# Problem of Uniformity of Measurable KPI factors: A Lesson from three Companies using Blockchain Technology

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### Abstract

Key Performance Indicator (KPI) is a usual way to determine the progress of a company. Though the KPI has been used, its relationship to specific technology is not a common report. Its usage is generally vague and changes with time and technology. The basis for the work is that KPI cannot be said to be a "one solution fit all" issue. The work gave an extended description of blockchain technology. It identified some structural composition of the technology. The structural composition are the "hangers" of KPIs coupled with client and management issues. Performance data were collected from two web sites for three companies that use blockchain technology. It evaluated the companies in that light. The essence of this is to provide the basis for the refinement of the KPI. The compared table shows that standardization of KPI is a big challenge.

**Keywords:** Key Performance Indicators, Blockchain Technology, Refinement

## Introduction

Key Performance Indicator (KPI) is becoming a benchmark for company performance. Despite its widespread use there is need to refine and redefine issues around it. This is because KPIs itself are so numerous with the number exponential in time. KPIs can hardly be standardized because of social factors and technologies around them. This makes it inevitable to continually refine and redefine it. KPI's exists in wide range of structures and content. Selection of KPIs relies upon specific characteristics of organization attempting to use them. These characteristics are dictated by the type of your industry, management hierarchy and vision of the organization. The objective of this work is to provide the basis for refinement of specific KPIs with specific reference to Blockchain. Currently, there are more than 50 companies using the block chain technology. An attempt is also to evaluate three companies with specific KPIs that at the close of the writing.

## Related work

With reference to historical writing (or do we call it a visionary writing) of Vannevar Bush [1], we can situate blockchain into his imaginations stated below:

Take the prosaic problem of the great department store. Every time a charge sale is made, there are a number of things to be done. The inventory needs to be revised, the salesman needs to be given credit for the sale, the general accounts need an entry, and, most important, the customer needs to be charged. ... But there may be ten thousand charge customers doing business with the store, and before the full operation can be completed someone has to select the right card and insert it at the central office. Now rapid selection can slide just the proper card into position in an instant or two and return it afterward. Another difficulty occurs, however... This was the imagination of method of doing business in 1945. Many of the problems envisage in this writing is being handled by the Blockchain technology. Just as the author alluded to the fact that "another difficulty occurs." another difficulty of refining Blockchain usage with KPIs is constantly a challenge.

A detail description of the blockchain technology is found in a report Yaga, Mell, Roby and Scarfone [2]. The description can be reconciled with the writing of Vannevar Bush [1]. It described the core of the technology with the fact that information representing electronic cash is attached to a digital address. It further explained that signature by users of Bitcoin

(an implementation of Blockchain) users and transfer rights is achieved digitally. It clarified that user and the blockchain records is transfer publicly, allowing all participants of the network to independently verify the validity of the transactions. The basic description and definition can be enhanced by applying the technology to a domain of interest. A report Mahdi and Maaruf [3] gave a conceptual description of how blockchain can be applied beyond Crypto-Currency. Specific mention was made of IoT and Health Care System. This is a good view of application of Blockchain but an unambiguous buttress into the structure of blockchain is needed [4,6].

## The Blockchain technology

A blockchain is a decentralized, appropriated and open computerized record that is utilized to record exchanges crosswise over numerous PCs so the record can't be changed retroactively without the adjustment of every ensuing square and the accord of the system. This enables the members to check and review exchanges reasonably. A blockchain database is overseen independently utilizing a shared system and a disseminated time stamping server. They are confirmed by mass coordinated effort fueled by aggregate personal circumstances. The outcome is a strong work process where members' vulnerability in regard to information security is minor. The utilization of a blockchain evacuates the normal for unbounded reproducibility from an advanced resource. It affirms that every unit of significant worth was exchanged just once, taking care of the long-standing issue of twofold spending. blockchains have been depicted as an esteem trade convention.

### Structure

The structure of blockchain is typified in its block, decentralization and openness. Each of this contributes to the inner mechanism of blockchain. The structure is the core of its mechanism and is the core of the factors to be considered in choosing KPIs.

**Blocks:** Block keep groups of valid transactions hashed and encoding into a Merkle tree. Each block contains cryptographic hash of earlier block in the blockchain connecting the two. The connected block shapes a chain, this iterative process validates the trustworthiness of the past block, the distance back to the first block. Two issues are important in a block. These are Block Time and Hand Fork.

a)    Block Time

The block time is the normal time it takes for the system to create one additional block in the blockchain. Some blockchains make another block as often as possible as at regular intervals. When of block consummation, the included information winds up unquestionable. In digital money, this is basically when the exchange happens, so a shorter block time implies quicker exchanges. The usual picture is that there is an expected block time, and an average block time. For example, the block time for Ethereum is set to somewhere in the range of 14 and 15 seconds, while for bitcoin it is 10 minutes.

b)    Hand Forks

A hard fork happens when there is a rule change such that the software validating according to the previous rules see the blocks produced according to the new rules as untenable. Where this happens, all nodes meant to work in accordance with the new rules must comply to the current situation in terms of their software

**Decentralized:** By putting away information over its distributed system, the Blockchain minimize various dangers that accompany information as it moves from one place to the other. The decentralized Blockchain utilizes specially assigned message methodology as a medium of transfer.

## Openness

Open blockchains are significantly plain to use than some ordinary control records, while open to people all things considered, still require physical access to see. Since all early blockchains were consent less, trade has ascended over the blockchain definition. An issue in this propelling trade is whether a private framework with verifiers depended on and insisted by a focal ace ought to be considered a blockchain. Defenders of permissioned or private chains fight that the enunciation blockchain might be related with any information structure that bundles information into time-wandered squares.

a)    Permissionless (Public Access)

The wonderful, favored standpoint to an open, consent less, or open, blockchain engineer is that guarding against unpleasant on-screen characters is not required and no way control is required. This construes application can be added to the structure without the help or trust of others, utilizing the blockchain as a vehicle layer. Open blockchains are massive plain to use than some standard control records, which, while open to individuals everything considered, still require physicalaccess to see. Since all early blockchains were assent less, exchange has rose over the blockchain definition. An issue in this moving exchange is whether a private structure with verifiers depended and asked for by a central ace should be considered a blockchain. Protectors of permissioned or private chains battle that the articulation blockchain may be related with any data structure that groups data into time-wound squares.

b)    Permissioned (Private)

Permissioned blockchains use a passageway control layer to oversee who approaches the framework. Instead of open blockchain frameworks, validators on private blockchain frameworks are checked by the framework proprietor. They don't rely upon obscure center points to support trades nor do

they benefit by the framework affects. Permissioned blockchains can similarly go by the name of consortium or cross breed blockchains.

## Types of Blockchain

Several classifications can be made of blockchain technology. The division can emanate from the functional view, production view, service view or access method. Three categories are known in terms of accessibility (a) Public domain (b) Private domain and (c) Consortium domain. It is sometime difficult to draw a distinct line of demarcation between these types.

a)    Public Blockchain

Blockchain is of total freelancer and it is accessible to any public anywhere and everywhere. Whoever can access the internet where able to use the blockchain and can save the currency in the form Digital Wallet (i.e which involves in the distribution process of a single algorithm designed for the achievement of reliability). Normally this offers the security to the algorithms and provides the economic incentives for the users a security and also as a type of proof of state.

b)    Private Blockchain

Coming to Private blockchain, it is considered as a middle-ground layer for the companies that are interested in using the blockchain technology. Normally the kind of companies identifies here tend to avoid the technology because they are not comfortable with the percentage of control offered by public level networks. Normally, they try to integrate blockchain into their bookkeeping and record-keeping methodology without giving up self-governance and risk of disclosing important information to the general population based on the web.

c)    Consortium Blockchain

This type of blockchain that is which is associated with several small-scale and large-scale companies. They are frequently said to be semi-decentralized as regards shared and open digital platform that is utilized to monitor exchanges across over numerous PCs. The concern is that the record should be managed retroactively without the modification of every subsequent blocks and the validation from the system. It is managed as a sole company. This stand as a bridge between the companies when it comes to the security aspects. It implied that different organizations may each work as the central connectivity for the system. The leaders of a consortium chain

bind customers authorization rights as they see fit and simple to grant permission.

## Usage scenarios

We have several companies, and which used Blockchain technologies, now we are discussing the three scenario which are leading these companies in success. (a) Cryptocurrency, (b) Smart contract and (c)Banks.

## Usage type

**Cryptocurrencies:** A cryptocurrency (or cryptocurrency) is a computerized platform intended to perform like a trade mechanism. It was conceived to help with full cryptography anchored on monetary exchanges control. Cryptographic forms of money is sort a substitutive cash and advanced cash system (of which virtual monetary cash is a subset). A large portion of the cryptographic form of money utilize blockchain technology to store exchanges.

**Smart Contract:** Smart contracts are blockchain based. They are self-executing contracts with the terms of the agreement between buyer and seller being directly written into lines of computer code (programs). The code and the agreements are executed across a distributed, decentralized blockchain network.

**Bank:** Blockchain technology is becoming a formidable banking option because it allows banking industries to make and authenticate financial transactions on a network immediately without a central coordinating authority. Conventionally, banking and payment transactions have been carried out based on a central authority or middleman for effecting or controlling payments. The blockchain technology provides a platform for a distributed network of computers to reach agreement without the need for this middleman.

## Comparative Analysis and Discussion

Dataset of activities of three companies using the Blockchain technology were accessed at the public domain. The two domain used were www.kaggle.com and www.coinmarketcap.com. This gave room for a synopsis analysis.

The three companies we considered were (a) Bitcoin (b) Ethereum and (c) Litecoin

**Average price analysis of the three companies for 2017:** An overview of the average Unit closing price of the electronic currency for fiscal years of 2017 accessed as in Table 1.

**Table 1:** Average of Closing Unit price in USD of three users of Blockchain

| Row Labels | Bitcoin | Ethereum | Litecoin | Average |
|---|---|---|---|---|
| Jan | 13085.5581 | 33.5545 | 216.0568 | 4445.0565 |
| Feb | 9472.0011 | 30.3079 | 185.2121 | 3229.1737 |
| Mar | 9040.5571 | 20.6087 | 169.0216 | 3076.7291 |
| Apr | 8033.5967 | 17.0290 | 134.3257 | 2728.3171 |
| May | 8450.9977 | 18.5410 | 139.7803 | 2869.7730 |
| Jun | 6793.5077 | 15.0777 | 100.2377 | 2302.9410 |
| Jul | 7146.3500 | 16.9100 | 82.9687 | 2415.4096 |
| Aug | 6700.1300 | 13.9426 | 62.1487 | 2258.7404 |
| Sep | 6610.6750 | 11.5530 | 58.3023 | 2226.8434 |
| Oct | 6485.1187 | 10.0168 | 54.3429 | 2183.1595 |
| Nov | 6266.6838 | 9.0375 | 50.5169 | 2108.7460 |
| AVG | 8007.7433 | 17.8708 | 113.9012 | 2713.1718 |

On the basis on the above data we can conclude that the bitcoin company is performing much better on the Unit price when compare to the Ethereum and Litecoin.

**Average price difference for the companies on a monthly basis in 2017:** The price difference within the month for three companies which is on the monthly basis is presented in Table 2.

**Table 2:** Sum of Difference in Price.

| Row Labels | Bitcoin | Ethereum | Litecoin | Grand Total |
|---|---|---|---|---|
| Jan | 41027.69 | 166.76 | 794.02 | 41988.47 |
| Feb | 27040.07 | 121.57 | 698.52 | 27860.16 |
| Mar | 19515.26 | 71.72 | 427.39 | 20014.37 |
| Apr | 12662.75 | 43.68 | 274.54 | 12980.97 |
| May | 11013.04 | 42.33 | 276.92 | 11332.29 |
| Jun | 7779.19 | 35.76 | 178.92 | 7993.87 |
| Jul | 8581.58 | 28.66 | 133.67 | 8743.91 |
| Aug | 8336.91 | 37.38 | 122.03 | 8496.32 |
| Sep | 5642.48 | 19.54 | 117.14 | 5779.16 |
| Oct | 3298.31 | 9.47 | 54.3 | 3362.08 |
| Nov | 2547.61 | 6.3 | 37.22 | 2591.13 |
| Grand Total | 147444.89 | 583.17 | 3114.67 | 151142.73 |

**Volume of sales in the three companies from 2017:** Monthly volume of sales of the three companies presented in Table 3.

**Table 3:** Monthly Volume of sales.

| Row Labels | Bitcoin | Ethereum | Litecoin | Grand Total |
|---|---|---|---|---|
| Jan | 13427350264 | 550425258.1 | 970510776.8 | 4982762100 |
| Feb | 8204206446 | 580264218.9 | 993280540.6 | 3259250402 |
| Mar | 6250055135 | 316030806.2 | 517703323.9 | 2361263088 |
| Apr | 6551667021 | 180525357.9 | 364414933.9 | 2365535771 |
| May | 6374571281 | 222497355.6 | 407626549.7 | 2334898395 |
| Jun | 4340472653 | 229199899.7 | 320317003.2 | 1629996519 |
| Jul | 4562643219 | 231686226.8 | 294384354.1 | 1696237933 |
| Aug | 4267508710 | 266213258.1 | 247447290.3 | 1593723086 |
| Sep | 4324845667 | 181888066.7 | 314018533.3 | 1606917422 |
| Oct | 3820544516 | 146546474.2 | 329366096.8 | 1432152362 |
| Nov | 4690966250 | 157839750 | 401687000 | 1750164333 |
| Grand Total | 6128330211 | 282051920.6 | 468686098.1 | 2293022743 |

## Measurement Challenge and a Schematic Path

A critical look at the Tables shows that there are wide range of differences between the companies. The question now is, can we use the same Blockchain KPIs to evaluate the companies? Details of KPIs should include not just basic structure of the Blockchain, clients KPIs, management, implementation, deployment and management but factors that will change from time to time. Will the KPIs for Bitcoin rightly fits into Ethereum or Litecoin? The response is NO. The interest now is how do we "scale" the KPI from one company to another in the face of social factor, changing technology, the human resources and political environment of companies? What factor can we identify? This is a million-dollar question.

## Conclusion

The work identified structural component of blockchain technology. An evaluation of three companies using the blockchain technology was carried based on their performance within a period of time. It concluded that "a one solution fit all" cannot be applied to using a set of KPIs on similar companies using the same technology.

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