and University of British Columbia among others.

A brief history of trust

"*Men live upon trust*" noted John Locke about 4 centuries ago. Trust has always been at the center of human relations - of any kind – be it your doctor, your supplier, your spouse, your colleague or your politician.

Trust is the medium by which humans interact. With deeper levels and understanding of trust, there are greater engagement and relations between individuals. Trust, however, is not only a bond between two individuals, but is also a social construct which all of humanity if built upon. In fact, the greatest institutions of society (i.e., governance structures, religion, economics, academic and research) have been built, in large part, on foundations of trust. Trust is one of the central tenets of humanity.

Trust represents one of the reasons why some social challenges continue to manifest while other forms of social change are more widely accepted and accelerating. Measuring trust is difficult, because it is something that compounds across time. Trust is exercised both like a currently, as well as like a foundation to a well-constructed home. The perception of trust to one individual may not be the same as that of another. Thus, trust-based relationships require mutuality between parties on a common definition (or discourse) of what trust is and how it is measured and valued.

> *The ultimate proliferation and success of Blockchain, as a form of digital assurance, security, and value, will reside in whether it can be a trust-based tool that reduces market, operational, and personal risks for defined stakeholder groups.*

For some, trust means knowing another party will keep your information safe and secure. For others, trust means that if your information were breached, the party that had managed your information would do everything in its power to

make you aware of the breach and take the necessary steps to protect you going forward.

In technology we trust...In trust we use technology?

The use of blockchain to instill greater transparency, accountability, and assurance into human interaction is an interesting evolution for business and in the human trust paradigm. On one hand, digital transformation and the proliferation of a global digital marketplace and economy require more robust tools and procedures for identity verification and assurance. That is where solutions like blockchain fit in and make sense. On another hand, the dissolution of trust-based relationships is on the rise, forcing individuals to place their trust, sometimes blindly, into technologies that they have no familiarity with. Therein lies the challenge.

Blockchain and other solutions for information security assurance are only as trusted as their designers and users enable them to be. Ultimately humans have influenced the derivation of digital tools, like Blockchain. Technology cannot completely eliminate the need for trust-based relationships. Blockchain can potentially provide a hedge for proactive risk management and liability protection, however it cannot (yet) be the exclusive proxy for all decisions requiring high degrees of trust.

Blockchain, much like any technology, is built upon a foundation and framework of trust. Blockchain can be a solution to deliver pragmatic solutions for business, government, and society. The ultimate proliferation and success of Blockchain, as a form of digital assurance, security, and value, will reside in whether it can be a trust-based tool that reduces market, operational, and personal risks for defined stakeholder groups.
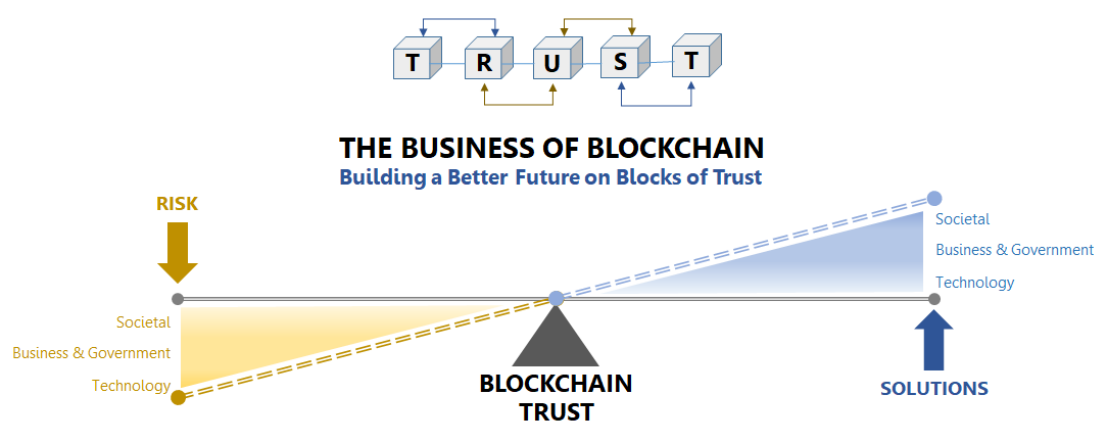
From our viewpoint there is reason to expect more investment in Blockchain technology in the next two to five years. While mature companies in mature industries evaluate how best they integrate Blockchain into their existing infrastructure to optimize efficiency of operations and provide enhanced

security features for customers, more agile start-up companies may have a near-term upside potential in capturing new customers on the merit of a trust-based technology solution.

Blockchain levels the playing field between global brands that were trusted by consumers and governments for having attained scale, reputation, and longevity versus new-age companies that have yet to prove any of these values but stand firmly behind the perception of a more secure means of doing business. As the digitally connected world struggles with ransomware attacks, information and data breaches, and daily concerns of cyberespionage, those organizations that wield advanced solutions for data integrity, assurance and security will continue to have upside potential in the marketplace.

What's next?

So, *this is it*? Trust restored, problems solved and life goes on? Certainly not. The possibilities are here but technology evolves in every direction. Today's achievement does not guarantee a carefree tomorrow. The only sure thing is progress. The point is how to properly distill a social benefit out of this. Maybe we should let technology do what does since the first industrial revolution. Not only making the world faster, products cheaper, systems secure and transactions reliable but making our living a little better as well.

Even by a small step at a time.

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About Mazars
Mazars is an international, integrated and independent organisation, specialising in audit, accountancy, tax, legal and advisory services. Find out more at mazars.com.

About CMM
Convergence Mitigation Management (CMM) is a high-value business intelligence, strategy, and management consultancy providing custom advisory services to business, government, applied research, and non-governmental organizations. Found out more at cmm-insights.com.

Author Contacts

STELIOS VOGIATZIS
DIRECTOR

Mazars
T: +30 210 69 93 749
M: +30 693 68 57 217
E: stelios.vogiatzis@mazars.gr
www.mazars.gr

MARK COLEMAN
PRESIDENT

Convergence Mitigation Management (CMM)
T: 1 315 209 2965
E: mark@cmm-insights.com
cmm-insights.com