Block Chain Accounting-The Face Of Accounting & Auditing In Industry 4.0

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I. INTRODUCTION

Rise of new technology has always led to unleash human ingenuity to new vistas of human oracle. This unlocked ingenuity helps to develop human life and consistently harness human skill on the planet. Newly created human knowledge, continually reshapes the way we live, creating new ecosystems, developing new business models and enhanced connectivity as ever before. These innovative technologies are evolved themselves with the potential to drive tremendous impacts on human lives and skills over a period, progressing human life on the planet. Inventions led to industrialization, industrialization has led to progressive automation from human to machines in systematic phased manner with more economic efficiency and quality.

All industrial revolutions are steered by inventions. Industry 1.0 was characterized with mechanization, steam and water power. Industry 2.0 with mass production and electricity, although industrial engineering and business processing system has been evolved and formalized through time and motion studies [1],and the creation of production lines by Henry Ford. Industry 3.0 with Electronic, IT systems and automation and Currently, humanity is in the era of fourth industrial revolution, referred as Industry 4.0, with a digital economy characterized by the interplay of emerging technologies like big data, cloud computing, business analytics, machine learning, robotics, Artificial Intelligence(AI) and Distributed Ledger Technology (DLT). Trade, technologies and training are intimately intertwined. These technologies are collectively yet again posing to upend the entire system of production, trade, commerce, banking, management and governance and have started significantly transforming the way we produce and deliver services in industry4.0.

II. BLOCKCHAIN - A BUZZAROUND

When block chain technology, the offspring of the DLT was first used in financial cryptography for the popular crypto currency, Bitcoin [2] in 2007 by a pseudonym, Satoshi Nakamoto, an anonymous author, no one has thought, the technology possess immense potential to unleash exceptional level of innovation in every aspects of industry and business. International Data Corporation (IDC) [3] predicts by 2021, minimum 50% of global GDP may be digitized, with increased industry drive in business operations, offerings and supply chain relationships. By 2020, 60 % of all the enterprises will implement new IT foundation for business processing. Not less than 25% of the Global 2000 companies will use block chain as a foundation for digital trust. In a survey conducted by PwC [4] in 2018 with 600 business executives from 15 industries, 84 % said, they are already involved with block chain technology, which shows its future impact on business and its process. Gartner predicts that block chain and its application is going to generate a business value of more than $175billion by 2025 and may increase to over $3 trillion by 2030[5]

As DLT being the “technology of future”, have a defining role in deciding on how business models are devised, to deliver services and document business transactions in the years ahead. Recognizing the potential impact of DLT on business functions, major global corporates have begun investing in DLT projects[6] No one wants to be left out from the game, as this technology of future is certainly have stake in the operational costs of companies, in terms of removing intermediaries, increased speed reach and ensuring transparency.

Banks and financial services sector understood the potential opportunities of distributed ledger technology, in 2014, subsequent to the launch of Bitcoin in 2008 .Their initial interest was using the technology for making monetary transfers, payments, clearing and settlements. But soon financial and technology service providers realized that this technology can not only be used for asset transfer but also for recording of any information where a record for future reference is required. The next sector that incorporated block chain in their operations are insurance in 2016 and more recently companies ranging from energy to logistics to real estate and digital ID management and customer services has done the same.

DLT is not just limited to the conventional areas of business but it's geared up to encroach the traditional business process areas where once we thought which is uniquely done by human resources such as accounting and auditing. DLT could significantly affects profession of accounting largely. In 2014, the Economist predicted accountants and auditors are among the top three professions who are most likely to be replaced by robots in the next 20 years and World Economic Forum reinforced it in 2018[7] "The New Bookkeeper is a Robot" [8] . In September 2017, The Telegraph [9] identified that there is 99% chance that accounting and book keeping work would be taken over by robots with 98% probability for auditing work. Their argument is based on the tenets that the accounting and auditing are rule-based disciplines and technology could perfectly convert these rules into lines of codes.

Realizing the potential significance of the technology, major global auditing firms Ernst & Young (EY), Deloitte & Touché, Arthur Andersen, KPMG and Pricewaterhouse Coopers (PwC) have started significant investment on DLT and have running projects to exploit its potential benefit in accounting and auditing domain. Future success of organizations depends on how quick they respond to this technology and in turn it decides their future cost and speed in generating accurate information for their users/clients.

Block chain, the powerhouse of Industry 4.0, will be the catalyst in shaping the future of accounting and auditing profession and the skill mapping of future auditors and accountants. Artificial Intelligence (AI) displacing human workers in the labour market [10]. As we mentioned earlier, technology and training are interconnected, are we prepared to embrace the change? These changes in the industry and business calls for the attention of academia, researchers and educators to integrate these changes into education and curriculum to be proactive and responsible to shape the future business professionals. But the understanding is inadequate. This paper is a conceptual paper trying to explore how block chain technology impacts future accounting and auditing arena

III. BLOCKCHAIN – THE CONCEPT

Block chain is essentially a cryptographically enabled database with distributed ledger maintained and accessible from the computer devices of each part. Every block chain is a distributed ledger, but not every distributed ledger is a block chain. DLT refers to the processes and related technologies that enable nodes in a network (or arrangement) that securely propose validate and record and state changes (or updates) to a synchronized ledger that is distributed across the network's nodes[23] .

DLT is primarily a database, which is distributed and connected across multiple computing device (nodes) without having a central authority. Each device (nodes) replicates and retain an identical copy of the ledger. Updates to the ledger are recorded independently by each participating device. The device then, votes on these updates and all of the participating devices agrees with the transaction. Once the consensus are reached from all participants, the ledger is updated and the latest agreed copy of the ledger is saved and the ledger is replicated and synchronized in all devices on real-time. Theses copies are saved in each blocks and these blocks are chained/linked to one another and secured using cryptography.

Block chain is a continuously growing lists of records linked together. Each block is linked to the prior blocks. The data recorded in the prior block cannot be changed unless you secure the consensus of all prior blocks. Alteration of recorded data in future is literally impossible without mutual consent of all participating nodes. Once the transaction is agreed and approved by authorized parties, it cannot be altered or deleted later on, but only new transaction can be appended. DLT in general and Block chain, particularly a breakthrough concepts in managing business information and can be applied in every economic activities. Block chain requires industry inter and intra connectivity with its ecosystem. For business, researchers and theorists distributed ledger presents a new paradigm to collect, record, replicate, retrieve and communicate business information system.

I. BLOCKCHAIN ACCOUNTING OR TRIPLE ENTRY BOOKKEEPING

To move the accounting process to block chain-enabled technology, literature suggest a new method of accounting -a triple-entry system [11 .Accounting, as a discipline was in continuous evolution since 700 years. Triple-entry accounting is an extension of the double-entry system that has been in use since the 16th century [12]. As single entry system was recording only on single aspect of a transaction, when an asset is moved in and out of the firm. When double entry was conceived, it was one of the breakthrough concepts. In double entry, every debit, there should be an equal credit. When an economic transaction is processed, both the parties independently and separately record the transaction from individual perspectives on how it affects their accounts. One organization records debits and the other organization records credits leaving a trail to be tracked for each transaction. When such transactions occur in voluminous piles, errors too creeps in, giving sizable work to an auditor. However, as Grigg describes, reliability of the double-entry system depend on proof or verification of each transaction as it otherwise could be tricked almost as easily as the single entry system.

Conversely, in triple entry, there will be three entries, a debit in sellers account, a credit in buyer's account and a third entry in the block, which serves an entry as well as authenticity of the transaction along with the receipts (documentary evidence). The third entry

will be the proof and available to both the parties for verification. The third entry records all the details of the transaction, name, quantity, price and terms of the transaction etc. The third entry recorded in the blocks, links the other two separate sets of books through the block chain. Both the parties can easily access the details of transaction through this block chain and can note discrepancies, if any. Discrepancies can also be corrected instantaneously without the intervention of a third party called auditor.

IV. CONVENTIONAL ACCOUNTING VS BLOCK CHAIN ACCOUNTING

From the time immemorial, Ledgers have been at the heart of accounting, be it single entry or double entry. Ledgers are simply collection of accounts, used to record monetary transactions in business. Ledgers have been transformed from rock tablets to papyrus, vellum to loose-leaf bound register. Until now, the notable innovation in this area was only computerization, which was a mere transfer from paper to bytes. Now, it is the first time computer algorithm is steering the change of ledger from paper to digital, controlled to collaborated and distributed across prospective users. Digital ledger will have inherent properties that can go beyond the conventional book keeping process.

In traditional accounting, records are kept in the form of general ledger, which is stored in a central location. The accountant enters each record and perform the required operations as needed. When a regulators or auditors or a prospective user require any specific information, the accountant shall retrieve and communicate to the party concerned. Usually, only accountant and auditors have access to such information in the general ledger.

However, in DLT, transaction records are entered and stored in a distributed /shared ledger. This ledger is then, shared among all concerned parties, which can be accessible by the authorized user, with a private key. In other words, the accountant, the auditor and the regulator can possess an identical copy of all records. However, each of this party can have access only to that part of the ledger that contains their interests.

Digital ledger/block ledgers assumes more transparency and immutability of accounting records which is that what was ultimately expected by users of accounting information to ensure true and fair view of the state of affairs of an organization. As the technology permeates into accounting function fully, a collaborative eco system comprising of accountants, auditors, regulators, technology providers and industry leaders needs to evolve to tap the benefit of this transition, which require large amount of investments

V. CHANGING ROLES OF ACCOUNTANTS & AUDITORS.

The data in block chain doesn't have a centralized database. The transactions between the parties are digitized and recorded upon acceptance of the participants, no matter the location where they are in, and then they synchronize data across their respective computer at multiple locations for storage and sharing in a verifiable and permanent way. The transactions are validated by miners, and such transactions are sealed in a block and they lock the block with a hash when they find the block is correct. Each transaction is time stamped at different time intervals and are linked to their previous event with a hash. When the data is converted into a hash, it then provides assurance on the fact that the transaction has occurred and provides information on completeness and accuracy of the transaction.

The transaction can be completed at much higher speed and is highly secured. Each node saves identical copy of the ledger and holds record of the transaction at all times and the digitized ledger is shared across the network which makes it difficult to alter retroactively without the alteration of all subsequent blocks and the consensus of the network. The DLT has got potential to grow in the field of accounting as it reduces costs in maintaining ledgers, reconciliation, and gives information on ownership and claims on assets. The question of preparing financial statements at the end of accounting year may lose its importance as the audit process is done on a continuous basis.

VI. AUDITING THROUGH DLT

Audit is a process with which all the interested parties get confidence with the operational process in an organization. Auditors examine the records of companies on behalf of their investors to ensure compliance with regulators. This would reduce reliance on banks, lawyers, government and other regulatory bodies. Automation and use of technology are giving boost to auditing processes. Auditing with the advent of distributed ledger technology is going to be a revolution as auditors would be verifying all the digitized documents rather than checking a sample of physical documents while auditing. This would enhance the level of assurance in the audit engagements. Auditors, who normally verify accounting documents at the end of the accounting year can have access to the transactions online and verification can start at any time without waiting for the year-end. Auditors, regulators, clients, and related parties will have the same copy of the document, provided they are given access with public or private keys, which is created by an accountant

By using hash code, an auditor can verify the transaction by checking the alphanumeric signature corresponding to the transaction with both parties. Fudging the financial figures is no longer possible.

Auditors can access irrefutable proof for all transactions and hence increases efficiency of audit process. Auditing using DLT is still in nascent stage and it is expected that there would be more scope for sharing experiences and deliberations on the implementation of DLT.

A five-step process shows how a transaction can be created and shared on the network. First, user initiates a transaction and the same is verified if it meets the conditions in its second stage. Thereafter, the transaction is broadcasted on the network for the order created on the platform. Consensus is expected in the later stage and finally it is updated in the ledger and positions are created.

VII. WHAT'S STOPPING DLT USAGE IN AUDITING

Although many claim advantages in terms of costs and efficiency, not all have started using this technology yet. The reasons could be many. As the technology is new and applications are not mature, audit teams have not gained hands on experience in using the system that puts trust on cryptographic algorithms. There are questions still to be clarified on several controls used in the technology and auditors are expected to be clear on such things. Expertise can also be another barrier as executives from financial services have not got enough skillset to deal with. In addition, many are of the opinion that dealing in cryptocurrencies have had a bad experience as they feel bitcoin and DLT are synonymous. Industry also has not been fast enough to embrace DLT technology and also the compatibility of existing accounting software to the new technology is also causing delays in implementation. Other major issues relating to the implementation of DLT can be attributed to reliability and security of data, expensiveness to manage, being resource intensive and to transparency of transaction. DLT may affect the audit profession in technical and non-technical ways as well. It might take longer time to embrace DLT technology. In spite of claiming big on security aspect, a certain issues relating to fraudulent transactions cannot be eradicated. There were instances where hackers managed to steal cryptocurrencies in the recent past. However, it was detected quickly and the loss was mitigated swiftly thus safeguarding the rest of the blocks from such an attack. Therefore, auditors must have a check on the operational issues of the internal controls while they do audit engagements.

VIII. .CHANGES TO EXPECT IN ACCOUNTING EDUCATION SYSTEM

The accounting parts that is concerned with transactional assurance will be transformed by block chain and smart contract approaches. Many of the todays accounting department processes can be optimized or even eliminated through the application of block chain technology and other modern technologies. The procurement processes can be simplified enabling secure recording of transactions in a way that can lead to increased operational efficiency. As a result of the above, the spectrum of skills required in accounting will change. Some areas like reconciliation and provenance assurance will be eliminated whereas areas such as technology, advisory and other value adding activities will expand. Accountant's skills will need to expand to include an understanding of the principle features and functions of block chain. They should be able to advise on block chain adoption and its impact to their businesses and clients and also have informed conversation with both technologists and business stakeholders. As said earlier, many major CPA firms are now investing more time in understanding block chain technologies and suggested that accounting professionals do the same. "Through every phase what's really happened is that the accountant's and the auditor's role has just evolved" said Erik Asgeirsson, President and CEO of CPA.com during a panel presentation at the Wall Street Blockchain Alliance's Blockchain for Wall Street education day in New York City [13]. The future Accountants should posses the ability to evaluate management 's accounting policies for digital assets and liabilities which are not directly addressed currently in IFRS (International Financial Reporting Standards).Auditors will spend much less time performing audits, and more time designing, reviewing, and verifying how information flows between systems[14]. They should be taught to take advantage of block chain benefits as well as address incremental risks.

IX. CONCLUSION

Whatever advantages that are gained from the adoption of DLT and audit automation, it would be a challenging job for the auditors looking at new procedures to address the risks coming from the usage of DLT. Early adopters of this technology need to contend with inherent challenges relating to security and privacy. While giving assurance of audit, they need to put a greater focus on IT controls to ensure that no material misstatements are made. As the technology matures, it should be able to address such challenges. Auditors need to gear up to provide complex assurance services in a fast changing business environments.

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