

The Effect of Bitcoin Transactions on Human Development: Emerging Business Models

Completed Research

Sajda Qureshi

The University of Nebraska at Omaha
squreshi@unomaha.edu

Jason Xiong

Appalachian State University
xiongjj@appstate.edu

Abstract

This paper aims to understand the logic and value of business model design as it relates to the effect of bitcoin transactions on human development and offers characteristics of three emerging business models. In this paper a business model is seen to be a social construct of how value is created and human agency is essential in creating value. The use of bitcoins is an example of human agency through which value is being created. The decentralization of financial transactions in a global internet information infrastructure is changing the way some businesses operate. This infrastructure is powering the use of bitcoins as the largest volume of cryptocurrency traded to date. It appears that the effect of bitcoin is in the emerging business models. Yet little is known about how these models emerge and what they mean. This paper offers a theoretical basis upon which the logic and value of business models can be understood as it relates to bitcoin use and human agency. It investigates bitcoin transactions in terms of their effect on human development. The findings illustrate a positive correlation between bitcoin transactions and human development where people have access to the internet. Based on these variables, cluster analysis is carried out to investigate the logic and value of business model design from the bitcoin effect. Three categories of countries are identified that are classified according to the emerging models they represent. The contribution of this paper is in uncovering the bitcoin effect as identified in the emerging business models it enables. This can be used as a lens to identify at the value created by a bitcoin business model based on the logic of its design.

Keywords

Blockchain, Cryptocurrency, IT for Development, Human Development.

Introduction

A blockchain is a distributed database of records also known as a public ledger of all transactions or digital events that have been executed and shared among participating parties. The blockchain contains a verifiable digital record of every transaction ever made and cannot be erased (Crosby et al., 2016). Cryptocurrencies are becoming a popular application of blockchain technology. It has been claimed that the technology and infrastructure underlying cryptocurrencies has made smart contracts between organizations economically efficient and distributed autonomous organizations increasingly prevalent. Cryptocurrencies operate on a decentralized distributed ledger technology in the form of a distributed transactional database, secured by cryptography, and governed by a consensus mechanism (Beck et al., 2017; Avital et al., 2016). There are different types of blockchains. While “proof of work” cryptocurrencies support transactions, they do not enable per se the execution of smart contracts. Smart contracts are currently enabled by, for instance, the Ethereum blockchain and consensus protocol “proof of stake”.

A particular application of blockchain in cryptocurrency is Bitcoin. It is a decentralized peer to peer digital currency that has been touted as the most popular use of blockchain technology (Crosby et al., 2016). The adoption of Bitcoins in payment systems is bringing about globally distributed businesses with unique models of value creation. Holotiuk et al. (2017) indicate that blockchain allows new services to be offered while rendering current ones obsolete. This disruption impacts the financial structure of firms in the payments industry and further generates a great potential for new business models while making some existing ones obsolete. There is a sense that the role of cryptocurrencies as a financial tool can potentially play an essential role in the sustainable development of the global economy (Nguyen 2016). By enabling

greater transparency, accountability and business opportunity, cryptocurrencies bring those at the bottom of the pyramid to borderless economic opportunities.

Blockchain solutions facilitate the rise of new business models that generate value in a geographically distributed customer-driven marketplace. They may reduce transaction costs by removing third-party intermediaries, and reduce risk as trust becomes more process-based than characteristic or institutional-based (Avital et al., 2016). This offers new ways of working and global business models. A particular area where blockchain is having an impact is in socio-economic development. Socioeconomic development has been defined by Roztock and Weistroffer (2016) a process of changes or improvements in social and economic conditions as they relate to an individual, an organization, or a whole country. At the heart of socio-economic development is human development. Human development which is the role human beings play in achieving social and economic development has been changing the ways people use currencies to bring about improvements in their lives.

New ways of doing business are made possible. The concept of a business model is a social construct of how value is created (Berger and Luckman, 1966). Most current work on business models is taxonomic and descriptive, classifying types of the business model in lists, heavily derived from multiple cases of organizations with clearly defined boundaries. The use of cryptocurrencies to make digital payments transcends organizational boundaries and offers businesses new ways of creating value. Generally, value is created through brokerage, advertising, intermediary, merchant, manufacturing, affiliate, community, subscription, and utility (Afuah and Tucci, 2000). In the global digital economy, a very different classification is offered: e-shop, e-mail, information services provider, e-auction, value-chain services provider, virtual community, the third-party marketplace, value-chain integrator (Timmer, 1999). The business model helps us understand a niche even if no one can explain exactly what it is." (Hawkins 2004, page 65).

However, there is no established general classification, which means that there is as yet the little theoretical basis for business model research and application. In particular, there exists no clear body of literature that explains how a business model works, what are its essential dimensions and features and how a good business model can be created (Wirtz et al., 2016). The question investigated in this paper is: What are the business model designs that are emerging from bitcoin use? What are the effects of these transactions on human development? The aspects of business models design will vary depending upon what parts of the world the transactions are taking place in. These transactions will depend upon several factors including bandwidth, infrastructure, regulatory environment, and technology skills. This paper builds upon the work of Qureshi and Xiong (2018) who arrived at a categorization of countries based on their analysis of bitcoin transactions per million population, internet penetration and global financial Inclusion through digital technology.

In this paper, we offer an investigation of the emerging business models from the effect of bitcoin transactions on human development. The following section offers an overview of business model design and describe the degree to which the different theoretical frameworks view each of the blockchain business model components for value creation. Then what little is known of the bitcoin effect on human developed is described. The methodology section offers a description of the variables that are analyzed in the subsequent sections. The model suggests a strong positive correlation between the bitcoin effect and human development. A cluster analysis offers a view into the emerging business models. The emerging business models are offered in the context of human development. There are many implications for business model design which are offered in the final section on emerging business models from the bitcoin effect on human development. Human Development is conceptualized as the enhancement of human lives and freedoms thus offering the human agency for value creation from the bitcoin effect.

Business Model Design

In this section offer a means to understand the logic and value of business model design as it relates to understanding bitcoin use and human agency. Business models are a social construct (Berger and Luckman, 1966) of a "reality." "Logic" and "value" are core words in the literature on business models. The emerging consensus is that a business model is a hypothesis (i.e., a model) of how to generate value in a customer-driven marketplace. It is a highly focused "public" declaration intended to help identify and build relationships that are core to turning the model into reality. Magretta highlights the "narrative" element of

business models: "The business model tells a logical story explaining who your customers are, what they value, and how you will make money providing them that value" (Margetta, 2002). It is in this sense that we view a business model as a hypothesis to be tested in the marketplace and often subject to public scrutiny particularly by investors. Hawkins (2004) makes the point that a business model may become a product in and of itself. Certainly, in the dot com era, the business model was the selling point for most startups, and it is very much the "brand" for such successful e-commerce firms like Amazon, eBay, and Expedia (Keen and Qureshi 2006).

While a number of business models have emerged here are very few guidelines in the research literature on business models as to the principles for designing a business model. Zott and Amit, (2010) define a business model as geared toward total value creation for all parties involved. Given the globally dispersed nature of new businesses, Zott and Amit, (2010) conceptualize a firm's business model as a system of interdependent activities that transcends the focal firm and spans its boundaries. Some of the business models have mushroomed from the rising volume of bitcoin transactions include (Cawrey 2014):

- 1) Bitcoin's public ledger has the ability to enable trusted recordkeeping on the internet while increasing overall transparency. This offers a level of trust while bringing about other pitfalls such as knowing who the parties are in a transaction.
- 2) Bitcoins market value means that people see it as an asset that can be used to back the value of anything that has value. While this is an emerging use of bitcoins and may reflect the rising value of transactions, its volatility can often make it a poor store of value.
- 3) Wallet technologies are being developed that offer multiple signatures and can be used in large inter-organizational transactions. It has been estimated that there 32 million bitcoin wallets globally with 7.1 million active bitcoin users. This means that bitcoin users have more than one wallet (Coin Dance 2018).
- 4) In some cases, bitcoin's emergence seems to support the development of smart contracts in the bitcoin block chain to enforce contractual price agreements and reduce volatility. However, smart contracts are not a built-in feature of bitcoin. Even if some work-arounds provide support to enable some limited features of smart contracts in bitcoin, these are far from full-featured Ethereum smart contract capabilities.
- 5) Bitcoin mining is the process by which computers confirm transactions on the network is turning into big business with advanced tools being developed to manage these systems. This decentralized infrastructure makes the completion of bitcoin transactions independent of national financial infrastructures. The mining process consumes a great deal of energy yet, in parts of the world where resources are cheaper than the cost of mining, and such businesses appear to be on the rise.
- 6) Bitcoin support businesses are updating existing business models with bitcoin payment options. This offers innovative ways of using bitcoins for traditional and novel transactions.

Since the frequency and volume of bitcoin transactions depend on the level and quality of Internet penetration in a country or region, it appears that the type of business models that emerge will vary depending upon where these transactions are taking place. The most parsimonious definition of business model is by Rappa (2002): it "spells out how the company makes money." Bitcoin use at best helps companies make money. At its very basic level, bitcoin use is an instrument of human agency. Betz (2002) similarly states that it is "an abstraction of a business identifying how [it] profitably makes money." "A business model is a blend of three streams that are critical to the business. These include the value stream for the business partners and the buyers, the revenue stream, and the logistical stream." (Mahadevan, (2000). Linder and Cantrell, (2001) extend their own definition of a business model as "the organization's core logic for creating value" including within it: "the set of value propositions an organization offers to its stakeholders, along with the operating processes to deliver on these, arranged as a coherent system, that both relies on and builds assets, capabilities and relationships to build value."

The innovative ways in which bitcoins are used can bring about new forms of organization and businesses. In order to understand these emerging business models, several common themes are running through these conceptions. The most distinctive is the focus on "value." The second is that they all stress that a business model is a statement of the basic "logic" of the business; it is an abstraction of propositions, articulated as claims and intentions. In some regards, this intellectual base for business models contrasts usefully with the less rigorous conception of business vision that preceded it; both of these are intended to set the framework for strategies for market innovation and/or organizational transformation. This relates to the

third common theme: the separation of business model from business strategy and also from the organizational structure.

In order to arrive at an understanding of the emerging business models from bitcoin transactions and human development in a global internet infrastructure, the business model is seen to establish the principles and axioms on which strategy is built. The principles of understanding the use of a cryptocurrency such as bitcoin is the strategy follows on from the business model and is targeted to achieve competitive differentiation. To some degree, the business model is the "what" of business innovation and strategy the "how." The two terms business model and strategy are often used interchangeably. This both weakens the value of the sharp logic of a useful business model and makes it a redundant concept if it is just a variant on strategy. Our phenomenological perspective on business models points to the big difference between approach and strategy being determined by the nature of business models as logic, abstraction, and narrative (Keen and Qureshi, 2006).

In this paper value is seen to be created through human agency where innovations in the use of bitcoin gives people the capability to lead the lives they choose to (Sen 1990, Kleine 2013). Economic development is defined as "the interruption of the business cycle" according to Schumpeter (1942) and is often used to describe growth in organizations and the regions in which they reside. In their analysis of virtual markets, Amit and Zott identify theoretical work on value creation that provides some inputs to business model thinking (Amit and Zott, 2001, page 511). These are value chain analysis, Schumpeterian innovation, Resource-based theory, Strategic network theory, and Transaction cost economics. They suggest that virtual markets have unprecedented reach because a near lack of geographical boundaries characterizes them. We map these against the three bitcoin-enabled business models that are identified in the above analysis. The following table entries describe the degree to which the different theoretical frameworks view each of the blockchain business model components for value creation.

	Miners	Innovators	Payment enablers
Schumpeterian Analysis (<i>Economic development and value creation through technological innovation</i>)	Economic development through technological innovations of faster more efficient completion of transactions	Innovation is the source of value creation. Technological innovations of blockchain lead to the transformation of markets and economic development.	Creative destruction leads to blockchain payment systems survival by destroying existing financial channels
Resource-based Theory (<i>Harnessing resources and capabilities leads to value creation</i>)	Heterogeneity of resource utilization (electricity, processing capacity) and capabilities used to create value	Innovations in blockchain transaction technologies enable the preservation of value	Blockchain resources and capabilities have a higher degree of mobility and volatility in value creation
Value chain Analysis (<i>Value creation at the firm level</i>)	The value created through new combinations of exchanges and mining services	Enables trusted transactions between organizations and industries (seamless supply chain integration)	Facilitation of inter-organizational international transactions
Strategic Network theory (<i>Network structures for value creation</i>)	Networks of miners complete blockchain transactions create wealth outside of the traditional banking system	The large size of the network of businesses and countries have a positive effect on the creation of wealth from Blockchain innovations.	Blockchain payment transactions enabled in new and unique ways increase value creation potential
Transaction cost economics (<i>Forms of governance for transactions embedded in an economic context</i>)	Distributed governance and transaction structures, reduce the cost of information processing in virtual markets	Public ledger enables trusted recordkeeping on the internet while increasing overall transparency in virtual markets	Reduced transaction costs enable a more considerable number of transactions and volume

Table 1: Business Models in Blockchain for Development

The effect of Schumpeter's "creative destruction," for instance, views innovation as a high-value generator. Transaction cost economics, which has been the underlying intellectual underpinning of many brokerage, value-adding intermediary and business-to-business initiatives, regards innovation as of low importance but cost reduction and new governance mechanisms as creators of value. The resource-based theory offers a view of blockchain enabled resources and capabilities on value creation. Strategic network theory views wealth creation through strategic alliances and networks made possible by blockchain transactions. In value chain analysis, blockchain infrastructure enables value to be created through supply chain integration and inter-organizational networks.

Human agency is essential in the creation of new business models. In this research we use the concept of Human development assess human agency. Human development is about enlarging individual people's choices so that they may have the freedom to pursue the lives they value (Sen, 1990). In this, income is seen to be an instrument of this freedom to pursue their wellbeing. Sen argues that there need to be a broad set of conditions that include access to food, shelter, health, and education that together constitute wellbeing (Sen, 1990). The effect on development is measured in terms of the United Nations Human Development Index (HDI). In order to assess the effect of bitcoin transactions on development, data on the Human Development Index (HDI) is used. The variables for this model are explained in the following section.

Methodology

Our sample size is limited to 45 countries due to the availability of bitcoin transaction data. Data for the variables in this study for the 45 countries were gathered as follows:

1) The Independent Variable (IV). Bitcoin Transactions per Million Population represents the number of transactions per million people for the countries for which there was data. The data was gathered from Coin Dance (2018).

2) The Independent Variable (IV) Internet Penetration Rate represents the Percentage of Individuals using the Internet. This was gathered for the countries in our Bitcoin sample from International Telecommunication Union (ITU, 2018).

3) Data for the Dependent Variable (DV) the Human Development Index was gathered for the countries in our Bitcoin sample from the United Nations Development Program (UNDP). The HDI is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living is measured in terms of GNI. Long healthy life is measured by the life expectancy and birth variable that comprises the life expectancy index. Knowledge is measured in terms of year of schooling within an education index, A decent standard of living measured as a Gross national income (GNI) Index which is per capita GNI based on purchasing power parity (PPP) which is the sum of value added by all resident producers plus any product taxes (fewer subsidies) converted to international dollars using purchasing power parity rates. The HDI is the geometric mean of normalized indices for each of the three dimensions (UNDP 2018).

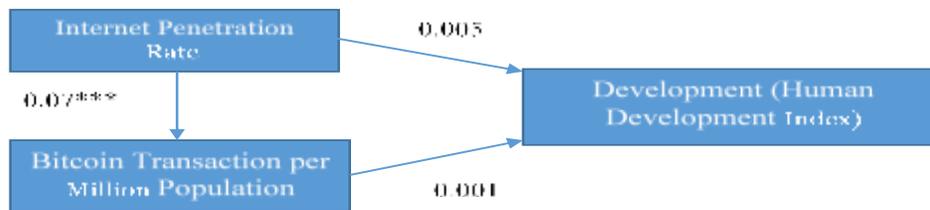
We first carried out simple linear regression to find out if there is a relationship between Internet Penetration Rate with Bitcoin transactions per million population. Then we tested our model to see if there is a relationship between bitcoin transactions per million population and human development using Multiple Regression Analysis. The model is described in figure 1 below. Finally, cluster analysis was carried out to see if there are types of globally distributed business models connected to cluster categories of countries.

Results and Analysis

In order to investigate how value is created by bitcoin transaction, we assess its effects on human development. This is carried out in two steps. In the first step a simple linear regression showed us that Internet Penetration rate is a predictor of the Dependent Variable, Bitcoin Transaction per Million Population is Significant. For 1 % of the increase in Internet Penetration, Bitcoin Transactions per Million Population will increase by 0.07. There is a positive relationship between the two variables. The internet penetration rate affects the ability of people to use bitcoins to bring about improvements in their lives. In the second step we carried out a Multiple Regression Analysis and found a positive correlation between Internet Penetration and the HDI and Bitcoin Transaction per Million Population and HDI. The analysis

shows that there is a correlation between Bitcoin transactions and human development as depicted in Figure 1 below:

Figure 1: Model of Bitcoin Transactions on Human Development



The adjusted R Square is 0.871 which means that the model explains 87% of the occurrences. This model is depicted as follows: $\text{Development (HDI)} = 0.005 * \text{Internet Penetration} + 0.001 * \text{Bitcoin Transaction per Million Population}$. This is the Bitcoin Effect. It illustrates that in 87% of the cases, the Human Development Index rises when bitcoin transactions per million population rise in countries where internet penetration rates are also rising. It appears that there is an enablement of global transactions through the bitcoin effect. In the following sections, the emerging business models from the bitcoin effect are analysed using the the logic and value of business model design from this bitcoin effect.

Emerging Business Models from the Bitcoin Effect on Human Development

In order to investigate the logic and value of business model design from the bitcoin effect, a cluster analysis is carried out of the countries in which bitcoin is heavily used. This helps us investigate the second question: What are the business model designs that are emerging from bitcoin adoption? We carry out a cluster analysis using the above variables for the countries in our sample to discover categories of business models. As bitcoin has no nationality or tie to a sovereign state, the business models it enables are global. The aspects of business models design will vary depending upon what parts of the world the transactions are taking place in. These transactions will depend upon a number of factors including bandwidth, infrastructure, regulatory environment, and technology skills.

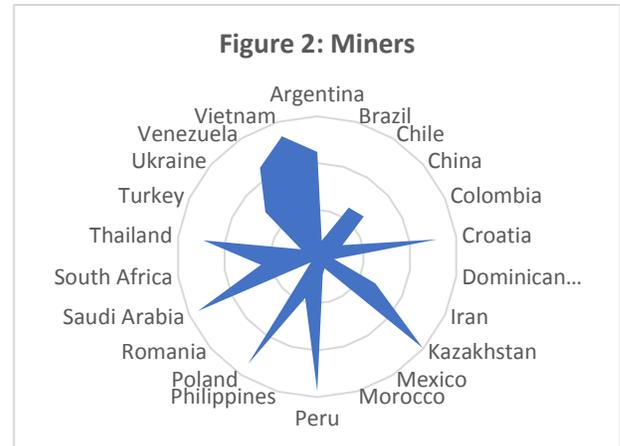
The cluster analysis revealed three clusters that were significant for the three variables: Internet Penetration, Bitcoin Transactions per million population and HDI. In the following sections, the categories from the cluster analysis are discussed, and distributed business model designs that are appropriate for each country cluster are arrived at. The countries categorized into clusters reveal specific characteristics that appear to be similar in relation to bitcoin transactions and human development to the countries in those clusters. Of the bitcoin business models identified in the literature, the following sections offer these in relation to the country categories in which they are emerging and most prevalent.

Miners: Medium Bitcoin adoption, Internet Penetration, and HDI

The majority of countries (22) in our sample fell into the first cluster. Compared to the other country clusters in our sample, they have medium levels of bitcoin adoption (an average of 2 million transactions per million population), internet penetration (average of 60%) and HDI (average of 0.73). These are Argentina, Brazil, Chile, China, Colombia, Croatia, Dominican Republic, Iran, Kazakhstan, Mexico, Morocco, Peru, Philippines, Poland, Romania, Saudi Arabia, South Africa, Thailand, Turkey, Ukraine, Venezuela, and Vietnam. The results are illustrated in figure 2. These countries represent variations to the bitcoin mining business model, which is the process by which computers confirm transactions on the network is turning into big business with advanced tools being developed to manage these systems. Other business models that are emerging use bitcoin's public ledger which can enable trusted recordkeeping on

the internet while increasing overall transparency. Economic problems that lead corrupt governments to print money have accelerated the adoption of bitcoin in Argentina, Venezuela, Colombia, and Brazil. While it is used as an emerging currency, these countries are also supporting mining business models that offer variations to the traditional model of exchanges.

Due to the relatively low energy cost and facility cost, there are many large bitcoin mines in the western part of rural China (Chow & Peck, 2017). China is leading blockchain based patent applications (Noonan, 2018). In 2017, more than 50 percent of blockchain related patent applications were originated in China (Noonan, 2018). South Africa has received investment in cryptocurrencies such as Bitcoin and Ethereum on foreign exchanges. South Africans can utilize their offshore annual investment allowance up to R 1 million ("Life after Bitcoin," 2018). More recently, blockchain is considered as an enabler for public mobile health (mHealth) solutions in South Africa (Weiss, Botha, & Herselman..., 2017). It is argued that the integrity of healthcare-related data can be protected by Blockchain, thanks to its decentralized nature. Another innovative adoption of Blockchain in South Africa is to use blockchain's s exposed ledger as a tool to fight for corruption. For example, it enables a more transparent funding mechanism for South Africa's public education system (Dinham, 2018).

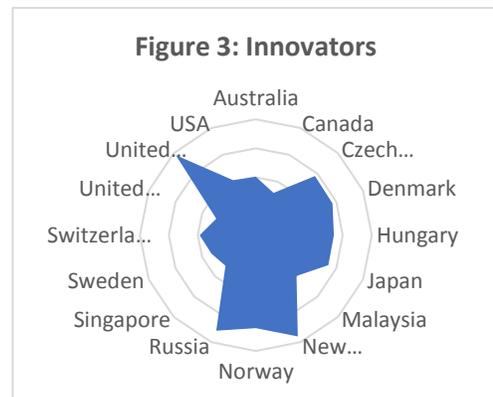


Innovators: High Bitcoin adoption, Internet Penetration, and HDI

The second cluster revealed 16 countries: Australia, Canada, Czech Republic, Denmark, Hungary, Japan, Malaysia, New Zealand, Norway, Russia, Singapore, Sweden, Switzerland, United Arab Emirates, United Kingdom, and the USA. Compared to the other country clusters in our sample, they have high levels of bitcoin adoption (an average of 11.74 million transactions per million population), internet penetration (86.4%) and HDI (0.87). This is illustrated in figure 3.

The business models that are emerging in these countries offer innovations that reflect bitcoins strong market value and people see it as an asset that can be used to back the value of anything that has value. Regulatory frameworks are supporting the use of bitcoin for smart contracts in the bitcoin blockchain to enforce contractual price agreements and reduce volatility.

The United States is leading the development and adoptions of blockchain related innovations. The awareness of blockchain related technology is relatively high in the United States. It is suggested that the majority of the US states have some levels of regulatory stance related to blockchain and bitcoin. Even blockchain has the potentials to disrupt US-based companies like Apple, Amazon, and Facebook (Ward, 2018), blockchain in the US is also believed to have the ability of help fight corruption (Aldaz-Carroll, 2018)



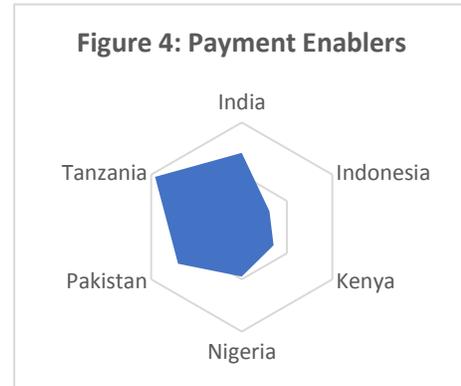
The United Kingdom is also supporting the development of blockchain related technology (De, 2018). Innovate the UK is investing a total of \$26.6 million in new projects that are related to the distributed ledgers technologies. On the other hand, the UK government is planning to tighten the regulation of bitcoin (McLean, 2018). Based on the report by the UK Government Chief Scientific, it is identified by the UK government that distributed ledger technology, including blockchain, has the potential to help the government reduce fraud, corruption, and errors (Adviser, 2018).

Payment enablers: Low Bitcoin adoption, low Internet Penetration, low HDI

Only six countries fell into the third cluster: India, Indonesia, Kenya, Nigeria, Pakistan, and Tanzania. Compared to the others, these countries represent low levels of bitcoin transaction per million population

averaged at 1 million, an average internet penetration off 22.5% and HDI of 0.5417. This is illustrated in figure 4. These countries are seeing a rapid uptake of bitcoins for payment transactions and facilitating trade with other countries. Exchanges and the development of wallet technologies that offer multiple signatures and can be used in large inter-organizational transactions and business models that are updating existing business models with bitcoin payment options are the business models emerging from this cluster.

Kenya is the home of Bitcoin startup, BitPesa which enables users to send and receive payments in multiple currencies. The payment systems offered by BitPesa have been credited with increasing trade between China and African countries. Kenyan companies are also trying to utilize blockchain technology to save their water catchment areas (Bwana, 2018). Given the rapid uptake of cryptocurrencies, this last group consists of countries that have limited or low bitcoin adoption primarily due to a regulation prohibiting crypto-related transactions. For example, the Indian government signals its discomfort and is trying to make trading virtual currencies more difficult in the future. Based on a study from Deloitte conduct in 2017, adoptions of blockchain technology in India are facing several challenges, including lack of awareness from the business, lack of suitable platform, vender, and partners, and data security challenges (Deloitte, 2017). While no dedicated legislation regarding cryptocurrencies, Pakistan's central bank is making it challenging to trade Bitcoins.



The analysis in this paper has offered three types of business models emerging from the use of bitcoins globally. In the following table, the emerging business models are offered in the context of the bitcoin effect as they relate to human development.

	Miners	Innovators	Payment enablers
Schumpeterian Analysis (Economic development and value creation through technological innovation)	Economically feasible as long as there is internet access and costs are low.	Innovation using bitcoin requires economic development. This is a candidate for resource-rich countries.	Bitcoin wallets and payment systems are being taken up by traditions financial channels.
Resource-based Theory (Harnessing resources and capabilities leads to value creation)	Resource utilization (electricity, processing capacity) needs to be low	Innovations in bitcoin are needed to enable higher uptake.	Bitcoin is highly volatile and thus not a stable store of value
Value chain Analysis (Value creation at the firm level)	Value is only created when people are able to use the proceeds from mining to pay for needs.	Hacking of Bitcoins make them less trusted	Bitcoin wallets may facilitate value creation through human agency
Strategic Network theory (Network structures for value creation)	The greater the number of miners, the lower the value created for them,	Bitcoin innovations have yet to offer network effects.	Bitcoin payment transactions are high in some countries but not others.
Transaction cost economics (Forms of governance for transactions embedded in an economic context)	As transaction costs per bitcoin mined go down, its usage may go up.	Bitcoins ledge can be hacked and is not as transparent as traditional banking transactions	Bitcoins reduced transaction costs enable greater number of transactions and volume

Table 2: Business Models from Blockchain on Human Development

This above table 2 uses the logic and value offered in table 1 to highlight the emerging business models as they relate to the bitcoin effect. Human development is often understood in Amartya Sen's terms to be the process of expanding the real freedoms that people enjoy to lead the lives they value (Sen, 2002). Anand and Sen (2000) contend that an understanding of development has to take place with appropriate

acceptance of the pervasive role of human capital. Human Development is conceptualized as the enhancement of human lives and freedoms.

Conclusion

This paper investigates to understand the logic and value of business model design. First, we investigate how the value created by bitcoin transaction by assessing its effects on human development. We found that there is a significant correlation between bitcoin transactions per million population and human development. This means that value is being created globally through the use of bitcoins. This is the bitcoin effect. It is identified in the enablement of global transactions. In order to investigate the logic and value of business model design from the bitcoin effect, a cluster analysis is carried out of the countries in which bitcoin is heavily used. Three business models are identified from the bitcoin effect. These are: 1) the Miners which are prevalent in countries with medium Blockchain adoption, internet penetration, and HDI, 2) the Innovators which are prevalent in countries with high levels of bitcoin, internet penetration, and HDI, and 3) the Payment enablers which are found growing in countries with low Blockchain adoption, low internet penetration, and low HDI. This analysis is used to arrive at the contribution of this paper: a framework of the Bitcoin Effect in Business Model Design as a lens to identify at the value created by a bitcoin business model based on the logic of its design.

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