Application of Block Chain Technology in Chemical Industries to Enhance Logistics and Supply Chain Management

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Abstract— The block chain is an array of blocks (units of data), that grows in a continuous manner .It is integrated with cryptography which links all the developing blocks in a securable manner. Each block has three fields which are cryptographic hash to the preceding block ,a timestamp and the data of the current block respectively .On the parameters of design it is insusceptible to any sort of alteration .It is like a smart ledger which is distributive in nature ,that records information and transactions in a transparent, verifiable and irreversible way. It is organized in peer to peer network that follows strict protocols. Retroactive alteration of data is next to impossible as it demands a major connivance.

Key words: Block Chain Technology, Cryptography, Timestamp, Ledger

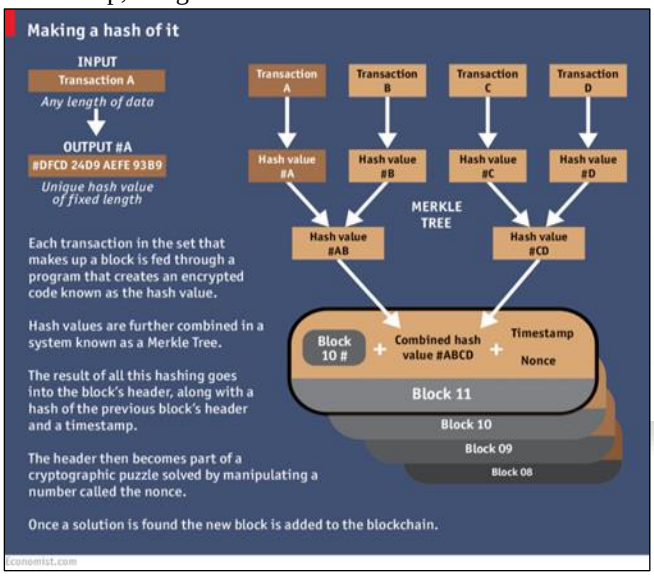

Fig. 1: Block Chain Technology

I. INTRODUCTION

Some of the giant challenges that our chemical manufacturers are dealing with are discussed below .In today's business environment non-agility , high capital costs ,ever increasing energy expenditures are factors that make an organization shortsighted with cost cutting measures that causes drastic effect on operational efficiency with low market response .To avoid this unintended scenario chemical industry is supposed to have the concrete I.T. Infrastructure .It is linked with an E.R.P. system that has new module developing at an overwhelming pace .It is nothing but the Block Chain Technique that provides track and trace abilities, seamless governmental regulatory compliances, algorithm optimization, precision, transparency, quality adherence etc.

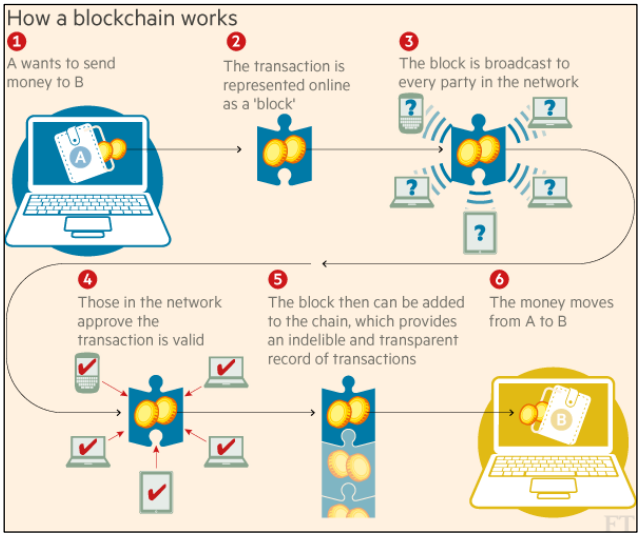

Fig. 2: (How does BCT work)

II. CHALLENGES TO CHEMICAL INDUSTRIES

Operational enhancement are worthless if Integrated with an outdated, obsolete and generic software solutions .Now a days Block Chain Technique has changed the manner in which business works .These solutions must be applied on logistics and supply chain of chemical industries.

A. Unanticipated triggers on commodity prices

For any chemical industry it is now prerequisite to maintain a panoramic view on key metrics like inventory turns, production output, logistics, supply chain management, accurate etc. It helps minimizing overall costs. This is done by scheduling production practices either completely or partially to the most cost friendly locations.

Solution- Block Chain Technique keeps track of budgets, revenues, profits, loss, cash flow, ledger etc. Using this it would be easier to find further efficiencies that can be generated by cheaper commodity prices.

B. Scrutiny generated by recalls and audits

It is very urgent and sensitive to make response to these recalls and audits maintaining duly compliances with government authorities.

Solution- It requires special production techniques, materials, tools, supply chain traceability to be ready for recalls and quality audits .This traceability of data should be broadcasted into peer to peer network which includes suppliers, customers, personnel and third party during the quality audits .It is done by Block Chain Technique. Through ledgers chemical companies are able to trace the consignments, batches, products, raw materials etc. In this way Block Chain Technique gives efficient manufacturing processes which adhere to regulatory compliances and speed up the business.

C. To Manage Operational and Manufacturing Data

Customers, distributers, and retailers want products and services faster .They generally want to shift risk to their suppliers as much as possible. Suppliers increase the pressure to manufacturers by high price, fluctuations in the quality of raw materials and Chemical makeup of these. Regulators multiply this pressure by greater oversight and tighter regulations.

To cope up with the above scenario companies need to manage operational and manufacturing data efficiently. Systems must be capable of actual end to end cost evaluation of individual product. Capital equipment must be serviced, upgraded and overturned by latest. Chemical companies require precise and reliable data of operations, equipments and other asset histories to reduce unexpected downtime and to make an intact order at given time.

Solution- Chemical companies need to limit expanded sea of irrelevant data and integrate business analytics and asset management toolkit to Block Chain Technique, to unlock the caliber of big data. Now end users can consume data more easily and effectively .By Block Chain Technique stakeholders gain visibility into business operations and underpin management decisions. Block Chain Technique gives data analysis to calculate the formulas and algorithms for each product to improve competitive and operational advantages.

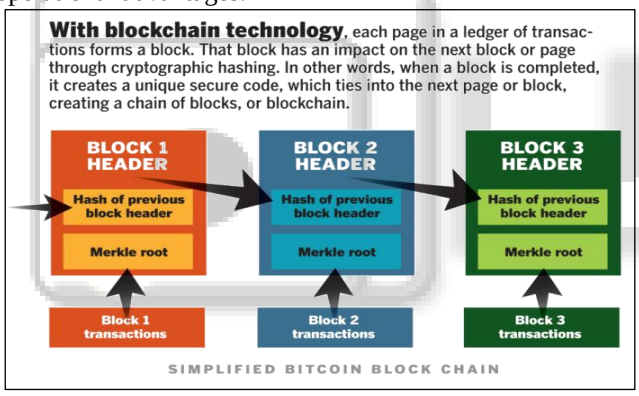

Fig. 3: Hashing in BCT

D. To drive down the formula costs to generate new efficiencies

Chemical companies have to assess the preview of needs. The availability of raw materials is affected by the factors as follow-

- The seasonality between availability and requirements.
- Decision of purchase considering the national and international vendors.
- Scheduling and inventory constraints.
- R and D schedule.....the list goes on.

Customers look for quality, availability and price performance. Natural and man-made materials are quite inconsistent. Formulation process is disturbed by chemical makeup, weather and geopolitical issues.STo mitigate these issues have to create formulas .With complex operational challenges of formulas strategies optimization is necessary to gain advantages. Chemical companies need to work smarter to conquer adverse impact of complex and changing constraints.

Solution- To achieve this goal one way is formula optimization using Block Chain Technique to deliver a higher level of value to internal and external stakeholders with greater insight into how the best available materials are being used.

III. Conclusion

It is a time when chemical industries have to synchronize their business operations with block chain technique. Organizations must consider new investments in block chain technique which helps them be as productive as possible.

References

[1] https://medium.com/@philippsandner/application of block-chain-technology-in-the-manufacturing-industries.
[2] https://instrumention..co.za
[3] https://automationworld.com/blockchain-meets-manufacturing-supply-chain
[4] Saveen A Abeyratne and Radmehr P.M. , Block Chain Technique in Manufacturing Industries ,Loughborough University , 05(09) , 2016.

