Blockchain in Healthcare Industry and Innovation:

No matter what we say, it will be impossible for us to overstate the importance of the healthcare industry. Having said that, this is easily one of the slowest growing industries in the entire space. We realize that this is a very controversial thing to say, however, the proof is in the pudding.

Compared to two decades ago, hospitals, overall, still function pretty much the same way. The reason, as Richie Etwaru says, states is its lack of innovation. This is actually pretty surprising when you consider the fact that this space, in particular, has some of the smartest and well-educated people in the entire world.

However, saying that no innovations have been done in the medical field is a really wrong thing to say. Just look at how much the average life expectancy has increased thanks to medicines. So, we will need to dig a little deeper to understand what Etwaru meant by saying “lack of innovation”.

If you look into a little deeper, then you will notice that this space is rife with vertical innovation, however, it always lags behind when it comes to horizontal innovation. So what do we mean by vertical and horizontal innovation?

Vertical Innovation vs Horizontal Innovation:

Vertical innovation is innovation that is done specifically in a particular field while horizontal innovation is something that can be adopted by everyone.

Let’s take an example to make this clearer:

Penicillin, Polio vaccine, and sophisticated operating methods are all examples of vertical innovations since they are specific only to a particular field.

Electricity, Internet, and Cloud Computing, on the other hand, are horizontal innovations which have been adopted by multiples fields and industries to make their functionality more efficient.

The fact that most hospitals still use papers and files to do their records goes to show that they lag far behind when it comes to

horizontal innovation.

Block chain: The Next Horizontal Innovation:

We have talked about Blockchain basics a lot of times on this site before. So, to give you an extremely short description. A blockchain is, in the simplest of terms, a time-stamped series of immutable record of data that is managed by a cluster of computers not owned by any single entity. Each of these blocks of data (i.e. block) are secured and bound to each other using cryptographic principles (i.e. chain).

The reason why the blockchain has gained so much admiration is that:

- It is not owned by a single entity, hence it is decentralized
- The data is cryptographically stored inside

- The blockchain is immutable, so no one can tamper with the data that is inside the blockchain
- The blockchain is transparent so one can track the data if they want to

Blockchain and Decentralization:

In order to understand why the concept of decentralization and running a trustless system is important, you need to understand the relationship that we humans have had with trust since the beginning of time.

Early cavemen learned the importance of trusting each other. It was literally a matter of life and death. A caveman by himself had 0 chance of surviving. Think of all the elements in the nature that could have killed them, from wild beasts to changes in the weather. A man had to learn how to live in communities with people that they can trust, just to survive.

As time moved on, you could see this trust evolve in a lot of interesting ways.

Firstly, we had the barter system, wherein people trusted each other to give them a product of value to exchange with theirs in order to carry out transactions. However, as time went on, our transaction system became infinitely more complex.

Our population exploded thanks to improved medical care in a large part and our businesses became a lot more complex. As a result, we moved from trusting an individual, to trusting a centralized institute, like a bank. However, as time grew, these banks became more and more powerful.

With the number of responsibilities that these banks were dealing with a point had to come where they were going to fail so badly, that people would have to look for an alternative financial system.

This point came in 2008 financial collapse. Many banks, and Lehman Brothers, in particular, were guilty of excessive risk-taking which plunged the whole planet into the worst recession since the 1930s great depression.

Disillusioned by the centralized banking system, an anonymous person(s) named Satoshi Nakamoto came up with the idea of Bitcoin. Bitcoin was the world' first decentralized cryptocurrency which was powered by the blockchain technology.

So, how is the blockchain decentralized?

It really is a pretty simple concept. All the records that are stored within the blockchain, isn't saved inside one centralized storage unit. There are multiple computers running within the network who own a copy of all the data in the blockchain. This is why, whenever anything is updated in the blockchain, all the nodes in the network get notified of this at once.

This is what we mean by decentralization. There is no single source which is in charge of all the data anymore.

Ok, all that sounds pretty cool, however, how is that going to help in the healthcare industry?

Health Care and Interoperability:

Interoperability is a huge problem in the healthcare industry. In fact, improved healthcare interoperability is been a top priority for providers, policymakers, and patients for quite some time now.

So what are the two major areas when it comes to ineffective interoperability?

- The trouble of identifying patients
- Information blocking

The trouble of Identifying Patients:

One of the most surprising things that we learned while researching for this guide. Apparently, there is still no universally recognized patient identifier. This despite the fact that organizations like CHIME and HIMSS have been pushing for its development for almost two decades.

This is truly shocking when you consider the fact that a unique patient identifier will be able to easily solve the problem of mismatched patient EHRs (Electronic health record) which has in the past led to several errors in patient care and increased the likelihood of patient harm.

This problem has been well expressed by the Director of Center for Biomedical Informatics (CBMI), Shaun Grannis.

"**Matching the correct individual to his or her health data is critical to their medical care,"** he says. **"Statistics show that up to one in five patient records are not accurately matched even within the same health care system. As many as half of the patient records are mismatched when data is transferred between healthcare systems."**

So, how can the blockchain potentially solve this problem? Well, let's look into it in a bit. Before we do so let's look at the second problem that we have here.

Information Blocking:

Despite being deemed an illegal practice, information blocking has been a problem in the healthcare industry. What do we mean by information blocking?

In the healthcare industry, information blocking is described as the result of "an unreasonable constraint imposed on the exchange of patient data or electronic health information." According to the U.S. Office of the National Coordinator for Health Information Technology, there are three criteria for identifying information blocking:

- There has been interference
- There has been knowledge
- There is no reason for the data to not be accessible.

It goes without saying that information blocking practices that involve unreasonable interference and awareness are a huge detriment to an efficient healthcare practice. Blocking can take place

because of policies that prevent the sharing of information as well as practices that makes sharing extremely impractical.

The reason for this is pretty straightforward. Hospitals don't want to lose out on patients and want to make it as difficult as possible for them to want to move on to another hospital.

In this digital age, this should have been a draconian practice, but various surveys and studies say otherwise.

- After surveying 60 HIE leaders, it was discovered that information blocking is extremely widespread and the various actions that have been taken to curb it are still extremely ineffective.
- 50% of respondents that have been studied by Adler-Milstein reportedly engaged with health IT companies by participating in information blocking. A quarter of these respondents also said that hospitals and health systems are guilty of this practice.

According to the researchers, information blocking can be curbed by one of the following methods:

- By increasing transparency so that each and every action that has been taken by the participants can be accounted for.
- There should be a strong financial incentive so that the participants will want to share information with each other.
- A collaborative relationship between health IT companies, hospitals, and HIEs could further curb information blocking.

Alright, so now we have acquainted ourselves with the interoperability issues that are eating up the healthcare industry from the inside. Now let's see how the block chain is going to help solve this issue.

Public and Private Block chains:

There are two specific kinds of block chains out there:

- Public Block chains
- Private Block chains

Since both are block chains, they provide a peer-to-peer network which offers a decentralized and immutable ecosystem which are synchronized via consensus protocols.

However, that's where all the similarities end.

Public Chains:

Public block chains are the ones that we are most familiar with. Bit coin, Ethereal etc. are all public block chains and the reason why they are called so is pretty self-explanatory.

They are completely open ecosystems where anyone can take part in the ecosystem. The network also has an in-built incentive mechanism which rewards participants for taking part more thoroughly in the system.