* NILAKANTHA SINGH DEO

*nilakantha.deo@capgemini.com*

SUPPLY CHAIN FINANCE ON

BLOCKCHAIN

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# Fundamentals of supply chain finance

Supply chain finance is a financial component to connect buyer, seller and funding institutions to come on to the same platform to optimize the working capital trapped in the supply chain. It gives the participant an opportunity to increase their short term credit without changing the figures in their balance sheet.

Commonly referred as reverse factoring and supplier finance. It can be categorized in many way as below.

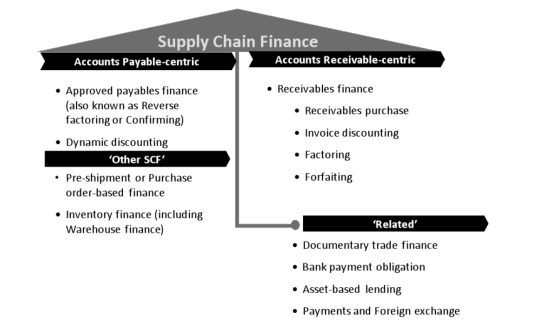


Figure :varieties of SCF

## Supply chain finance (SCF) eco system

Sellers sell their invoices to the banks or financial institutions at a discount price often called as factors.

* Thus raise their working capital.
* Getting paid early, before time.

Buyer in turn can ask to increase his payback time to the funding agency.

Instead of dealing with the credit worthiness of the supplier the bank or financial institutions involved in the loop deal with the buyer who has a better credit score and a less risky prospect.

SCF transactionsand traditional supply chain

It can be listed as follows:

* Extension of buyers account payable.
* Inventory finance
* Payables discounting

As compared to traditional supply chain to enhance working capital through factoring and payment discounts SCF offers the following thing.

* As the cash flows in supply chain it can be valued by financial institutions.
* The competition between buyers and sellers is replaced by collaboration.
* Organizational sustainability is achieved as cash flow is traceable.

For an example buyer might delay the payment as long as possible and the seller can expect it as soon as possible. The buyer who has better credit score can negotiate betternorms with the seller by utilizing his credit score to delay the payments. Whereas the seller can expect cheaper capital by selling his receivables.

## Work flow of SFC

A typical extended payables transaction works as follows.

1. Let’s say Company B buys goods from a supplier S.
2. S supplies the goods and submits an invoice to B, which B approves for payment on standard credit terms of 30 days.
3. If supplier S requires payment before the 30-day credit period, the supplier may request immediate payment (at a discount) for the approved invoice from Company B’s financial institution.
4. The financial institution will remit the invoiced amount (less a discount for early payment) to supplier S.
5. In view of the relationship between Company B and its financial institution, the latter may extend the payment period for a further 30 days.
6. Company B therefore has obtained credit terms for 60 days, rather than the 30 days provided by supplier S,
7. B has received payment faster and at a lower cost than if it had used a traditional factoring agency.

Current Supply chain finance and bottle necks

The transaction involves different agents and intermediaries making the process slow and complex. Security flaws ,time consuming process and complex IT systems are overheads. Inconsistent Government procedure are an additional headache when it comes to data integrity ,historical data and credit risk evaluation.

Also seller performs receivable monitoring and fraudulent activities are inevitable.

The current SCF has majorly two components.

1. Reverse factoring
2. Dynamic Discounting

**Reverse Factoring:**

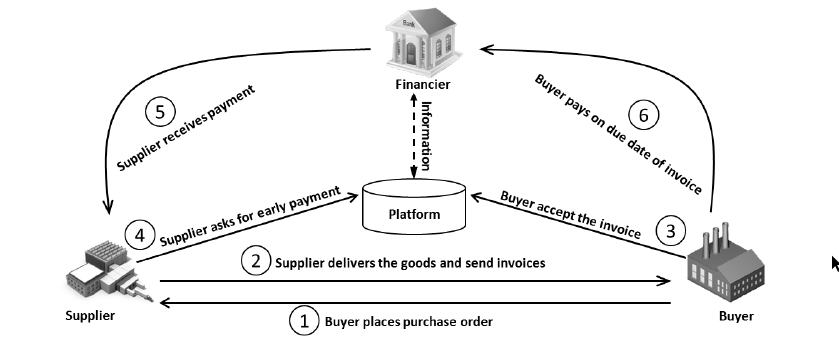


Figure : Reverse factoring (Account payable Centric)

Buyer negotiate with the seller to increase the payment time and sellers get advantage to get paid early by selling their invoices, a method called reverse factoring ,and increasing liquidity. So buyer and seller work hand in hand and Financial institutions provide cheap and short term financing to increase working capital of each party.

Supplier expects early payment by selling the invoice to a financial institution often called as factor.

Buyer can delay payment or on due date according to the agreement with the financer or factor.

To make the process simpler and transparent the following should be done.

* Financial institutions persuade buyers to do a KYC check on the suppliers.
* Supplier on boarding
* Credit risk calculations of all participating parties
* Credit score calculations
* Rating of funding institutions
* Bidding system can be introduced to generate more revenue from factors

**Dynamic discounting** is another approach where buyer and seller can directly interact with each other without the involvement of a financial institution.

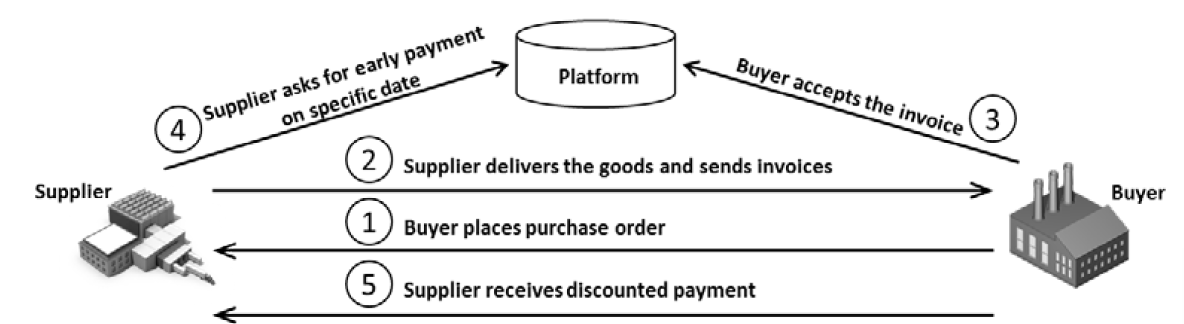


Figure :Dynamic Discounting(Account Payable-centric)

So supplier is funded directly by the buyer and a healthy negotiation from both parties can be seen.The earlier the supplier receives the payment the higher the discount the buyer gets for the order.

* Here all participating nodes are non-financers
* KYC is not required
* The system is Fraud prone in absence of automated infrastr
* Evaluation of credit portfolio is required to make it more sustainable
* Negotiation mechanism can be introduced too.

# The cloud based traditional SFC

The traditional cloud based Supply chain finance systems works as follows. In spite of a serialized chain the cloud based solution makes it a centralized structure thus each participant has an opportunity to see the physical goods and cash involved in the chain moving in real time. But the very centralized nature of it make it difficult to new player to wait till getting verified and authorized by a central authority. Which delays the subsequent process.

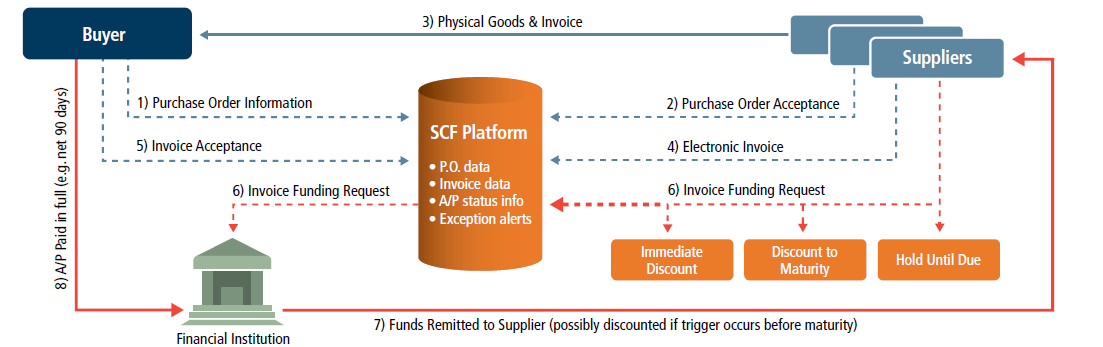


Figure :Cloud based SCF

# Benefits of Blockchain based solution

Blockchain based solution has the following advantages over cloud based solutions.

* Being **decentralized in nature** it's a trust keeping mechanism in a trustless world.
* Can bring integrity in a highly complex , multiparty ,trustless financial machinery.
* Its **security by design** and no need of additional layer of security. So expenditure on buying and configuring antivirus ,anti malware or security building software year on year can be saved .
* **No Central authentication** is required unlike cloud based solution which can be corrupted or manipulated .
* **No single point of failure** (as long as majority of the participant are performing honestly corrupted nodes can be outnumbered through consensus mechanism)

Other salient features are

* **Peer-to-peer network:** The architecture provides the database structure for a public distributed ledger.
* **Transaction logic:** Cryptography and a digital signature is used to secure the transactions process between anonymous accounts.
* **Immutability of data:** The ledger consists of consecutive data blocks individually secured and cryptographically sealed, interlinked to previous data within a chain
* **Consensus mechanism:** An algorithm enables a global election allowing users to agree about one true systemic-state of the network for synchronizing the shared ledger.

# SCF from Blockchain point of view

* Automation of the execution of standard operations or accounting
* Reduced time of operation ,elimination of manual errors.
* Improved resource allocation through suggestive rating mechanism
* Greater transparency as each node can see the goods and cash moving in real-time in the supply chain.
* Built in security to avoid vulnerability in the first place

The Blockchain based SFC can be shown as below.

Synchronization layer of Supply Chain Finance

SCF Challenges

* supplier on boarding problem
* Financing options for a limited number of SME
* supplier financing in multi-tier supply chain
* paper based transaction process
* Disputed invoices
* Lack of transparency
* Lack of efficient collaboration
* Invisibility of real time data
* absence of trust infrastructure
* Lack of permission less joining mechanism
* Factor Bidding mechanism
* Rating Systems

Relevance of SCF

* working capital manage anent
* financial flow optimization
* liquidity improvement
* risk mitigation
* cash flow management
* payment and settlement process improvement
* reverse factoring
* dynamic discounting

Need for digital transformation

* More transparency across supply chains
* increase speed and effectiveness of SCF
* access to real time validation of invoices
* Easy and fast supplier on boarding
* create trust and collaborative network
* full adoption of SCF from large to small partners
* Effective data sharing among partners
* Visibility of payment and other status

Participation on a single platform

* Supplier
* Buyer
* LSP
* Financial service provider
* Fintech

Blockchain technology

* Interoperability
* Scalability
* Transparency
* Trust
* Built in security
* Autonomy
* Permission less /open access

Physical and financial Supply Chain Visibility and Control

Figure 5:BCT(Blockchain Technology) based SCF(Supply Chain Finance) solution

# Conclusion

The major concerns (Yaghoob Omrana, 2017) of paper based or cloud based digitized supply chain solutions are avoided if Blockchain based solution is adopted.

The major inefficiencies of existing SCF-instruments from a technical perspective are the built in strength of Blockchain based SCF. BCT improves SCF-solutions by eliminating technological inefficiencies.

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Yaghoob Omrana, M. H. (2017). Blockchain-driven supply chain finance: Towards a conceptual framework from a buyer perspective.

# Glossary

|  |  |
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| AP | Accounts Payable AP is money owed by a business to its suppliers and shown on its balance sheet as a liability. |
| AR | Accounts Receivable AR is money owed by suppliers to a business and shown on its balance sheet as an asset. |
| COGS | Cost Of Goods Sold COGS represent the direct costs attributable to the production of the goods sold by a company. This amount includes the cost of the materials used in creating the good along with the direct labour costs used to produce the good. It excludes indirect expenses such as distribution costs and sales force costs. |
| DPO | Days Payable Outstanding DPO= (Accounts payable/COGS) x 365 |
| DSO | Days Sales Outstanding DPO= (Accounts Receivables/Net sales) x 365 |
| Full-time equivalents | The number of employees equivalent to one full-time employee. 1FTE = one employee working full time |
| KYC | Know Your Customer Refers to relevant information obtained from a bank’s clients for the purpose of doing business with them. The objective of KYC guidelines is to prevent banks from being used, intentionally or unintentionally, by criminal elements for money laundering activities. Related procedures also enable banks to know or understand their customers, and their financial dealings better. This helps them to manage their risks prudently. |
| Receivable Finance | Receivable Finance allows suppliers to finance their receivables relating to one or many buyers and to receive early payment, usually at a discount on the value. |
| Recourse (with/without) | ‘With recourse’ is a legal agreement that provides protection to lenders, as they are assured of having some sort of repayment – either cash or liquid assets – in the event that the borrower is unable to satisfy the debt obligation. |
| ‘Without recourse’ | In a ‘Without recourse’ agreement, If the borrower defaults, the issuer can seize the collateral (usually property), but cannot seek out the borrower for any further compensation, even if the collateral does not cover the full value of the defaulted amount. |
| SCF | Supply Chain Finance The use of financial instruments, practices and technologies to optimize the management of the working capital and liquidity tied up in supply chain processes for collaborating business partners. SCF is largely ‘event-driven’. Each intervention (finance, risk mitigation or payment) in the financial supply chain is driven by an event in the physical supply chain. The development of advanced technologies to track and control events in the physical supply chain creates opportunities to automate the initiation of SCF interventions. |
| Spread | An amount that each bank decides to add to the base rate as its revenue. The bank buys the money at a price (exchange interbank rate) and resells it to its customers recharged with a profit margin (spread). |
| WACC | Weighted Average Cost of Capital As a company’s assets are financed by either debt or equity, WACC is the average of the costs of these sources of financing, each of which is weighted by its respective use in the given situation. By taking a weighted average, we can see how much interest the company has to pay for every dollar it finances. |
| Working Capital | The amount of day-by-day operating liquidity available to a business. In mathematical terms, working capital is calculated as WC=(AR)+(Inventory) – (AP) + (Cash) |