



Supply Chain and Blockchain

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Look around you. Take a closer look at the room that you are sitting right now. Most probably you won't see any item in the room, made by you, your relative or neighbour. If somehow you find such item, I'm pretty sure that tools and materials used to make it, aren't produced anywhere near you. We are surrounded by thousands of products made by people whose nationality, religion, political and ethical views are absolutely unknown to us. All these items are brought to us by Supply Chain.

Supply Chain

What is Supply Chain? There are lots of definitions. Here is my favorite one: Supply Chain is an art and science of sourcing, making and distributing goods and services at the right time, right place and in right quantity. Supply Chain includes two or more parties connected to each other to ultimately fulfill a customer's demand.

Parties are connected by three major flows:

- Physical flow - goods and services that move from supplier to customer (and sometimes back - this is called reverse physical flow).
- Financial flow - money that moves from customer to supplier.
- Informational flow - data that moves in both directions (quotes, purchase orders, invoices, order status updates etc.)

If a company wants to have effective and efficient Supply Chain, it needs to actively manage these flows.

Although the term “Supply Chain” is relatively new, the concepts are ancient and go back to Roman Empire, where the term “logistics” was used in military. Supply Chain extremely evolved in recent decades. Experts agree that typically there are four stages of development. Stage 1 - Multiple Dysfunction; Stage 2 - Semi Functional Enterprise; Stage 3 - Integrated Enterprise; Stage 4 -Extender Enterprise. The primary differentiating point of these stages is how a company creates, manages, organizes and shares information with other parties. At Stage 1 company has no coordination of information flow, data is diffused between departments and a lot of information is duplicated, outdated or lost. Oppositely, at Stage 4 company not only fully integrates its data, but also extends and shares it with its suppliers and customers through various collaboration processes, such as CPFR (collaborative planning, forecasting, and replenishment). One of the best known case for such collaboration is P&G and Wal-Mart, who integrated their Supply Chains more than a decade ago and gained a huge improvement in efficiency and cost reduction.

Early in the evolution of the Supply Chain, many organizations operated in a stable environment with established supply and demand. the costs were low due to predictable demand and need for changes was minimal. This model used to hold true for many industries, especially those that were regional and had only regional competitors. As globalization and technology have connected the world, fewer and fewer industries have this level of stability. Many companies evolved to the 4th Stage since then, while other immature Supply Chains are still in Stage 1.

We see that everyday more companies enter global market to offer their goods and services. First time in history of mankind, whole world is in competition and cooperation with each other. Globalised Supply Chain, along with lots of benefits, has quite a few challenges:

- Lacking knowledge of general international trade practices and regulations.
- Differences in Import, export and transportation regulations among countries.
- Various cultural, ethical and social differences.
- Different currencies, exchange rates and monetary policies.

The theory of transaction costs, developed by Nobel Memorial Prize winners - Ronald Harry Coase, Kenneth Joseph Arrow and Oliver E. Williamson, explains to us that there are certain costs to make a transaction between the parties, which can be divided in three broad categories:

- **Search and information costs** are costs of determining that the required goods are available on the market, have the lowest prices, etc.
- **Bargaining costs** are the costs required to come to an acceptable agreement with the other party, drawing up an appropriate contract and so on.

- **Policing and enforcement costs** are the costs of ensuring the other party sticks to the contract terms and, if contracts are broken, taking appropriate action (often through the legal system).

All the obstacles we described above can be seen as an additional costs for making a transaction between companies. Therefore, reducing these costs can increase trade and help economy grow.

Blockchain

Blockchain is a buzzword that everybody use but few truly understand. Basically it's a technology of decentralised, constantly growing list of records (i.e. blocks) linked to each other and secured using cryptography. Blockchain architecture is secure by design, meaning that data recorded in the block can't be changed retroactively without changing all subsequent blocks, which in practice is nearly impossible. Everyone knows the most popular implementation of this technology - Bitcoin, but Blockchain can be used in much more tasks, where permanent, transparent public ledger system is needed, like Public Registry, Property Registry, Finance or Supply Chain.

Using Blockchain technology in Supply Chain Management is relatively new idea, but it presents promising opportunities for improvement across the globe. Until today, creating a trade transaction (especially with foreign companies) involved a lot of middlemen: banks, chambers of commerce, various governmental agencies, customs brokers, port authorities etc. All these entities create quite a big finance and time overhead on top of this transaction, sometimes making it economically impractical to do actual trade. With implementation of the Blockchain, some of these middlemen can be automated and some eliminated, thus reducing the cost of transaction. Technology can deliver the following key benefits to users:

- Increase traceability of materials moving through Supply Chain, which lowers counterfeit/gray market trading risks.
- Avoid or reduce middlemen, automatically creating needed documents (Invoices, Certificate of Inspections, Certificates of Origin, Packing Lists etc.) in compliance with the appropriate government regulations and streamlining their approval process.
- Reduce paperwork and administration costs.
- Reduce exchanges rates losses by integrating with global payment systems like SWIFT, TARGET etc.
- Create a rating system for suppliers and customers, which is based not on the subjective perceptions, but rather on objective merits, like on-time delivery or payment, promised quality and others.
- Implement Smart Contracts, which basically is an agreement coded in the system with predefined terms and conditions, avoiding misunderstandings and fraud.
- Geographically distributed computing systems with higher level of availability.

Why should we care

Legitimate question is why should we care? To answer this question, I'd like to give some statistics:

- According to WTO, volume of the international trade (both goods and services) was 20 trillion USD in 2016
- According to Bank for International Settlements, in 2016 daily Forex turnover was 5.1 trillion USD
- According to "State of Logistics - 2016" report, published by Council of Supply Chain Management Professionals, total business logistics costs in the United States were 1.4 trillion USD - 7.5% of total US GDP.
- In World Economic Forum 2013 report, it was estimated that improvement (i.e. reduction) in two key components of supply chain barriers - border administration and transport and communications infrastructure, would increase world GDP by 4.7% and International Trade by 14.5%. For contrast: eliminating all the tariffs in the world at once would increase global GDP by 0.7% only.
- McKinsey & Company Global Payments 2016 report stated that financial Institutions' revenues, gained by cross-border transactions (trade finance and cross-border payment services) were 276 Billion USD.

Supply Chain has become critical to any organization's operations. It connect functions, divisions and business units within a firm as well as across firms. Complexity of the international trade, as well as the volume of information surrounding it is increasing exponentially. We need an advanced approach and technology for international trade management, which will dramatically reduce transaction costs including banking fees, currency conversion losses and slow service, simultaneously increasing trade supply chain visibility and trust across the globe. I believe that Blockchain can solve this problem and help companies all over the world benefit from it.

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Executive with 15 years of experience in creating efficient Supply Chains. COO at Greenet - Leading International IT company with operations in 6 countries. George is a free trade advocate and Supply Chain enthusiast.