SERATIO BLOCKCHAIN

White Paper

Currency of Intangible Non-Financial Value

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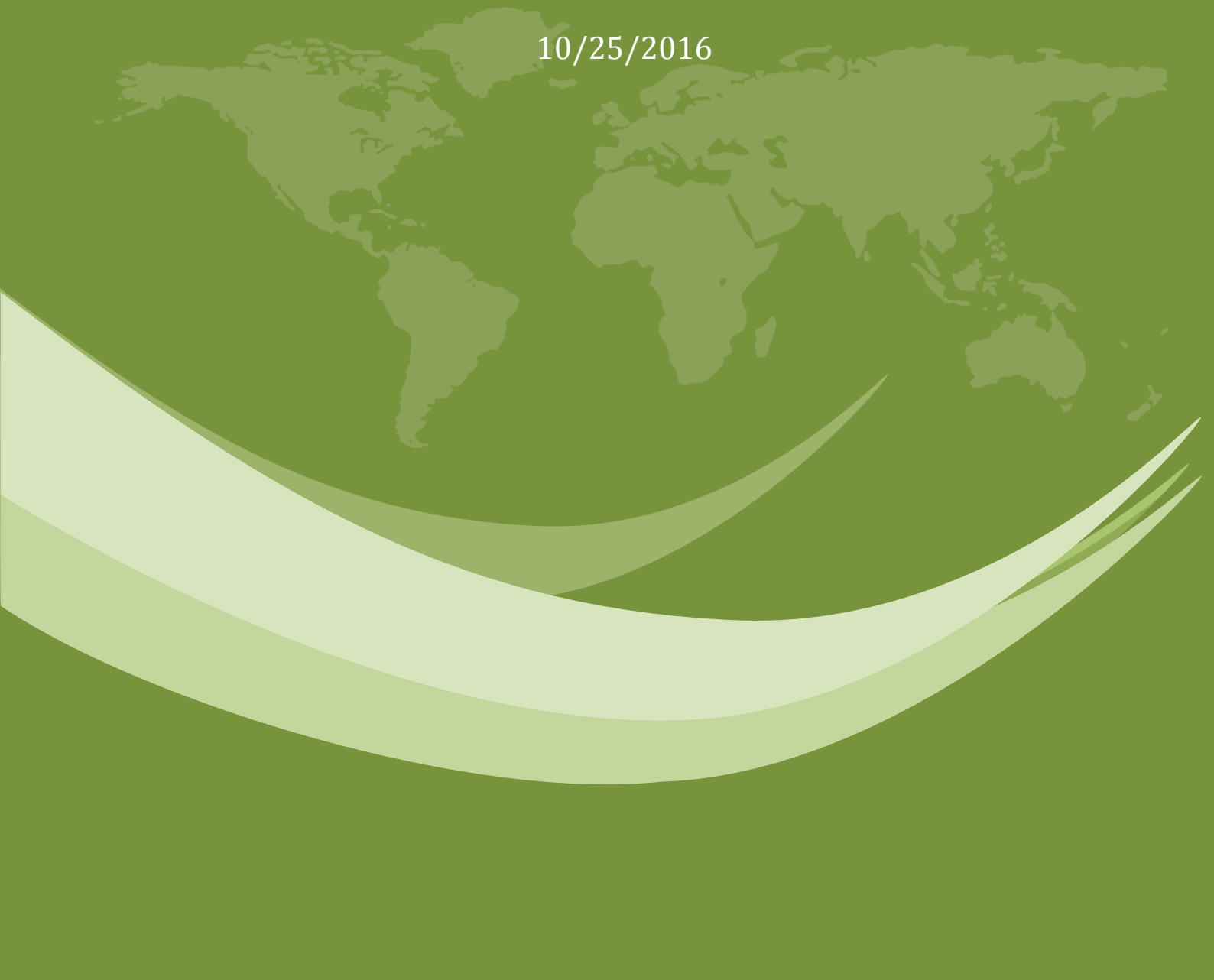

Seratio Blockchain

Internet-of-Value: capturing Total Value through Social Earnings Ratio integration of intangible non-financial attributes within a Seratio Blockchain

White Paper 1.1

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Description: Seratio integrated Internet-of-Value block combines hard tangible financial & soft intangible non-financial value – transact value based on your values.

Abstract: What the world needs now is not just a faster and cheaper way to carry on business-as-usual, but a disruptive and abrupt change in how we encapsulate all value and transact it. The Internet-of-Value is an opportunity to redefine value, mainstream it, and to use blockchain to transact it across our society.

This work introduces general principles of the Theory of Value developed at the Centre of Citizenship, Enterprise and Governance, with an extension of the Theory onto the digital world, contributing to the further spread of the Blockchain technology by means of one application of the Social Earnings Ratio – Proof of Value certificates.

Keywords: IoV, Blockchain, Value, S/E Ratio, Intangible, Attribution, Proof of Value

Introduction to IoV

The Internet-of-Value (IoV) is a broad umbrella that describes the movement of value across TCP/IP, and it is considered to transcend Internet-of-Things as shared data manifests itself in the creation of value. Today blockchain is the perceived vehicle by which this value should be transacted.

Almost exclusively IoV is focused on a tangible asset class, mostly financial as it appears on a balance sheet which can include IPR and brand. In reality, however, there are many kinds of value outside this narrow categorisation. Love has value, kindness has value, people have value, nature has value … in fact, more often than not, these non-financial intangible values determine our decisions. Cars and other items are not selected only because they are the cheapest. Yet IoV currently only

captures half the value terrain, and thus blockchain has hitherto been unable to capture the transaction of soft, non-financial, and intangible values, opting only for the more traditional hard asset classes. Total Value has two aspects.

Total Value = Tangible Financial Value + Intangible Non-Financial Value

If we fail to use this opportunity to capture Total Value, then we are perpetuating the same paradigm of value that has developed since the 14th century (double entry accounting) and given us the world we deserve. The value of trust, ambition, hope, freedom, peace and spirit are no less valuable to decision making including financial ones. After all, sentiment drives the world, including the financial sentiment that controls our stock markets that harbour financial value, but we appear to insist to ignore half this asset class that drives mankind and its transactions.

Even when the great moral philosopher Adam Smith first wrote about our feelings that form the undercurrent of mankind in The Theory of Moral Sentiment (*Smith, 1759*), it was only his seminal The Wealth of Nations (*Smith, 1776*) that achieved traction to drive market forces. There are formidable barriers to understand and transact value based on sentiment due to the difficulty to measure sentiment objectively, consistently, reliably and on an agreed basis. Overlay on this, IoV demands digitisation of this kind of value, the ability to process rapidly and cheaply the data, and then to integrate this social attribute to an ordinary tangible financial transaction.

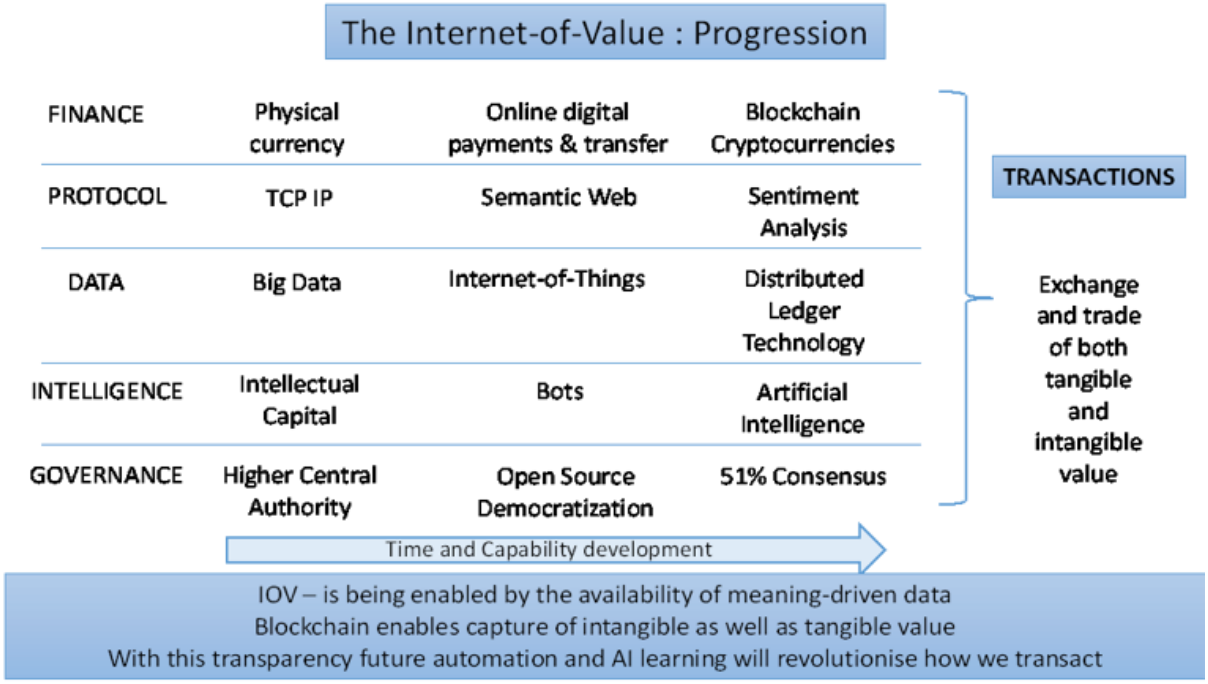
Indeed, it was Bill Gates (*Bentley, 2014*) who said we should seek bitcoin type "technology where there's enough attribution where people feel comfortable"[3]. Without it anonymous blockchain products like bitcoin will forever be susceptible to areas which can operate in a vacuum of goodness – terrorism, drugs, money laundering, etc. Without the ability to inject 'good' attributes into blockchain, IoV comparisons will be limited to be 'better' than, not 'more' than existing solutions. Invariably the larger blockchain solutions – predominantly in the financial world – market that this revolutionary technology provides cheaper than faster hard asset solutions to existing solutions – but does not introduce a way of transacting other value based assets such as equality, diversity or honesty.

So, what would the world look like if we could transact both kinds of value? What if we could introduce a system using blockchain to capture Total Value capturing social good in our products, projects, processes and even people including the organisations they work in? Where decisions on purchasing can be based on the provenance of that product, or the reward of a contract not only on price but also its social impact. A

Smith, A. "The Theory of Moral Sentiments", A Millar, London (1759)
Smith, A. "An Inquiry into the Nature and Causes of the Wealth of Nations", Strahan and Cadell, London (1776)
Bentley, G. "Bill Gates: Bitcoin is better than currency", City A.M. (03.10.2014)

place where decisions on where to work are based on the corporate social responsibility of the company. Imagine volunteering at your NGO and getting credited with non-financial currency on your mobile, going to the Starbucks and paying with some of that 'social' currency, walking down Google street and deciding where to shop depending on its sustainability agenda, choosing our clothes based on the slavery conditions of manufacture, transacting only with those who have demonstrable values aligned to us. So, whilst there may not be good or bad assets like money, there are however good and bad attributes which we can attach to them.

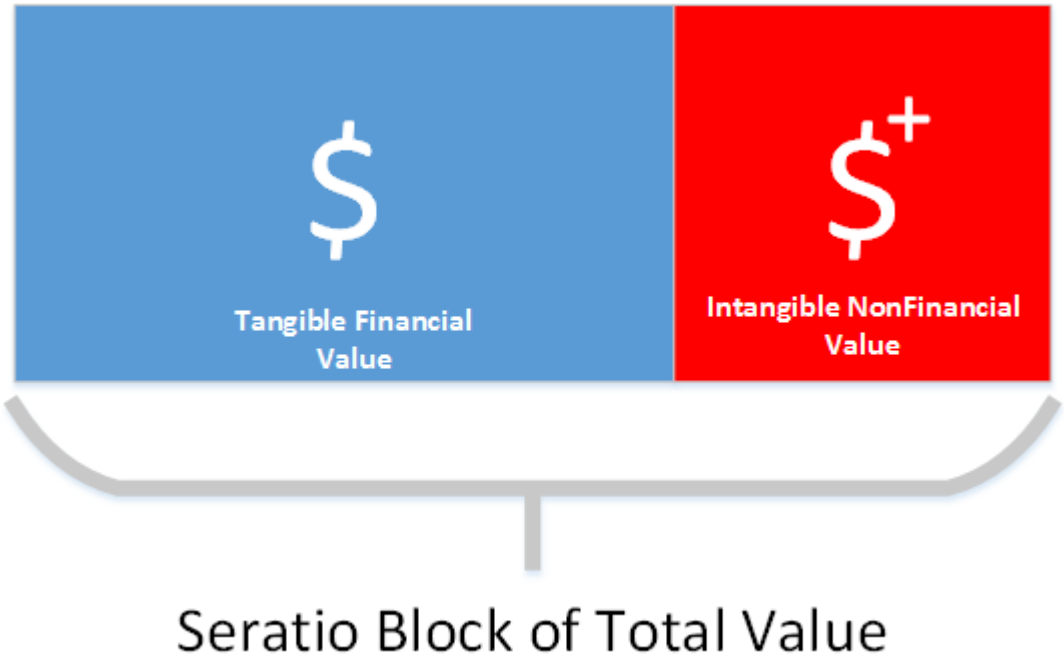
It can be argued, correctly, that the price of something already carries a premium of intangible value more than normal intangible assets such as brand, intellectual property, etc. seen on audited balance sheets. After all, whether capitalization or the price of a product is not just the cost but also how we are aligned to it or empowered by it. If we can capture more of our sentiments, make them more transparent, then our values will drive value and a blockchain currency will truly represent us.



Internet-of-Value then, sits within a broader context of value exchange with cryptocurrency being a particular subset, and blockchain the distributed transmission system to transact value; there are other layers like AI which build on this. Our contention is that with the rise of the Semantic Web 3.0 where we can capture sentiment through Fast Data, we are now able to digitally capture total value. This paper describes a methodology by which Blockchain can cement all components of value to allow us to transact in a new landscape hitherto impossible to achieve.

Seratio Blockchain

The central premise is that all value transactions have both financial tangible component and non-financial intangible components. Sometimes the latter component is explicit e.g. voluntary or involuntary charity payment, but most often it is implicit in the value being transacted e.g. our alignment towards the brand being transacted, our desire for the product, our happiness with the outcome, etc.



$TV = \$ + \$^{+}$

where $ is tangible financial value
where $\$^{+}$ is recognised intangible non-financial value

Within the blockchain paradigm, a single [block] of value can be summarised as having two interlinked components …

Total Value (TV) = [Financial Tangible | Non-Financial Intangible]

$TV = [\ \$ \mid \$^{+}\ ]$

This block can be described by two simple parameters:

• Hard component = TV or $

• Attribute = ratio of $\$^{+}$ to $

Hard values are well defined and easy to identify, but is it possible to resolve the ratio of intangible to tangible assets? Yes it is and it's called the Social Earnings Ratio. Established in 2011, S/E Ratio is the corollary to the Price Earnings Ratio – the single number metric used by stock markets all over the world, and universally used to represent financial value. Thus, conceptually …

Total Value (TV) = p/e + s/e

where

S/E = $^{+}$ / $

The S/E Ratio is an Open Source metric shared globally in the Social Innovation industry under Creative Commons 4.0. It's the fastest adopted social impact metric in the world (*Castelanno Lubov, 2015*), has already been applied to c. US$ 5 trillion of value, and is used to enact compliance with laws that are dependent on non-financial value e.g. Social Value Act 2012, Modern Slavery Act 2015, four EU Commissions, and in 2016 introduced into the global FIWARE open source community.

The Social Earnings Ratio stems from an understanding that value is not a function (ƒ) of what something is worth, but what you're willing to pay for it. The difference is a function of sentiment – how you feel e.g. financial sentiment. So, Twitter – who make no money – has a high financial sentiment and ergo value, whilst the corner shop who makes profit albeit small, has low financial sentiment. Sentiment can equally be interpreted as Alignment of the actors (e.g. shareholders) to the target. Sentiment, how we feel, is dependent on our values e.g. confidence in the future expectation.

Value = ƒ (Sentiment) = ƒ (Values)

Whilst the science of measuring values is still immature, that cannot be said of sentiment analysis which has been around over a decade and forms the basis of many online engines, often used as a tool by Google and others in everyday products.

The rapid rise of S/E Ratio stems from several significant advantages:

• Digitization of non-financial value – very rapidly 10–60 seconds

• Converts sentiment into financial value – provides a currency value to our feelings

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Castelanno Lubov, D. "Vatican Has Long Promoted Intangible Value; Can They Be Measured", Zenit (05.01.2015)

• It is 100% objective, replicable and with distributed feedback

This makes S/E backbone a Proof-of-Value system, allowing IoV to expand its remit to include non-financial value through the 'Seratio' blockchain.

Proof of Concept

The project has been outlined through a series of presentations.

Phronesis I INTRO: SERATIO BLOCK (2 min 20 sec)
https://youtu.be/ApgNCzcTNCU

Phronesis II DEEP DIVE: DIGITAL GOOD – DIGITAL GRATITUDE – DIGITAL PROVENANCE (12.5 min)
Prezi http://ow.ly/A34u303S4wa
Video https://youtu.be/kTiUeHAvBFc

It is the aim to make significant structural change through this innovation. There are currently 3 main Proof of Concept pilots for Q4 2016.

a) REWARDING CHARITY/NGO: The unsung heroes that volunteer in our society bring real value to all of us. We are launching a regional pilot in the UK targeting the 7 million carers in the UK (1:10 of the population) with the retail solution shown in Phronesis II. Initial target are carers that work within learning difficulties with our regional coordinating partner in mid England being www.heartofenglandmencap.org.uk

b) ISLAMIC CURRENCY: Currencies based on beliefs are strong contenders for cryptocurrencies based on positive values. Muslims have a highly developed economically active network (e.g. cross-border remittance) and believe in trading with integrated values based on trust within the community. We have formed a 50/50 JV with Hijaz University led by Sheykh Siddiqi to develop a 2017 solution targeting initially 500 million Muslims (UK, Indonesia, Pakistan, Saudi Arabia) including a blended anti-radicalisation agenda

c) HYPERLEDGER: More a goal than present reality, we aspire to have Seratio block admitted into the Hyperledger (www.hyperledger.com) as a build standard for non-financial value blockchains to promote mass adoption and become the de-facto standard for all Total Value currencies.

Role of Blockchain Technology

This initiative comes out of our IoV Blockchain Alliance for Good, Bisgit.IoV (www.bisgit.org), driving towards enlightened ideas and outcomes, including the philosophical elements of IoV integrating emotional and ethical dimensions. In blockchain, however, the challenge is not in the sandbox of the blockchain world, but rather articulating and ensuring successful implementation when it meets the real world. As we know "no battle plan ever survives contact with the enemy" (*Von Moltke, 1963*). We are keen not to just talk to our IoV community but to use the Seratio blockchain to integrate existing markets. Cryptocurrencies that stand alone (e.g. bitcoin, ethereum) – of which there presently over 700 – demonstrate that the challenge is not technology.

Most of the present applications of blockchain are involved with translating a closed hierarchical system into open source distributed ledgers, both permissioned and unpermissioned. We see the role of Seratio blockchain technology to add to this unfurling landscape:

(i) EXISTING: To transport value in a world with existing actors that currently articulate value but do not transact it efficiently or at all.

(ii) NEW: To create new markets and applications in value transactions, currently unheard of, or impossible to do with existing solutions and technologies.

(iii) BLUE-SKY: To paint a picture of with a new paradigm by speculating a new ideal, but nevertheless separate world, where we transact value through our values providing total transparency of value alignment to revolutionize informed choice.

This White Paper contains the proposed architecture upon which we are planning to build our systems. This draft is released to garner support through our Slack team. As part of the open source community, we welcome assistance, amendments, suggestions and partnerships.

Von Moltke, H. *The Swordbearers : Studies in Supreme Command in the First World War*", Correlli Barnett, p. 35 (1963)

Proposed Roll-Out

As a build on blockchain we are platform independent and to ensure flexibility of implementation we are deliberately open to design on a variety of platforms including Ethereum and Synereo, as well as several Blockchain-as-a-Service (BaaS) platforms – Microsoft Azure, Deloitte Rubix and IBM Bluemix; there are also proprietary API enabled platforms such as Monax and Factom.

We have devised a long term 5-year strategy for product roll out.

a) ARCHITECTURE (2016-17): Following PoC trials in 2016, establish the Seratio BaaS system to enable a multitude of applications that may use non-financial value.

b) UNICORNS (2017-18): Roll out several high profile, volume, applications that scale the technology in retail, religion, Hyperledger standards and game changer sector of Artificial Intelligence and Bot markets; this 2 min video presentation outlines our ambitions #mydigitalconscience https://youtu.be/tdjyoxfuhHs

c) OFFLINE>ONLINE (2018-19): We consider the Seratio blockchain to be a key enabler for the transformation of offline markets currently transacting on intangible sentiment where digitisation has not yet been adopted – to online opportunities thereby more than doubling the IoV market size. Examples we are currently working on several pilots include Ethical Leadership (commissioned by www.missionperformance.com) and Health & Wellbeing (commissioned by www.moveitorloseit.co.uk).

d) CAPACITY DEVELOPMENT (2019-20): Sustainability, Happiness Index, etc. are amongst the 1500 (listed http://ow.ly/CbFUa) non-financial impact metrics used globally. Whilst they articulate other non-asset class values, they are unable to transact them – something increasingly required to underpin legislation (e.g. http://ow.ly/JNxqv). Our early focus will be migrating our own Fast Data prodigy metrics to blockchain – such as Freedom (www.modernslavery.uk), Social Impact (www.publicvalue.online), Personal Value (www.serat.io), several European Union projects (www.socialvalue.eu), MOOC educational certification (www.seratio.org), etc. We will JV with other partners who are active and have momentum in their own online industries e.g. dating, social media, recruitment, anti-money laundering, etc.

e) ADOPTION (2020-21): Finally, with a 5 year global adoption strategy, we intend to deliver our Phronesis World built on a Distributed Ledger of Non-Financial Value to allow existing digital institutions to interact with our values.

Cryptocurrency Credibility and Market Failure

In 2008 Satoshi Nakamoto (*Nakamoto, 2008*) published his "Bitcoin: A Peer-to-Peer Electronic Cash System". In the core of the paper was the innovative payments system that allowed transactions to be carried out directly from one party to another and thus eliminated the need for an intermediary. The system and the technology behind Blockchain and DLT (Distributed Ledger Technology) has gained wide interest both online and offline. Today, Blockchain is studied, developed and widely speculated upon.

Despite this relatively high interest in Blockchain, however, public confidence in cryptocurrencies remains low. Until recently Bitcoin, based on blockchain, has been mainly associated with digital black markets and illegal auctions stemming from the arms and drugs trade, confidential information leaking and other credibility issues (*Greenberg, 2013; Caffyn 2015).* Instances when judiciary in some countries make news because of the confusion whether digital currencies based on the Blockchain are, or are not, currencies does not help the situation either (*Sidahmed, 2016; Stempel 2016*). Now with problems at The Dao, Ethereum Fork, 51% attacks, questionable ICO's (Initial Coin Offerings), significant losses at exchanges, the Bitcoin credibility issue has not only not disappeared, but expanded to other cryptocurrencies.

Market interventions to overcome the loose nature of early cryptocurrency solutions have hitherto compromised central aspects of blockchain – anonymity, or confined to permission only networks, and even the lack of distributed governance. What this is resulting is in the classic 'let a thousand flowers bloom' with no consensus. Far from being the second wave of the internet – where data was transacted on ONE common TCP/IP protocol ensuring value exchange, blockchain cannot exchange value as there is no commonality between blockchain attributes. Other than being a descriptor, the word 'blockchain' means nothing. It's like discovering "steam", claiming all kinds of applications of steam, with the only commonality being the attribute of the colour – white. We applaud Hyperledger in attempting to bring some coherence to an already fragmented market. In the Social and Sustainability Innovation markets the same 'let a thousand flowers bloom' approach has led to market failure, no progress with not even Carbon trading becoming a common currency due to lack of trust in the figures. Without a single instrument articulating value clearly it has been very difficult to make progress in social cohesion agendas.

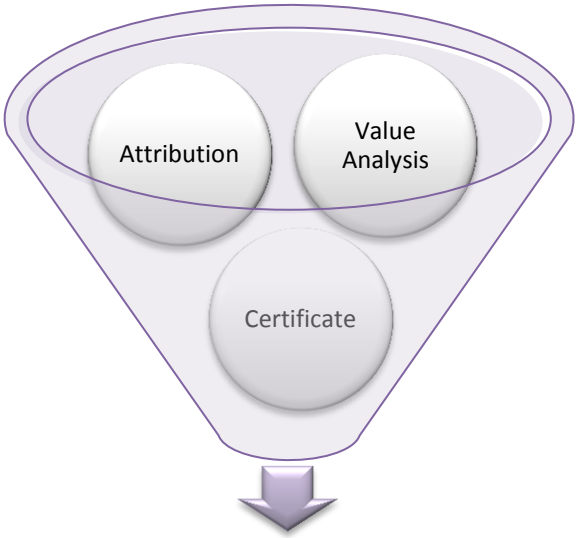
Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System, *October 2008*
Greenberg, A. "Follow the Bitcoins: How We Got Busted Buying Drugs on Silk Road's Black Market", Forbes (2013)

Caffyn, G. Meet Darkleaks, a Bitcoin-Powered Black Market for Secrets, The Coindesk (February 2015)
Sidahmed, M. "Bitcoin 'not real money' says Miami judge in closely watched ruling", The Guardian (26.07.2016)
Stempel, J. "Bitcoin is money, U.S. judge says in case tied to JPMorgan hack", The Reuters (19.09.2016)

Proof of Value

Confined to intangible value transactions, we are suggesting a radical different approach by focussing on a common non-financial attribute that is a build on any blockchain, not adding to the ever increasing diverging protocol pool. We are able to do this with a likely chance of success as, unlike tangible value blockchains, the market is not yet fragmented yet into myriad solutions. Whilst it is not possible to attribute values to data, we can attribute values to the sender and even the receiver. The concept of proving online attribute of an entity / individual by means of certification is called Proof of Value.

Proof of Value Theoretical Framework



Worth noting, Proof-of-Value (PoV) should not be confused with Proof-of-Work (PoW) or Proof-of-Stake (PoS). Despite being envisaged to serve as part of the verification process, PoV is rather a rationale behind proposed integration of value (both financial tangible and non-financial intangible) concepts into the software. Precisely we propose the S/E Ratio methodology.

Theory of Total Value

The Centre for Citizenship, Enterprise and Governance (CCEG, www.cceg.org.uk) has been studying value movement and developing tools for its effective measurement since 2011. Below we have summarised some of the relevant parts to IoV Blockchain.

Financial tangible value of a transaction is the amount of digital value (e.g. crypto coins) sent from one involved party to another, whereas non-financial intangible value represents intangible value of involved parties at the time of transaction. Total Value of every transaction is the sum of its hard financial (tangible) and soft non-financial (intangible) values. All objects / entities / individuals have their own financial and non-financial values and therefore analytical transaction reasoning can be applied and extended onto any tangible and / or intangible subject.

Social Earnings Ratio (S/E) is an intangibles assessment metric that helps articulate non-financial (intangible) value in a single number. S/E was created at CCEG as the corollary to the Price Earnings Ratio (P/ E), the universally accepted financial value index. The S/E metric is constantly evolving. It was originally used to calculate non-financial value of a business enterprise, but today the metric is mature enough to be deployed to monitor and articulate non-financial value of a country, region, family, SME, and even a network. S/E used to measure social impact of an individual is known as Personal Value (P/V).

The Social Earnings Ratio® is freely available under Creative Commons 4.0 International, Attribution-NonCommercial-NoDerivatives. Various SaaS platform builds using S/E Ratio® are operated by Seratio® at www.seratio.com. Calculation times are generally 10-60 seconds. We have chosen a couple of samples to illustrate its application to Blockchain.

$$TotalValue = FinancialValue + NonFinancialValue = P/E + S/E \quad (1)$$

$$S/E = \frac{SocialValue}{FinancialValue} = \frac{\$^{+}}{\$} = \frac{EnvironmentalRatio + MoneyLeveraged + ReportedCSR + \left(\frac{PeopleSupported * Capitalisation}{Shares}\right) * AlignmentRatio}{ReportedCSR * 10^{DegreeofSeparation}} \quad (2)$$

$$P/V = \log_2\left(\frac{EnvironmentalRatio + MoneyRaised + Donations + \left(\frac{PeopleInfluenced * FinancialWorth}{FamilyMembers}\right) * \frac{PositiveFeedback}{TotalFeedback}}{Donations * 10^{DegreeofSeparation}}\right)$$

(3)

$$EnvironmentalRatio = \frac{CarbonReduction * NonTradedtCO2}{10^6} \quad (4)$$

$$AlignmentRatio = \frac{PositiveSentiment}{TotalSentiment} \quad (5)$$

where

$EnvironmentalRatio$ represents environmentally consciousness of the entity / individual

$AlignmentRatio$ shows how aligned people are to the analysed entity / individual;

$CarbonReduction$ – amount of tCO2 reduced by the analysed entity in the observed year;

$NonTradedtCO2$ – price of the non-traded tCO2

$MoneyLeveraged$ – money leveraged by the entity for the social purposes

$ReportedCSR$ – claimed CSR spendings

$PeopleSupported$ – number of people supported per social project

$Capitalisation$ – capitalisation of the entity

$Shares$ – number of shares

$PostiveSentiments$ – number of positive mentions

$TotalSentiments$ – number of total mentions

$Degree\ of Separation$ – correlation of network cohesion

$MoneyRaised$ – money individual helped raise for social causes in the observed year

$Donations$ – money donated by the individual in the observed year

$PeopleInfluenced$ – number of people positively influenced by the individual

$FinacialWorth$ – financial worth of the individual

$FamilyMembers$ – number of people in the immediate family

For Blockchain applications, *AlignmentRatio* illustrates how aligned users are to the network. Alignment in this cases means how potentially active a network is – how many transactions could take place at a time. Consequently …

$$AlignmentRatio = \frac{v_1}{v_0} \quad (6)$$

$$v_0 = C_{k_0}^2 \quad (7)$$

where v_1 – number of (confirmed) transactions at given time t_0.

v_0 – number of all potential transactional combinations, that is number of possible transactions [subsets] at given time t_0.

$$v_0 = C_{k_0}^2 = \frac{k_0(k_0-1)}{2} \quad (8)$$

where k_0 – number of active users (nodes) at given time t_0.

Given (2) (S/E is calculated via AlignmentRatio),

$$S/E = f(AlignmentRatio) \quad (9)$$

Then

$$AlignmentRatio = F(S/E) \quad (10)$$

Applying (8) in (10),

$$F(S/E) = \frac{v_1}{v_0} = \frac{2v_1}{k_0(k_0-1)} \quad (10.1)$$

At the same time, total network value - “capitalisation” is

$$V_t = k * V_n * AlignmentRatio \quad (11)$$

(similar to $Capitalisation = Number of Shares * SharePrice * MarketSentiment$)

Or using (10),

$$V_t = V_n * k * F(S/E) \quad (11.1)$$

where V_t – total value of the network;

V_n - value per user (node);

k - number of active users;

n - number of all users of in the network.

Thus, Total Value of the network V_t is in a direct correlation with S/E. The higher S/E the higher is the value of the network. Elaborating it, through attributing a network with the Social Earning Ratio one can bring in more (active) users by increasing the value and trustworthiness of the network which will result in even greater increase of network value and hence more new (active) users.

PoV Certificates (or briefly Certificates) represent an attribute of an entity's / person's online credibility, where attribute means proven (non-financial intangible) value of the certificate holder. They are aimed at establishing trust among the users by showing users' credibility. Technically certificates are codes which one can use to prove one's own reputation online. Certificates are awarded on the basis of Total Value analysis.

Applications of Seratio Blockchain

Whilst the Blockchain Technology makes its way to broader adoption and has already penetrated through many spheres including highly behind-closed-doors banking, the adoption is still partial (*Gagliordi, 2016; The EconoTimes 2016*). The problem is due to

Gagliordi, N. "Visa to test blockchain system for international money transfers", ZDNet (1.9.2016)

one of the fundamental ideas behind the blockchain – anonymity. Whilst anonymity helps maintain relatively high level of security, nevertheless it shatters the mainstream trust in blockchain and hinders its further adoption. CCEG's solution to the problem is to bring in non-financial intangible attribution of each transaction (and hence whole network) to show online reputation of involved parties without exposing confidential data. There are various options how this can be implemented, here is one.

Imagine there is a transaction that is about to take place between two parties. Let's name them A and B where A is a customer and B is a service provider. Then A represents a sender and B is a receiver. B wants to know how reliable A is without undermining A's privacy and hence requests PoV certificate of A. A provides the certificate that is issued and / or checked by means of the S/E Ratio smart contract and – if correct – money & service exchange between A and B happens. Otherwise, both sides get refunded. In terms of the S/E Ratio Smart Contract, it operates in accordance with the principles of the Theory of Total Value.

So, how does one "apply" for a certificate? Anyone can receive the certificate by sending their data to the S/E Ratio Smart Contract. The contract will calculate S/E score for you and issue you with an approved private-key-like code, which you can further use in your transactions. Certificate request can be done beyond or within a transaction. It is not mandatory that one applies for the PoV certificate, unless the recipient demands it.

Example: Islamic Currency

One of the instances where PoV Certificates could be practically useful is to prove that blockchain-based cryptocurrencies are "halal" (Sharia compliant).

According to Islam, al-mal al-Halal or Lawful Money is money that is allowed, permissible and earned legitimately. Besides, it should not be created out of nowhere but has to contain value, compared to the one precious metals have. (***Al Jalld, 2008; Mukherjee, 2014; Zainudin, 2016***) Some Muslim scholars draw parallels between Bitcoin and Gold and therefore suggest the former carries intrinsic value of the latter

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Barclays and Wave execute blockchain-based global trade transaction, The EconoTimes (7.9.2016)
Al Jallad, N. The concepts of al-halal and al-haram in the Arab-Muslim culture: a translational and lexicographical study, University of Jordan (2008)
Mukherjee, S. R. "Global Halal: Meat, Money, and Religion", Religions, Vol. 5, No. 1, pp 22-75 (January 2014)
Zainudin, S. Is Bitcoin Halal? What Scholars Say and Where It Stands in Islamic Banking and Finance, Analysis, (March 2016)
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Tayel, M. M. I. Can Bitcoin be Self-regulatory Legal Tender? A Comparative Analysis of United States, European Union and Islamic Legal Systems, Central European University, (March 2015)

(*Zainudin, 2016; Bergstra, 2014; Tayel, 2015*), whilst others agree on the fact that Bitcoin conforms with Sharia banking laws, such as prohibition of usury (riba), incorporation of the principles of social benefits (maslaha) and mutual risk-sharing (mudharabah) (*Evans, 2015*), however majority cite its volatile nature. The latter due to lack of authoritative body and as mentioned earlier- low public trust.

PoV Certificates would show the "actual" Islamic value behind every (blockchain) transaction. S/E non-financial intangible Muslim attribution would show and prove faith alignment of those involved in the transactions. S/E Ratio Blockchain will calculate S/E scores and accordingly award the parties with PoV Certificates. Certificates will be considered valid only after validation by approved third parties (licensees), such as S/E accredited mosques. As a consequence, non-financial intangible attribution via PoV Certificates would help the vulnerabilities inherent within digital currencies:

- High volatility due to low public confidence
- Necessity to tie to gold or other precious metals / commodities in order to weight it down with value
- Provenance establishment

S/E non-financial intangible attribution via PoV Certificates has the power to revolutionise blockchain-based cryptocurrencies and restructure the majority that are deemed to be precarious, valueless and originating from nowhere but rather backed up by the reputation and trust of the holders and users.

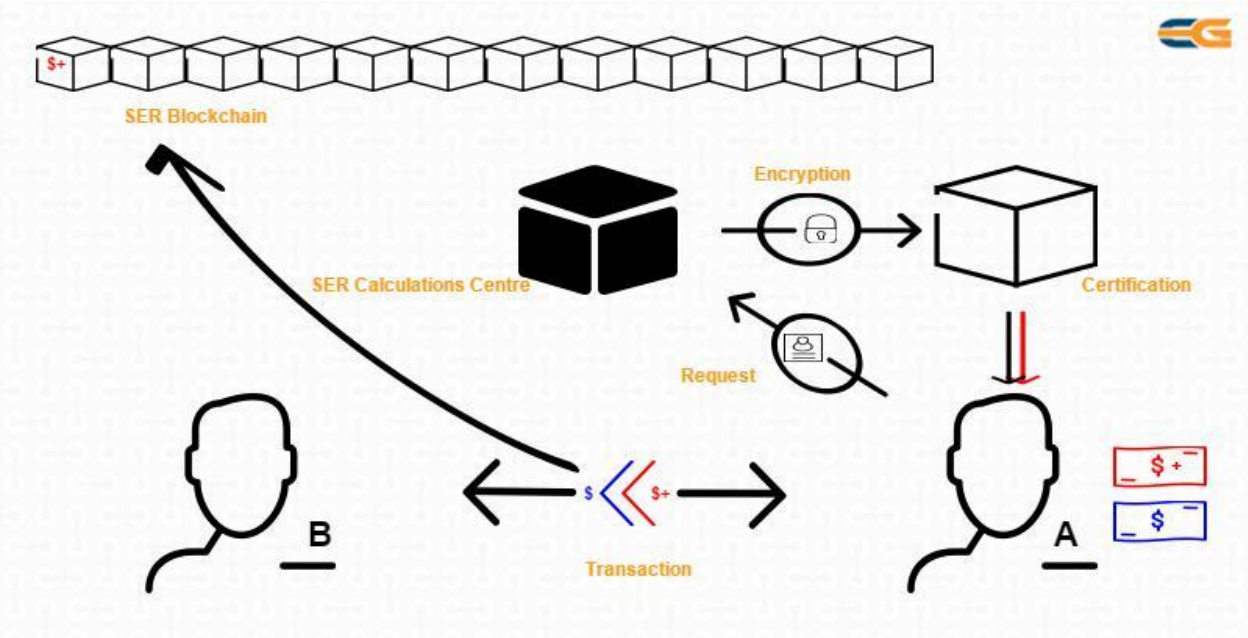
Implementation Options

In order to receive a PoV Certificate, A, the Sender sends his/her data to the S/E SaaS (or S/E Ratio licensee), where data is verified and S/E score is calculated. After that, the score is secured through the S/E Ratio system then sent back an encrypted version of the certificate to A. The system will also store a copy locally. This certificate can now be used in the transactions. If certificate holder needs to prove existence of the certificate he/she (or possibly B, the Receiver) sends a request to the (S/E Ratio) Smart contract. The Smart contract will check it with the Seratio blockchain and – if everything is correct – will grant its permission to execute the transaction. In terms of the Seratio Blockchain, it will represent a simple private database.

Larger entities have public accounts available through XBRL and brands that yield PoV distributed feedback for verification, allowing for a prepopulated database. Smaller organisations or people would register and conduct the certificate request before

Evans, C. W. Bitcoin in Islamic Banking and Finance, Journal of Islamic Banking and Finance, V. 3, No. 1, pp1-11, (June 2015)

hand. This figure illustrates the general operating principle of non-financial intangible attribution using S/E methodology.



There are several ways of embedding S/E metric into a Blockchain.

(i) Place S/E calculations in a Smart Contract of an existing platform.

(ii) Create a hybrid system where Seratio software, which orchestrates the certification process, will be connected to an existing Blockchain platform which carries out transactions.

(iii) Create an independent Seratio platform, that will allow both certification awarding and transactions to happen in one place.

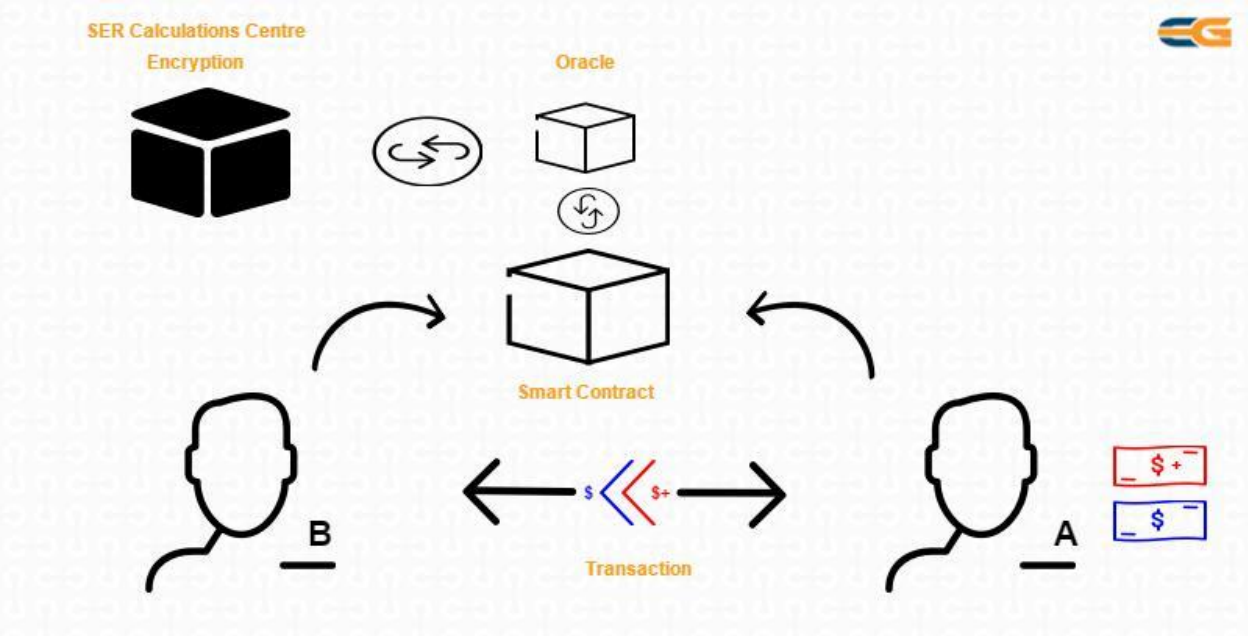
In the case of the first option (complete absorption by an existing platform), this varies from platform to platform. Implementation of the second option (hybrid system) may be complicated due to transactional costs and storage issues. In order to keep certificate issue as fast as possible, one may place actual calculations not in a block (that is, along with transactional data) but on an oracle. Oracle(s) will execute the calculations without overwhelming the block and hence without slowing down the whole system. Alternatively, oracles could help synchronize the block with the transaction with the proprietary Seratio API. This API will in the turn carry out the calculations and send the output back to the oracle(s) that will transmit it further to the block. The contract in the block then will decide if to trigger the transaction or refund the money. (*Buterin, 2014; Ethereum Blog,*

Buterin, V. "A Next Generation Smart Contracts & Decentralized Application Platform", Ethereum White Paper (2014)

Ethereum and Oracles, Ethreum Blog, (22.07.2014)

2014)

Figure of Hybrid System: Seratio Smart Block Operating Principle using Oracles



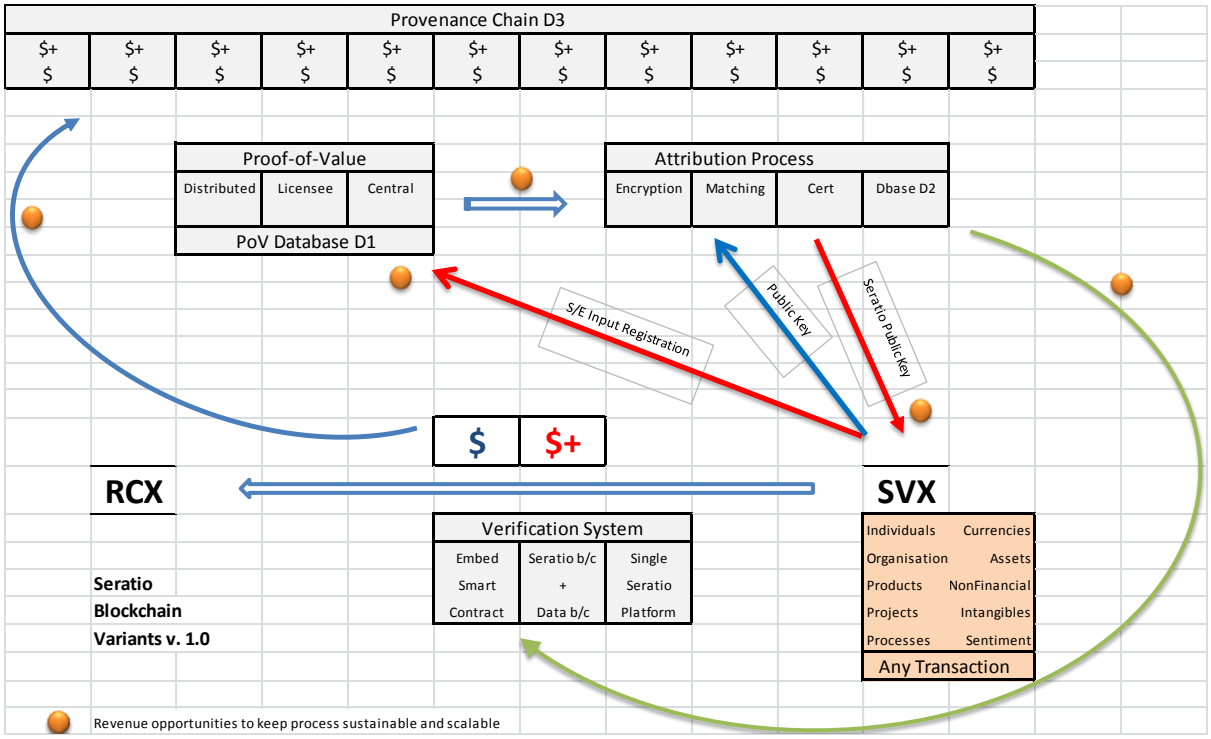
Such a principle is envisaged for Turing-complete blocks (like Ethereum smart contract). Alternatively, there is a possible way of embedding the technology into Synereo's RChain (*Synereo Blog, 2016*) for example. Instead of using oracles, the S/E algorithm will be just placed and executed in a "smaller" inner chain and not in the main "transactions" blockchain.

There are also several complications with the oracles, one of them being that they tend to hide executed operations. Whilst it may be considered to be generally useful as users' private data will not be completely exposed to anyone in the network, there might be concerns on how transparent the system actually is. In order to solve this issue S/E algorithm will be stored in the smart contract as ordinary data, despite the fact that storing large amount of data in a block may negatively affect transactional costs. In case of a public ledger, this problem is solved with possibility to opt out, as at this stage we envisage this kind of certificates requests to be users' personal choice and therefore something optional rather than mandatory. This is not the case in a private ledger, as we will be operating in reward-free environment (verification is up to ledger holders or validators appointed by the holders). To completely avoid oracles, one might go for Bletchley Cryplets by Microsoft Azure. As presented, they carry higher

"Meet RChain: The first scalable, blazing fast, turing-complete Blockchain", Synereo Blog, (05.09.2016)

level of security due to secure protocol and trusted host they use, unlike oracles that use "random" protocol and host. Nevertheless, the operating principle here stays the same as with oracles. (*Gray, 2016*)

The S/E non-financial intangible attribution can take place in many different ways, whether S/E is an add on to an existing platform, symbiotic or an independent platform. The latter, a public platform where all the transactions along with certification awarding can be executed directly at the Seratio platform, is the ideal for scaling and efficiency but costly to implement. A more comprehensive option maps looks like this …

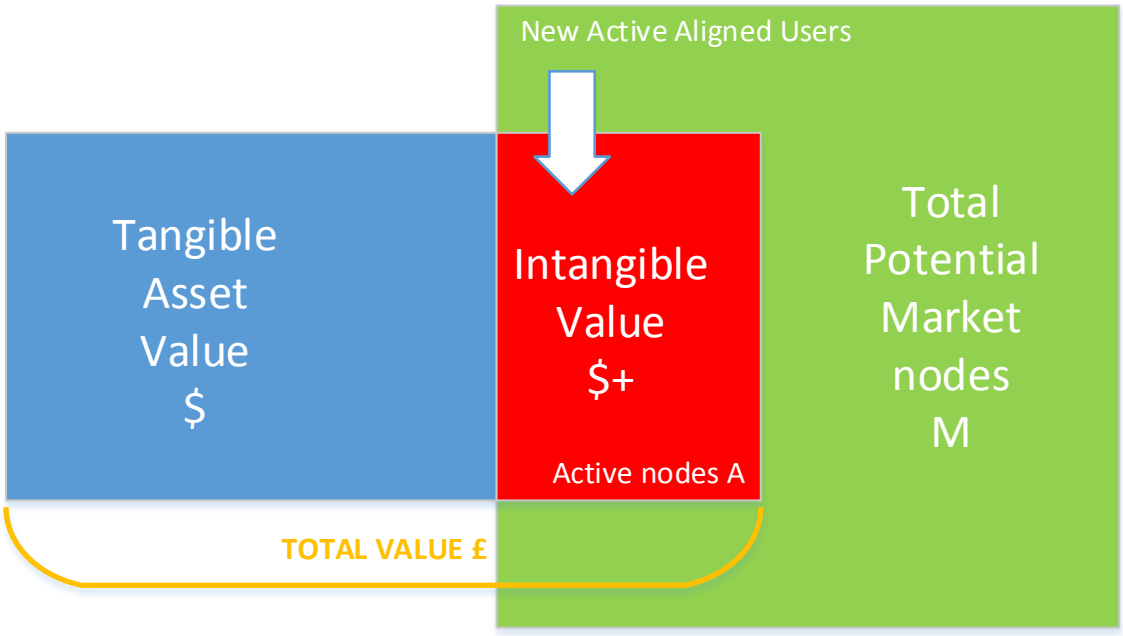


One might argue that there is no need to overcomplicate it all by means of the blockchain & DLT (Decentralised Ledger Technology) when a regular centralised system could be of a use. This is not the case when conventional centralised data base can be applied as S/E calculations involve private data (e.g., financial assets and daily choices of an individual) that should be kept securely. Centralised data base does not provide the necessary security level, whereas data stored in a decentralised blockchain is less likely to be stolen or gamed. Besides, certificates are tied to a specific person / entity and have to be kept this way, so that no one can use someone else's certificate.

Gray, M. "Introducing Project "Bletchley"", GitHub (20.09.2016)

Network Theory to Real Life

This paper has demonstrated a way of helping increase confidence in a particular Blockchain and with that an opportunity to attract more people to transact with it. We have shown above that the value of a network increases or decreases depending on whether its S/E indicator goes up or down. Given that, S/E (i.e. non-financial intangible) network attribution opens an avenue for new active users to enter the network due to increased alignment with the values of the transaction, or transactors. Increasing trust of the network will result in growth in new active users and thus network value.



To put it in simple language, if we assume P is node price:

Sentiment/Alignment (C) = A / M

Total Value (£) = $ + $$^{+}$$

⇨ £ / $ = 1 + s/e

From network theory, total node value …

$ = C x M x P

⇨ £ = C.M.P + s/e (C.M.P)

This provides a direct linkage between s/e attribution and transaction value. In brief, the higher the intangible attribution e.g. goodness, the greater the value of the transaction. So, it is in the interest of all parties to take make more explicit and transparent the soft intangible non-financial value attributed to the transaction.

Unique Components

Sentiment is rapidly replacing money as the currency of the world. Five-star rating systems of the intangible "satisfaction" informs us where to stay, eat or shop. Ebay 'Trust' %, Facebook 'Likes', 'Tweets', 'Followers' are all alignment sentiment metrics. We are increasingly relying on feelings and even rely other peoples' feelings to guide our everyday financial decisions. Corporates are not immune. Net Promoter Score (NPS), the one number index of customer 'Loyalty', is now hard linked to HPO (High Performance Organisations) and thus success.

The Holy Grail of social innovation industry is to hard code positive values with rewarding outcomes. Without it, we have two separate non-intertwining sectors. The latter, an all powerful financially driven asset world that generally governs strategic decisions, laws, and money. Frankly, all the key elements of life synonymous with higher and central authority – the antithesis of the blockchain philosophy. It has stuck because its correlation of FIAT money to benchmark success is very transparent.

The second, a sentiment based advocacy of good, social and environmental causes that governs our communities, friends, life decisions, ethics, morality. In essence, how we decide to live our life synonymous with distributed networks of people and the planet – the essence of Internet-of-Value. Social Innovation 'success' is obfuscated, cluttered with a myriad of sentiments and metrics. White fog has ensured no clarity of outcomes and which beliefs drive them. Indeed, evidence suggests that social good is inversely related to financial value.

Financial Value = ƒ (1 / Values)

That is true, however, only for cost (what something is worth), not what we are willing to pay for it (value). We need a hard link between non-financial metrics (values, beliefs, sentiments, feelings) and financial outcomes to provide an irrefutable glidepath to change. The Seratio Blockchain provides this.

Value is not just asset class but within everyday asset prices there is the inherent non-financial value – e.g. a car price reflects our 'desire' and emotional response to it. Greater transparency of the non-financial benefits that transaction brings to us results in greater (total block) asset value; for many instances this just means we can charge more for the same transaction as it conveys more of the values we are aligned to. At last our values can be equated to 'good' asset value, greater market size, greater total value. For the first time we can evidence empirically the relationship between doing 'good' and 'value', and accurately forecast the consequences of our decisions.

To summarise, the Seratio Blockchain demonstrates that …

Financial Value = ƒ ([Potential Market x Alignment x Share Price] + [Social Performance])

So, a corporate capitalization (worth) will increase when:

- There is an increase their social and sustainability responsibility
- They articulate their values more clearly and transparently
- There is an increase their potential markets by adopting their values

The same goes for transactions of products, which confirms our intuition:

Product Price = ƒ ([Component Cost x Alignment]+ [Social Premium x Product Cost])

So a product can bear higher sale price if:

- More customers feel socially aligned to the product
- More associated 'good' provenance
- More transparency in the supply chain

In essence what the Seratio Blockchain has allowed us to do is irrefutably prove the linkage between being good and creating value, not just in the introspective social innovation industry, but in the financial world.

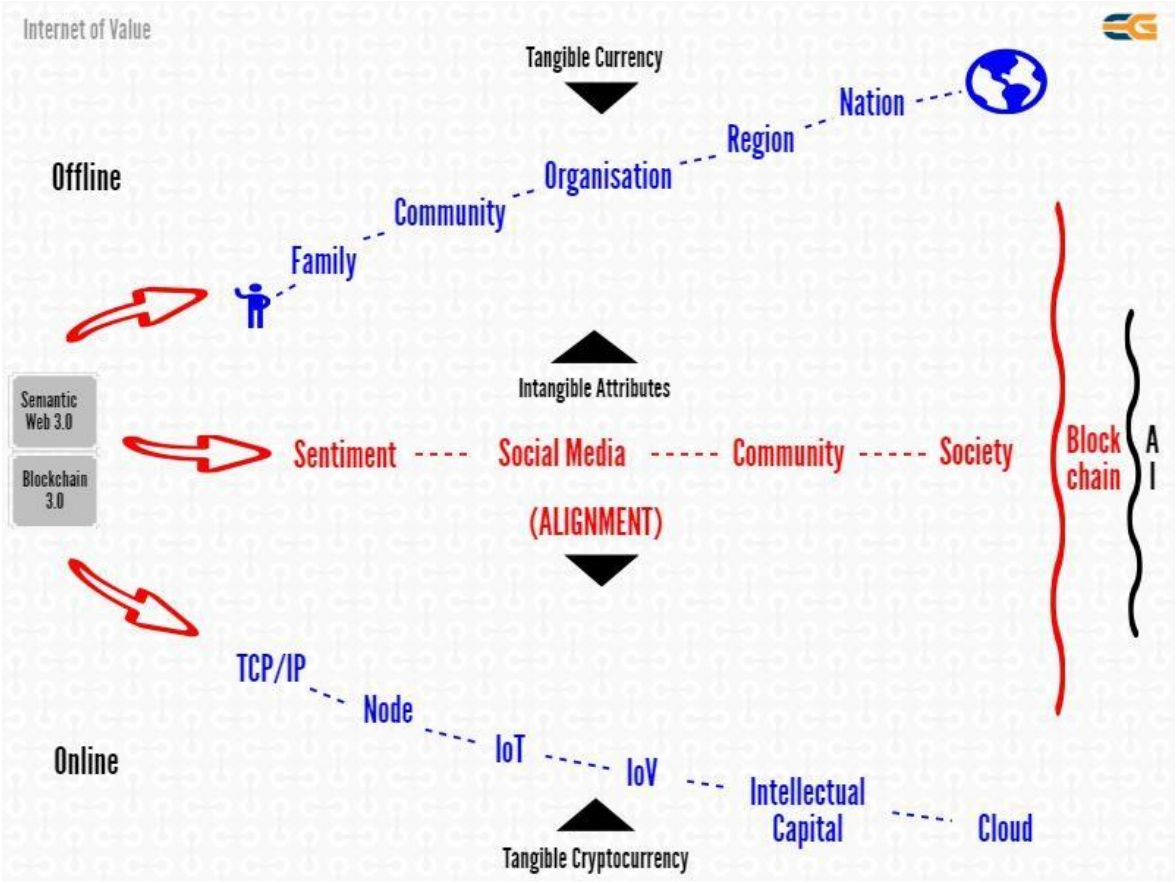
S/E ~ Blockchain Total Value

This social 'good' index relationship to value is significance in mainstreaming the transaction of good in everyday life.

The Seratio Blockchain, like S/E, is neutral, agnostic and non-partisan when it comes

to the values it promotes. Through attribution any set of values can be injected in the transaction but this is not to be confused with ethics. For example, you may need to be ethical to be trusted but being trusted does not mean you are ethical. Nevertheless, often the transactions that are preloaded with ethical values are aligned to the markets they serve.

A further USP of our work is the introduction of an objective, repeatable and efficient Proof-of-Value for soft, intangible, non-financial transactions in Blockchain. This sits alongside existing Proof-of-Work, Proof-of-Stake, Proof-of-Activity and Proof-of-Existence for tangible hard data. For PoV data mining is the harvesting of sentiment in a distributed consortium ledger. Adding this attribute to both the online and offline worlds is a major step for absorbing meaning into our transactions.



The reality is that the vast majority of current blockchain applications are b2b orientated as here transactions and efficiency matters. Consumers at the ground level would find it very difficult to engage when the pathways to implementation remain so complex. Organisations transact with data, but humans transact with feelings – the Seratio blockchain bridges this gulf by providing the transport mechanism to do so.

Background Note

Information on the open source Social Earnings Ratio® (Creative Commons, 2011) may be found at the not-for-profit Think Tank, Centre for Citizenship, Enterprise and Governance (www.cceg.org.uk) which focuses on Movement of Value. CCEG has received over 100 commissions, shown at www.socialearningsratio.com and operates 10+ SaaS platforms through the trading arm Seratio Limited (www.seratio.com). CCEG has over 50,000 members including 6,900 heads of CSR of the world's largest companies and 2000 politicians. Members receive the journal Social Value & Intangibles Review https://issuu.com/seratio. CCEG has founded the IoV Blockchain Alliance for Good (Bisgit.IoV) at www.bisgit.org

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