

## Extending the Cryptocurrency market: The effect of Blockchain

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The blockchain is a chain of blocks that contain information. It was introduced in 1991 by a group of researchers to timestamp digital documents to prevent backdating or tampering them. Manipulating a data within a block is extremely difficult as one has to update the data in all the blocks following the new hashed block. Blockchain technology was adopted by a Japanese researcher Satoshi Nakamoto in 2009 to develop the most popular cryptocurrency known as Bitcoin.

Following the success of the Bitcoin in 2017, other cryptocurrencies such as Ethereum and Litecoin soon followed. But for the adoption of a new currency and switching from an incumbent one, the newly launched currency has to take over the existing network of the present currency. Dowd and Greenway in 1993 defined the utility of the currency market as  $u(T) = (a + bn) / r$ ; where  $u(T)$  is the net benefit of the present currency flowing in the network since time  $T$ , ' $a$ ' and ' $b$ ' are fixed parameters, ' $r$ ' is the rate of discount, and ' $n$ ' is the currency's network size. The parameter ' $a$ ' is the benefit from using the currency irrespective of its network size also known as the private benefit, and parameter ' $b$ ' is the benefit of the currency that is dependent on its present network and is known as the social benefit. The parameter ' $b$ ' increases as the user network of the currency grows.

For the general mass to switch to cryptocurrency, either the parameter ' $a$ ' or parameter ' $b$ ' should be very high. But the private benefit (i.e., parameter ' $a$ ') being minimal for cryptocurrency, the population looked towards the social benefit (i.e., parameter ' $b$ '). Now the main issue arose for the cryptocurrency while competing with the social benefit of the existing currency market. The current currency market (i.e., USD) had a much higher social benefit than any cryptocurrency. Therefore, the population had a high reluctance to switch to any new form of cryptocurrency to avoid considerable risks.

The second issue arose when multiple cryptocurrencies were launched into the market one after another. While the population was still coping with the launch of Bitcoin, other cryptocurrencies such as Ethereum and Litecoin soon followed. There was a very low possibility of the three cryptocurrencies to co-exist side-by-side. This created a divided social benefit in the cryptocurrency market as the cryptocurrency market size ' $n$ ' was divided amongst the number of cryptocurrencies in the existing market. Therefore, the net reduced utility of each cryptocurrency's market was  $u(T) = (a + (bn/3)) / r$ . This net reduced utility could not supersede the utility of the existing currency market (i.e., USD) which had both high private as well as social benefit.

Therefore, for a cryptocurrency to be successfully adopted, the private, as well as social benefit, must be looked at. The private benefit can be promoted by making the population aware of the benefits and the security of the usage of blockchain technology, the backbone of the cryptocurrency. For the social benefits to be realized, the cryptocurrency exchanges must promote cashback offers or lesser exchange rates on cryptocurrency transactions.

Also, at a given time frame, only one cryptocurrency should be launched by the cryptocurrency exchanges into the currency market to prevent market cannibalization. Market cannibalization in cryptocurrencies will lead to the division of the social benefit amongst all the cryptocurrencies thus hindering the effective diffusion of any particular cryptocurrency.

This study addressed the above issues in the adoption of a newly launched cryptocurrency in the currency market and developed a framework for assessing the private benefit and the social benefit of a cryptocurrency.