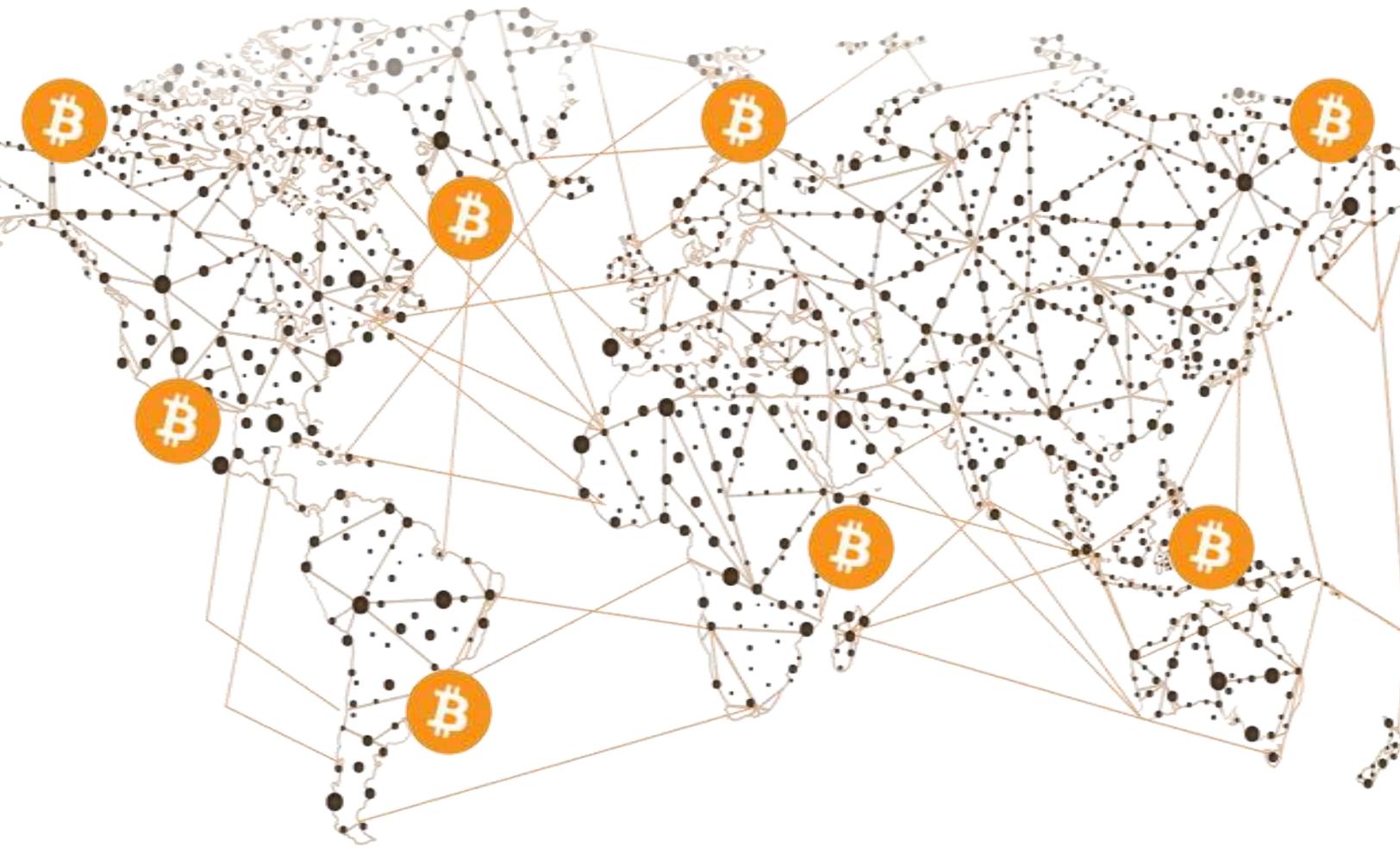




Industry Perspective on Bitcoins



PHD Research Bureau
PHD Chamber of Commerce and Industry



INDUSTRY PERSPECTIVE ON BITCOINS



July 2017

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Mr. Gopal Jiwarajka

★★★★★★★★

“Bitcoins have gained tremendous ground on global financial transactions and payments in the recent years. However, no directives to regulate the crypto-currency make it a highly risky asset.”

★★★★★★★★

From President's Desk

Bitcoins have emerged as one of the most talked about financial instrument in the recent times. At this point, Bitcoin is neither a legitimate form of currency nor an investment. Until it gains widespread acceptance and price stability, it may never be a mainstream method of payment.

The world of bitcoin is highly private and no traditional financial institutions are involved in the transactions. Unlike other digital currencies that have some central authority controlling the monetary mechanism, the Bitcoin network is completely decentralized, with all parts of transactions performed by the users of the system.

The empirical analysis suggests that the scale of bitcoin use has increased substantially across the globe. Bitcoins have gained tremendous ground on global financial transactions and payments in the recent years.

No directives to regulate the crypto-currency make it a highly risky asset. Proper vigilance and regulation of bitcoins can surely enhance the acceptance rate of the crypto-currency in the coming years. Moreover, the monitoring mechanism of the currency should be in place and well-regulated.

The Reserve Bank of India has warned about investing in virtual currencies like Bitcoins by exposing them to potential financial, legal and security related risks.

PHD Chamber is continuously advocating for building stronger and transparent transaction and payment mechanism in India.



Mr. Saurabh Sanyal

★★★★★★★★

“From a user perspective, bitcoin is still a mystery. Presently, the apex bank of India, RBI has warned the citizens about the risks involved in bitcoins.”

★★★★★★★★

From Secretary General's Desk

The study “Industry perspective on Bitcoins” has been prepared to encompass the perception of various industries and firms on the working mechanism of bitcoins in India.

The world of Bitcoins offers users the advantages of lower transaction costs, increased privacy, and long-term protection of loss of purchasing power from inflation. However, it also has a number of drawbacks that could hinder wider use. These include sizable volatility of the price of Bitcoins, uncertain security from theft and fraud, and a long-term deflationary bias that encourages the hoarding of Bitcoins and majorly no regulatory authority among various others.

From a user perspective, bitcoin is still a mystery. Presently, the apex bank of India, RBI has warned the citizens about the risks involved in bitcoins.

I take this opportunity to express my gratitude and respect to our office bearers Shri Gopal Jiwrajka, President; Shri Anil Khaitan, Senior Vice President; and Shri Rajeev Talwar, Vice President for their constant support.

I would like to appreciate the efforts of members and various industry stakeholders for participating in the survey conducted by PHD Research Bureau to access the industry perception on Bitcoins, and for providing their valuable inputs and deep insights while preparing this report.

I commend and appreciate the ardent efforts put forward by Dr. S.P. Sharma, Chief Economist; and Mr. Rohit Singh, Research Associate for producing this report.



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Executive Summary

The term bitcoins has gained immense footprint in the global arena of payments and transactions. Bitcoin is a consensus network that enables a new payment system and completely digital currency. It is the first decentralized peer-to-peer payment network that is powered by its users with no central authority or middlemen. From a user perspective, bitcoin can be considered to be cash for the Internet. Bitcoin can also be seen as the most prominent triple entry book-keeping system in existence. While there are or have been at least 110 other digital currencies, Bitcoin accounts for 77% of the global market value of all digital currencies and an even higher percentage of digital currency users.

The major advantages associated with bitcoins area **payment freedom**, wherein it is possible to send and receive any amount of money instantly anywhere in the world at any time, no bank holidays, no borders, no imposed limits; **low fees**, wherein bitcoin payments are processed with either no fees or extremely small fees, users may include fees with transactions to receive priority processing, which results in faster confirmation of transactions by the network. In addition, services exist to assist merchants in processing transactions, converting bitcoins to fiat currency and depositing funds directly into merchants' bank accounts daily; **attractive for micro-transactions**, wherein the fees are so low that bitcoins can be used in transactions that are economically unattractive for most merchants, especially in developing countries; **fewer risks for merchants**, wherein the transactions are said to be secure, irreversible, and do not contain customers' personal information. This protects merchants from losses caused by fraud or fraudulent charge backs, and there is no need for payment card industry compliance. Merchants can easily expand to new markets where credit cards are not available or fraud rates are unacceptably high; **security and control**, wherein users are in full control of their transactions and it is impossible for merchants to force unwanted or unnoticed charges as can happen with other payment methods. Bitcoin payments can be made without personal information tied to the transaction. This offers strong protection against identity theft. Bitcoin users can also protect their money with backup and encryption; **transparent and neutral**, wherein all the information related to Bitcoin money supply itself is readily available on the block chain for anybody to verify and use in real-time. Further, no individual or organization can control or manipulate the Bitcoin protocol because it is cryptographically secure. This allows the core of Bitcoin to be trusted for being completely neutral, transparent, and predictable.

The apparent disadvantages associated with bitcoin currency are **acceptance**, wherein many people are still unaware of Bitcoin. Every day, more businesses accept bitcoins because they want the advantages of doing so, but the list remains small and still needs to grow in order to benefit from network effects; **volatility**, wherein the total value of bitcoins in circulation and the number of businesses using Bitcoin are still very small. Therefore, relatively small events, trades, or business activities can significantly affect the price. In theory, this volatility will decrease as Bitcoin markets and the technology matures. Never before has the world seen a start-up digital currency, so it is difficult to forecast how it will play out; and **ongoing development**, wherein Bitcoin software is still in beta with many incomplete features in active development. New tools, features, and services are being developed to make Bitcoin more secure and accessible to the masses. Some of these are still not ready for everyone. Most Bitcoin businesses are new and still offer no insurance. In general, Bitcoin is still maturing.



In addition, the survey conducted to appraise the present situation of bitcoins with industry revealed some startling results. The survey revealed that nearly 97% of the respondents were aware about the term bitcoins however, none of the respondents dealt with the crypto-currency for their businesses. Further, it was revealed that the major hindrance faced by the Indian industry in dealing with bitcoins as a measure of payment mechanism is Security and regulatory aspects associated with the bitcoins.

To conclude, Bitcoin and Block chain technology are an important development in the emerging fast moving and financially driven economy. The Bitcoin Network has resulted in an important ecosystem with varied projects that have raised approximately USD 1 billion in venture capital financings since 2013, with USD 575 million disbursed in 2015 and 2016 across 63 deals, globally. Bitcoin has evolved past the historical difficulty and unpleasant public association with bad actors. The promise that is provided is something which all participants in finance must be keenly aware. Additionally, navigating and understanding the complex and evolving regulatory constructs around Bitcoin and Blockchain ventures is imperative for businesses seeking to participate in this exciting new ecosystem.

In India, Bitcoin prices depend on a lot of factors like international prices, market volatility, overall demand and supply in India. At times, the Indian buy and sell prices are 5-10% higher than international market. This happens when there is high demand for bitcoins in India and sellers are not ready to sell cheap. Similarly, there are days when Indian buy and sell prices are lower than the international market. It is important to note that, even in the international market at times, there is 5% gap between China and USA price and there are price gaps even within USA exchanges.

The industry seems to grow by the proper regulation driven bitcoins in India. To boost the digital campaign in India, bitcoins witnessed profound growth in the past few months. There has been a sudden spurt of interest in going cashless and digital currency in the country. Arguably, bitcoins can be a boon for the large population of the country which is still unbanked; it can provide them a superior and simple peer to peer digital currency trading platform through desktops and mobile devices. However, it is essential to expand the regulatory framework for bitcoins to reinforce the safety and security aspects of bitcoins, coupled with awareness programmes about the pros and cons associated with bitcoins to bolster the digital campaign in India.



1. Introduction

The term “Bitcoin” has gained tremendous footprint across globe in the past couple of years. Bitcoin is a type of digital currency, which was created and is held electronically. No one single person or authority controls it. Bitcoins aren’t print produced, like rupees or dollars – they’re produced by lots of people simultaneously running computers all around the world, using specialized software that solves mathematical problems.

Bitcoin is the first example of an expanding category of money known as crypto-currency. Bitcoin can be equated with gold; it is limited in supply. In all, only about 21 million Bitcoins will ever be generated through till year 2140, after which the process will automatically stop. Around 16.2 million bitcoins have been mined so far (as of Feb 7th 2017).

1.1 Creation of Bitcoins

In reality, creation of bitcoins is a mystery. No one knows for sure. Apparently, the currency was created by a person or a group who identified himself/themselves as "Satoshi Nakamoto". While the name sounds Japanese, Bitcoin's creator never provided any personal details. He collaborated with other early Bitcoin fans through online forums but never met with other members of the Bitcoin community face to face. Then, starting in 2010 he gradually reduced his involvement in the currency's development.

Millions of bitcoins were created in the currency's first two years, and Satoshi likely owns hundreds of thousands of them. Before leaving the scene, Nakamoto passed his torch to a developer named Gavin Andresen, who is currently the project's lead developer. Andresen now works under the auspices of the Bitcoin Foundation, the closest thing the anarchic Bitcoin community has to an official public face.

1.2 Mining of Bitcoin

Mining of bitcoin, where BTC is the unit of bitcoin, is an expensive affair. It needs a host of powerful computers, particularly bitcoin hardware; uninterrupted power supply and several people working as a team.

Once the hardware is in place, you can join a ‘bitcoin mining pool’, where several people are working together to validate ‘blocks.’ A block is a record of recent transactions carried out using bitcoins. Miners, upon clearing a block, are ‘paid’ in bitcoins by the bitcoin network for their services. All Bitcoin transactions are marked in a public register called the Blockchain. Bitcoin has specific protocols that are rules for making bitcoin work. It has been decided that there will be only 21 million bitcoins ever. A bitcoin can be divided into smaller portions with the smallest amount being one hundred millionths of a bitcoin and known as a ‘Satoshi’, named after the creator of bitcoin.

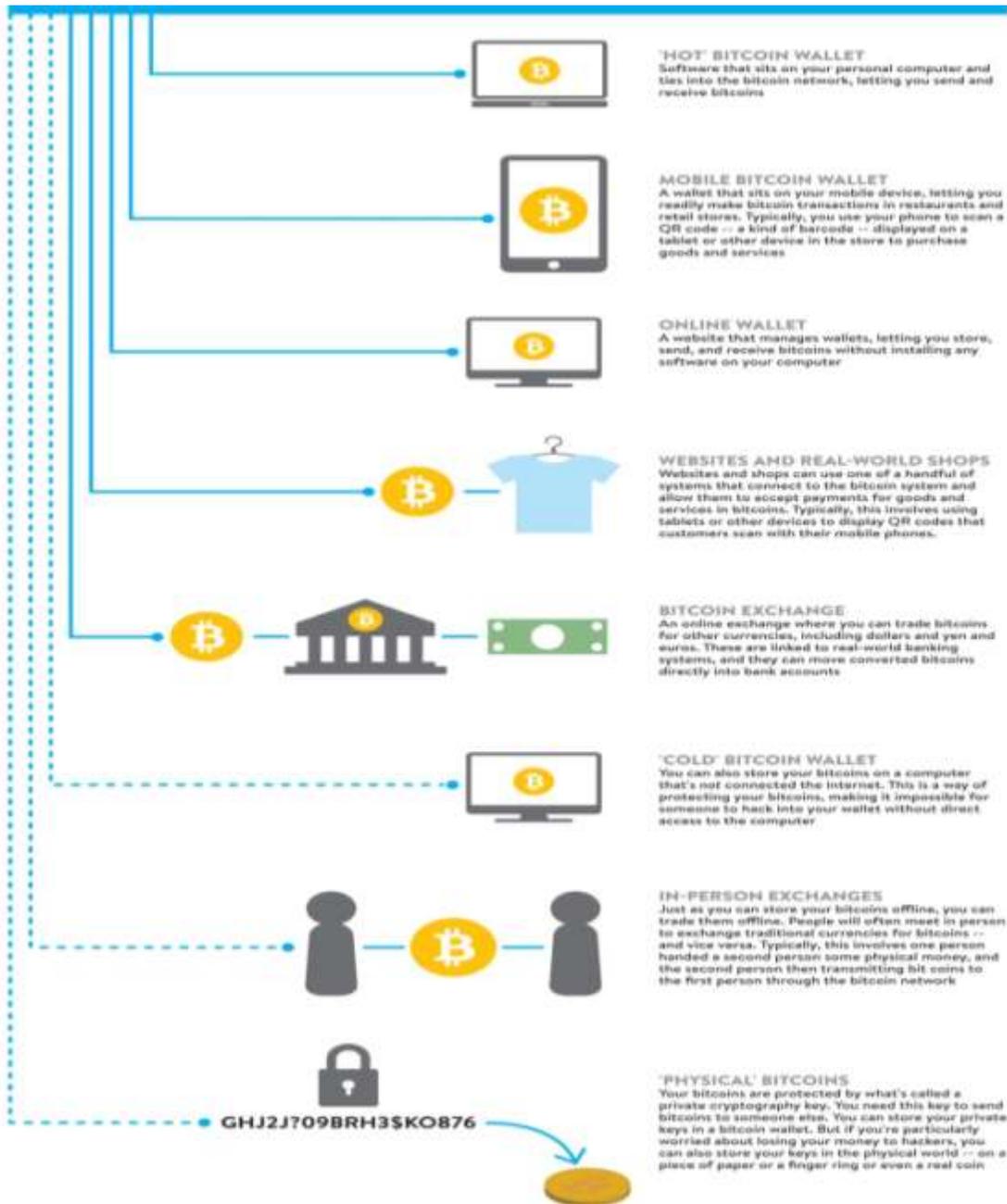
1.3 How are bitcoins different from normal currency?

There are several key characteristics that separate Bitcoin from normal fiat currencies. Bitcoins are not stored by one central authority. Any machine that processes bitcoin transaction and mining can be a part of the controlling network and all the machines work together. So no one central authority can interfere with working of Bitcoin and its policies to cause a meltdown or take away the bitcoins. If a part of a network stops working and goes offline, the rest of the process keeps on

happening. A normal bank will require you to fulfil many pre-requisites and paper work before opening even a simple bank account. A business or merchant account for payment is even more of a hassle. With the bitcoin, it takes mere seconds to setup an account, no questions asked and no upfront dues required.

Bitcoin Miners are a network of computers, spread across the globe, that drive the bitcoin digital currency system. Anyone can setup a bitcoin miner, providing additional processing power to the network, and they're encouraged to do so. Miners also generate bitcoins, i.e. money, for those who operate them.

Anatomy of Bitcoins





A user can have multiple bitcoin addresses, and the information linking isn't personal like names, addresses etc. However bitcoin is extremely stringent in storing the details of every single transaction that ever happened in its gigantic version a ledger, known as block chain. The block chain has all the info. If you have a public bitcoin address, anyone can know how much bitcoins are at that address, though they would not know that it is yours. There are some actions that can increase your privacy like changing bitcoin addresses consistently and not transferring many bitcoins to a single address.

Bitcoin also don't charge for international transfers. You can send your money anywhere and see it arrive in minutes, as soon as bitcoin network finishes processing the payment. The most important characteristic of Bitcoin and what specifically differentiates it from conventional money is that it is decentralized i.e. no one particular institution has complete control over bitcoin network. Many people like this feature because they like the fact that no large bank can control their money.

The number of bitcoins mined would go down as the years pass by. The limited production is aimed at curbing inflationary tendencies in the ecosystem. The bitcoin network has put in place rules regarding the release of bitcoins (through mining). Each time a new block is validated, freshly minted bitcoins are used to reward miners (in effect released into the transaction sphere). The reward, initially, was 50 BTC, which fell to 25 BTC in 2012 and more recently to 12.5 BTC. This process of reducing the 'fresh release' of bitcoins is called 'halving'. Consider bitcoin as a rupee coin now; it can be fragmented into small bits. So if you successfully solve a block as a miner, you may get 0.2 or 0.3 bit of a bitcoin. Bitcoins can be fragmented far more times than a fiat currency.



2. Evolution of Bitcoins

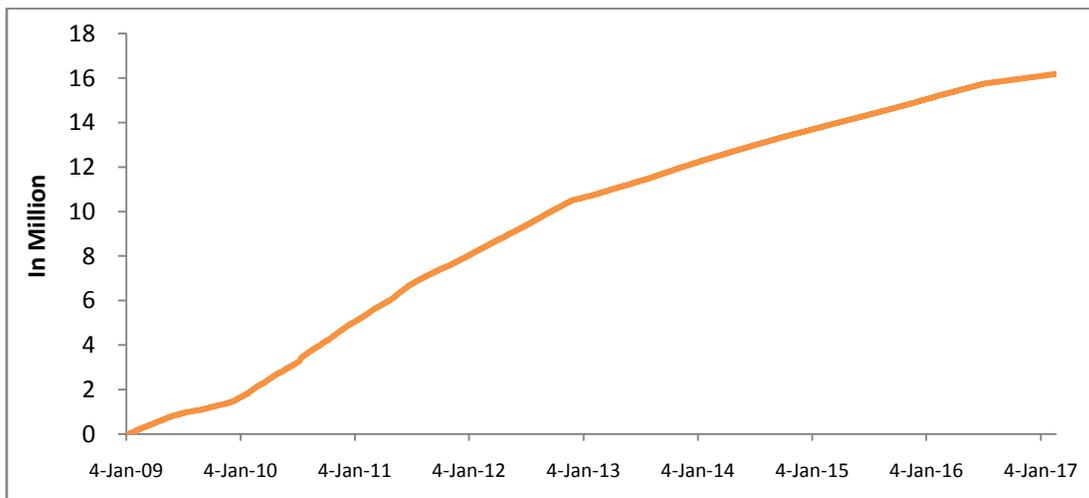
The primary use of bitcoins was always envisioned as a form of currency. However, as a form of payment and currency, there's been a need to correlate it to a monetary value. Thus bitcoins are like all other currencies, in that their value may fluctuate, and this value can be denominated in various currencies, such as the Australian dollar, Indian Rupee or the American dollar.

Once you correlate the value of a bitcoin to the dollar, you create the opportunity for it to be seen as a way to profit monetarily to investors. If the value of bitcoin can rise or fall and this value can be connected to a dollar value, an investor may see this as an opportunity to make money on the value of that bitcoin. Although it wasn't the original intent of bitcoins to be treated in this manner, the reality is that today they are, and there are various tools that people can use to make investment returns off of the cyber currency. Since its inception in 2009, bitcoins have gained tremendous coverage in the global arena and financial markets. The evolution of bitcoins can be elaborated from the charts below.

2.1. Bitcoins in Circulation

Bitcoins in circulation are the total number of bitcoins that have already been mined; in other words, the current supply of bitcoins on the network.

Chart 2.1: Bitcoins in Circulation



Source: PHD Research Bureau; Compiled from Blockchain.info

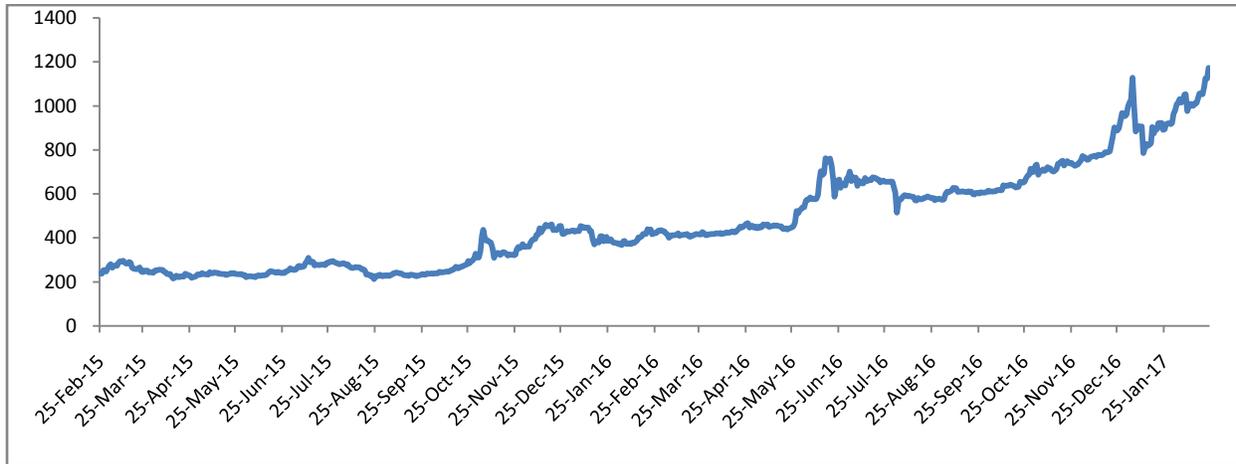
The number of bitcoins in circulation during January 2009 was 50 BTC. Since then, the growth in bitcoins circulation witnessed a significant surge to 16,188,075 BTC on 27th February 2017. Prior to January 2013, the growth in bitcoins circulation was relatively steep as nearly half of the pegged bitcoins were already mined in the first four years of its inception. It can be illustrated from the chart above that post 2013, the growth of bitcoins, although positive, remained flatter compared to pre-2013 period. The supply of coins grows steadily because of the way bitcoin is programmed. Each miner introduces new coins to the supply at a rate of 12.5 coins roughly every 10 minutes. This adds up to over 1,700 new bitcoins per day.



2.2. Market Price (in USD)

Market price of bitcoins is the average USD market price across major bitcoin exchanges.

Chart 2.2: Market Price of Bitcoins (in USD)



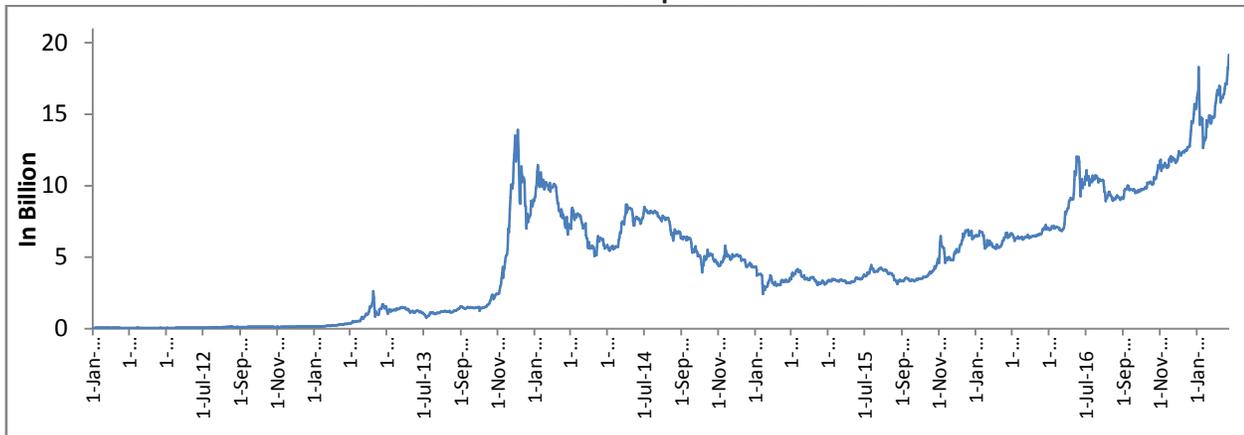
Source: PHD Research Bureau; Compiled from Blockchain.info

As on 27th February 2017, the market price of bitcoins was USD 1,191. Between January 2009 and August 2010, the market price of bitcoin was zero. Since then, the market price gained tremendous ground to reach USD 1,120 on 30th November 2013. In the recent years, on the back of rising popularity and acceptance of bitcoins across the globe, the market price of bitcoins embarked on a consistent rising trajectory, as shown in chart 2.2.

2.3. Market Capitalization of Bitcoins

Market Capitalization of bitcoins is the total USD value of bitcoin supply in circulation, as calculated by the daily average market price across major exchanges.

Chart 2.3: Market Capitalization of Bitcoins



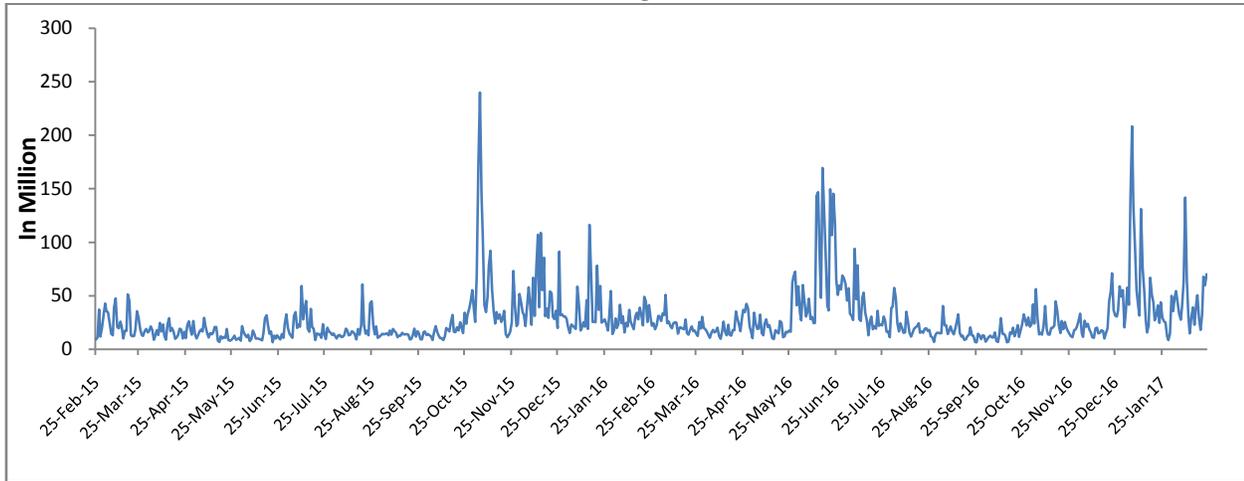
Source: PHD Research Bureau; Compiled from Blockchain.info

The market capitalization of bitcoins on 27th February 2017 stood at USD 19.325 billion. In a period of 5 months, market capitalization of bitcoins have gained tremendous footprint from USD 1 billion in July 2013 to USD 13 billion in November 2013. According to chart 2.3 above, the market capitalization for bitcoins has grown over the years on the back of expansion of digital economy and hassle free transactions.

2.4. USD Exchange Trade Volume

Exchange Trade Volume is the total USD value of trading volume on major bitcoin exchanges.

Chart 2.4: USD Exchange trade volume of Bitcoins

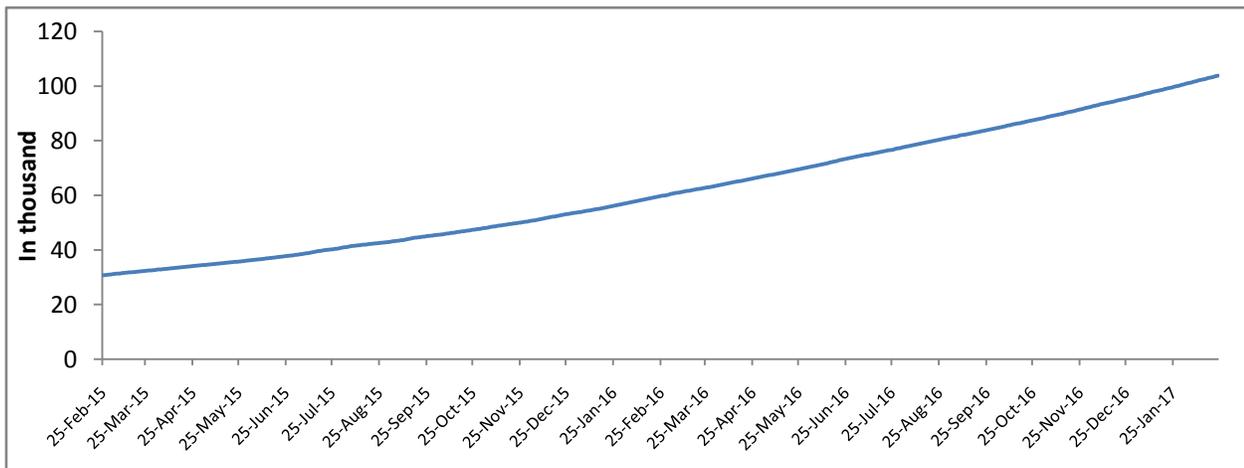


Source: PHD Research Bureau; Compiled from Blockchain.info

During January 2013 – February 2017, the exchange trade volume of bitcoins witnessed high variations. Presently, the trade volume of bitcoins stood at USD 39.23 million on 27th February 2017. The maximum trade volume achieved by Bitcoins was on 4th November 2015 at USD 240.09 million.

2.5. Block Chain Size

Block chain size is the total size of all block headers and transactions (Not including database indexes)



Source: PHD Research Bureau; Compiled from Blockchain.info

The Block chain size of bitcoins has grown opulently from 10 Mega Bytes (MB) in January 2011 to 104,396 Mega Bytes (MB) in February 2017. The Chart above suggests that the world is getting more integrated with the concept of bitcoins.

3. Global Perspective on Bitcoins

3.1. Introduction

Although bitcoin has not replaced any national currency as the principal medium of exchange yet, its use has gained traction in several developed countries, especially the ones that are fast doing away with cash. Estonia, Denmark, Sweden, Finland, South Korea, the US, Canada, the UK and Australia have seen bitcoin being increasingly adopted for use digitally.

At least one country—Cyprus—saw the new technology being adopted in a time of economic adversity. The Cypriot banking crisis of 2013 saw bitcoin emerge as a preferred option, with the country even becoming home to the world's first bitcoin ATM. Today, there are more than 500 different cryptocurrencies, but Bitcoin still booming the ruling radical advantage.

The United States

The United States has hired a generally positive method against bitcoin. At the same time, it has special government agencies deceive preventing or shortening the use of bitcoin for illegal transactions. Prominent businesses like Dish Network (DISH), Dell, and Overstock.com (OSTK) welcome payment in bitcoin.

Canada

Like its southern neighbor the United States, Canada maintains a usually bitcoin friendly stance moment also ensuring the crypto-currency is not used for money laundering. Bitcoin is viewed as an asset by the Canada Revenue Agency (CRA). This measure that bitcoin transactions are viewed as trade transactions, and the interest generated is treated as business income. Canada considers bitcoin exchanges to be money service businesses. This brings them lower the circle of the anti-money laundering (AML) laws.

Australia

Australia gives entities to trade, mine, or buy bitcoin. The Australian Taxation Office (ATO) considers bitcoin transactions trade method based on appropriate taxes belong to the use and user.

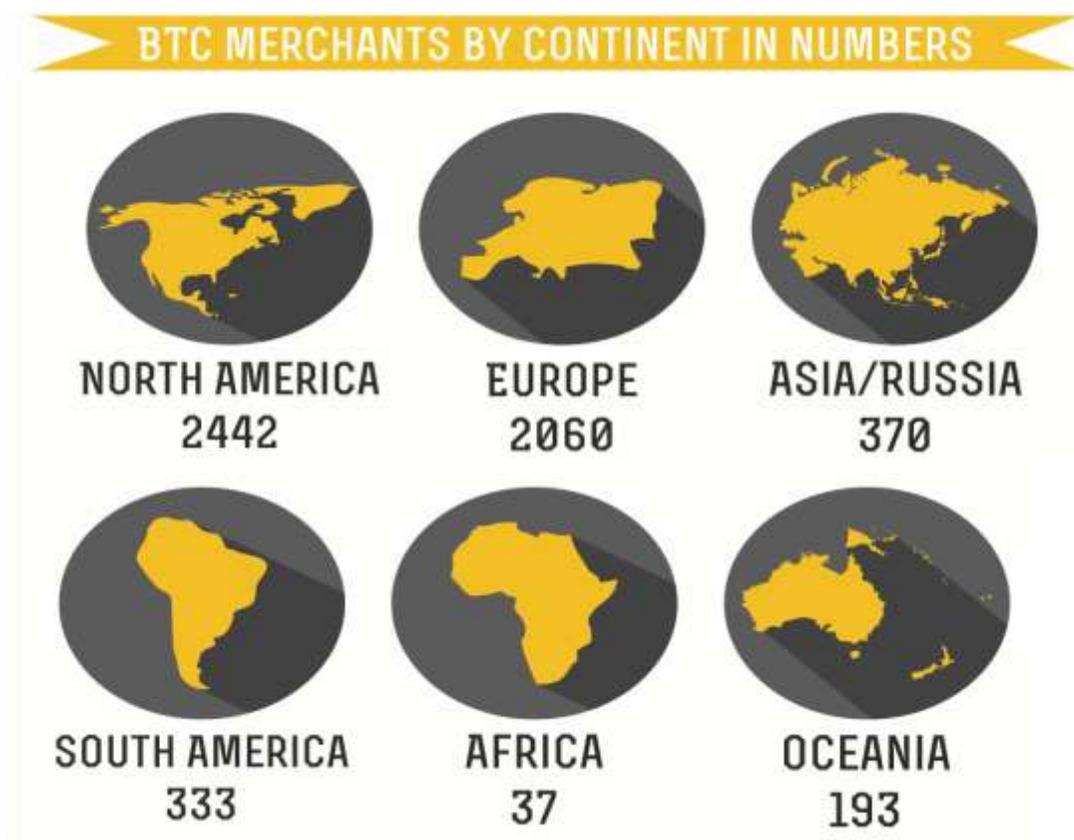
The European Union

Though the European Union (EU) has followed developments in crypto-currency, it has not delivered any official outcome on legality, acceptance, or regulation. In the absence of central supervision, individual EU countries have developed their own bitcoin stances. A few nations are giving bitcoin while others are either undecided or issuing warnings.

Other Major Countries

In Finland, the Central Board of Taxes (CBT) has given bitcoin a sales tax exempt status by classifying it as a financial service. The Federal Public Service Finance of Belgium has also made bitcoin exempt from value-added tax (VAT). In Cyprus, bitcoins are not supervised or regulated but are not illegal either. The Financial Conduct Authority (FCA) in the United Kingdom (UK) has a pro-bitcoin stance and wants the governing environment to be supporting of the digital currency. The National Revenue Agency (NRA) of Bulgaria has also brought bitcoin under its current tax laws. Germany is open to bitcoin; it is treated

legal but taxed extraordinarily depending upon in case the authorities are dealing with exchanges, miners, enterprises, or users.



3.2. Reasons for surge in Bitcoins across the globe

- **Capital Controls:**

Global restrictions on sovereign currencies are playing a major role in driving increased bitcoin demand.

- **Anticipated Reduction in Remittances:**

Isolationist policies by some governments to restrict remittances are pushing consumers into Bitcoin as well.

- **Slowing Supply Growth:**

The explosion of bitcoin supply growth is slowing, with so-called miners getting fewer electronic coins in exchange for letting the network use their computing power.

- **Increased Acceptance:**

The use of bitcoins by investors and online shoppers is growing at a steady clip, with more than 1.1 million accounts known as “Wallets” added in the third quarter.

- **Corruption Crackdown and the War on Terror:**



Governments all over the world are boosting reporting standards of assets abroad and allocating more resources to figuring out how and where illegal cash moves around. That's boosting demand from people who want to receive and send cash without all the oversight.

Right now the currency is tricky to use, both in terms of the technological terms required to actually acquire Bitcoins, and finding somewhere to spend them. To get them, you have to first set up a wallet, probably online at a site, and then pay someone hard currency to get them to transfer the coins into that wallet. Bitcoin's monetary policy would only be relevant if it were to be adopted by an entire economy, perhaps which isn't going to happen any time soon.

4. India's perspective on Bitcoins

4.1. Introduction

The combined trading volumes (all exchanges put together) could be in the range of Rs. 200–250 crore per month in India. Roughly Rs. 1,200–1,500 crore worth of bitcoins are traded in India every year. A few e-commerce sites accept bitcoins. A few users — residing abroad — use the crypto currency to remit money home. Most Indians buy bitcoins as an investment vehicle. They buy bitcoins when prices are low, and sell when prices go up.

The electronic coin that trades and is regulated like Oil and Gold surged 79% since the start of 2016 to USD 778, its highest level since early 2014. That's four times the gains posted by Russia's Ruble and Brazil's Real, the world's top two hard currencies.

After its 2008 creation, enthusiasts hailed Bitcoin as the next big thing in foreign exchange markets and an obvious monetary evolution in an increasingly digital world. By 2014, its value tumbled 58 percent as governments cracked down on its use and a major exchange lost account-holders' funds. There are a number of reasons the hard-to-track currency is staging a comeback now, from capital controls in places like China to isolationist rumblings in the U.K. and U.S. as well as increased adoption by Companies and Consumers.

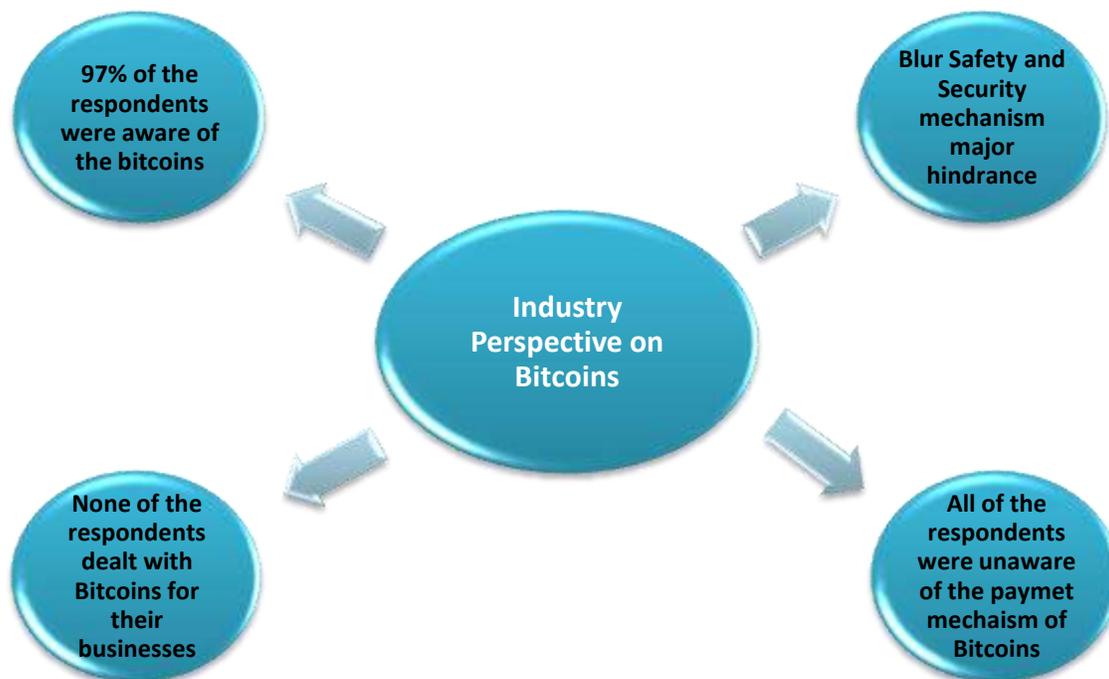
Owning a bitcoin is easy. You have to first open (simply free-download) an account with one of the many exchanges like Zebpay or Coinsecure. Most bitcoin exchanges ask for KYC documents like PAN card and bank account details. Once the account is opened, the new user is asked to deposit money into one of the several bank accounts of the exchange (using NEFT/RTGS). The money deposited (in the exchange's bank) would be used to buy bitcoins on the bourse.

4.2. Industry Perspective on Bitcoins

This chapter will focus on the world of bitcoins and its utilization by the Indian industries. To understand the ground level reality, we have conducted an in-depth survey. The interview was conducted through a structured questionnaire. However, attempts were made to collect other information also which are of potential importance to the Indian industry and use of bitcoins.

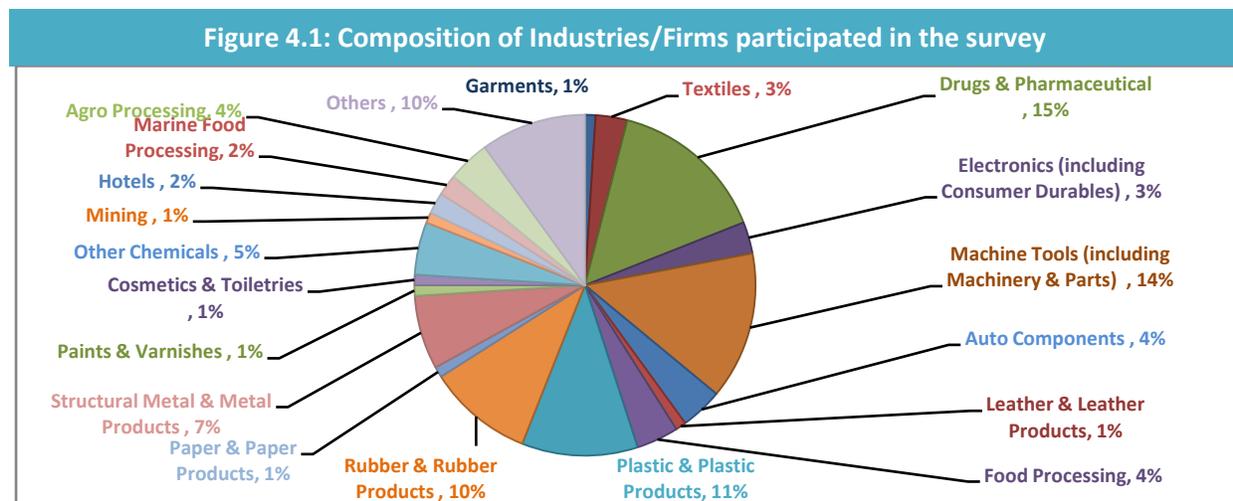
The survey questionnaire was circulated to 1800 people, directly or indirectly, associated with an industry. Out of the 1800 people, the response sample size constituted of 223 industry stakeholders. The responses are from the basket of 21 differentiated industries, viz. garments, textiles, drugs and pharmaceutical, electronics (including consumer durables, electrical appliances (including white goods), machine tools (including machinery and parts), auto components, leather & leather products, sugar, food processing, plastic and plastic products, rubber and products thereof, paper and products thereof, structural metal and products thereof, paints and varnishes, cosmetics and toiletries, other chemicals, mining, hotels, marine food processing, and agro processing.

Key findings are summarized below according to the parameters prescribed in the PHD CCI survey:

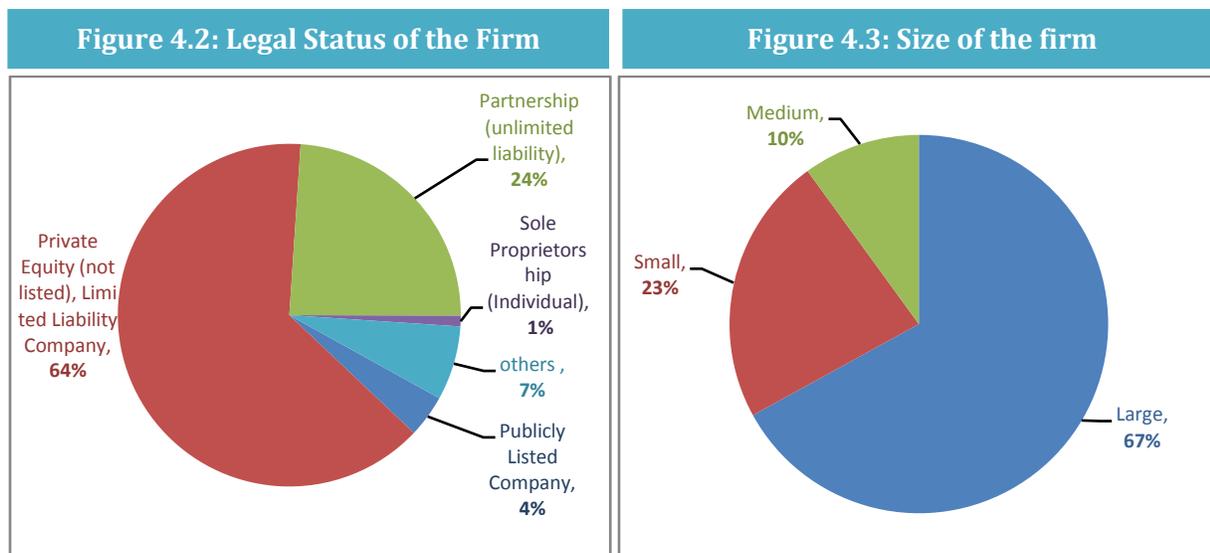


4.3. Composition of Industries/Firms in the survey

The survey was conducted with the firms/industries across various sectors. The assessment of the survey revealed that majority of the respondents was from drugs & pharmaceuticals (15%); followed by machine tools (including machinery and parts) (14%); plastic and plastic products (11%); rubber and rubber products (10%) among others.



Source: PHD Research Bureau



Source: PHD Research Bureau

Based on the survey conducted, it was revealed that nearly 64% of firms contributed their responses were private equity (not listed), limited liability company, followed by partnership (unlimited liability) with 24% share; others (7%); and sole proprietorship (individual) and publically listed company with combined share of 5%, according to figure 6.2 above. Also, majority of the respondent firms participated were large sized, viz. 67%; followed by small sized (23%) and medium sized (10%), based on the average revenue generated in the previous three years, according to figure 6.3 above.

4.4. Survey Results

The survey conducted by the PHD Research Bureau on the Industry perspective on Bitcoins have reaped some remarkable results, which helped in accessing the current ecosystem of bitcoins across the industries in India. The survey revealed that 97% of the respondents were aware of the bitcoins. Astoundingly, none of the respondents dealt with bitcoins as the actual user of bitcoins for their business. This suggests that due to lack of proper vigilance and regulation, Indian industry has remained far away from the use of bitcoins. Further, the survey results also revealed that vague and convoluted security aspects of bitcoins have made Indian Industry reluctant for making transactions and payments for their businesses.

In India, Bitcoin prices depend on a lot of factors like international prices, market volatility, overall demand and supply in India. At times, the Indian buy and sell prices are 5-10% higher than international market. This happens when there is high demand for bitcoins in India and sellers are not ready to sell cheap. Similarly, there are days when Indian buy and sell prices are lower than the international market. It is important to note that, even in the international market at times, there is 5% gap between China and USA price and there are price gaps even within USA exchanges



5. Regulatory and monitoring mechanism of bitcoins

The distribution of trust and secure to the peer-to-peer network of bitcoins is governed by a consensus mechanism called proof-of work. The consensus algorithm reverse engineers the current financialization scheme. Through using bitcoin as a token of value with a combination of cryptographic hash functions, game theory and economic incentives, a whole new economy is now being created. Bitcoin mining is the heart of the system. It is a broadcast math competition engaged by a network of computers around the world with clear rules, including the total number of bitcoin created, a predictable issuance rate and automatic adjustment of mining difficulty.

By using precious resources, miners work to solve difficult mathematics problems. Each 10 minutes, problems are solved and whoever solves the problem first wins a fixed number of bitcoins. This process leads to both creation of money and clearing of transactions and it is designed to create economies of scale, with rewards proactively incentivizing all to follow the network rules of consensus.

What make the global Bitcoin heart beat and its ecosystem thrive is not just miners and developers, but everyone's participation in the network. This includes merchants, investors, entrepreneurs and users. By removing third parties, the inventor of this technology found a way to create a direct feedback loop among all participants, aligning the balance of supply and demand with the force of consensus, which is more democratic than the current oligarchic system that operates under a pretense of democracy.

In the current financially engineered market, monetary supply does not correlate with the real demands of people. Yet, with this new Bitcoin market, monetary supply is created through real demand with the feature of infinite divisibility (bitcoin can be divided into 8 decimal points and more if consensus is reached).

The only way miners and developers get paid for their work is to be on the side of consensus, so they are incentivized to respond to the demands of users. Instead of pumping money like a central bank printing press, this globally stretched heart is a receptive organ. It listens to the impulse to transact freely that comes from everywhere and the network self-regulates to develop its own immunity against both internal and external attacks.

Governance without central authority

Over the decades, democratic governments have become vehicles of control that have lost their fail-safe. Satoshi's white paper published in 2008 cleared a path for evolution. This wisdom can help humanity solve the problem of a historic failure of accountability.

Bitcoin un-governs people as well as un-banking them around the world. Proof-of-work distributes what used to be third party trust across a massive global decentralized network, fostering a kind of self-governance in each individual. People who till now have been blindly handing over their consent to institutions can instead choose to be equal under the law of mathematics.

Governance without central authority can at first seem inefficient. But it is more secure than the current system of representation. The more the system reduces the need to trust a third party, replacing it with a borderless network, the lower the security risk becomes. With Bitcoin, governance can be innovated to function as a platform of consensus. Rather than a system to govern others, it can be used as



settlement; to work out disputes and reconcile conflicts. Distributed trust as its core technology enables the capacity to set up rules agreed to by everyone, which cannot be altered by one person or group. The Bitcoin blockchain opens a door into a pluralistic society where all can participate in creating governance models and currencies that manifest their values through the principle of mutual aid and voluntary association.

On the other hand, as Bitcoin gains more value, proof-of-work becomes a lightning rod, attracting malicious attackers. Each 10 minutes, the heart of the Bitcoin network expands, time-stamping out greed and antisocial impulses, while confirming our altruistic nature. Through a network of consensus built upon this virtue of selflessness, humanity that once was known as killer apes can now become a species capable of love.

RBI's take on Bitcoins

The Reserve Bank of India (RBI) on 1 February 2017 said that it has not given any license or authorization to any entity or company to operate virtual currency schemes or deal with bitcoin or any virtual currency. "Any user, holder, investor or trader dealing with virtual currencies is doing it at their own risk," said RBI in a release on its website.

This is not the first time that the central bank has issued a cautionary note in this regard. In December 2013, it had cautioned users, holders and traders of virtual currencies, including bitcoins, about the potential financial, operational, legal, customer protection and security risks they are exposing themselves to.

6. Conclusions

Bitcoin is a new concept, but it's in the process of being understood and adopted by a growing number of consumers, businesses, and investors around the world. As this process continues the reasons to start using bitcoins are becoming more compelling. There is also increased investment in the sector and many new finance companies are offering more professional and consumer friendly solutions for everyday use.

Over the past few months, bitcoin adoption is rapidly ascending in India, coupled with the government's decision to demonetize Rs.500 and Rs.1,000 notes. Bitcoin and other virtual currencies have begun to gain widespread acceptance in India, despite lower internet penetration and a natural skepticism of assets not backed by tangible entities such as land. The central bank had issued a notice on the risks involved and added that it could be used for money laundering and funding terrorism activities. It stopped short, however, of issuing a ban or any other restrictions.

Bitcoin poses some technological and financial risks, such as permanent loss of capital. However, as these risks are mitigated, more consumers, merchants, and investors should start learning about and using Bitcoin. Indian Bitcoin companies are seeing a lot of growth, and they don't see it slowing anytime soon. At the present time, there isn't much regulation throughout the land, and this seems to have brought more prosperous innovation and business building within India's digital currency sector.

It seems Bitcoin is prospering quite well in India and industry appreciates the concept. However, the industry remains a bit skeptical on the security and regulatory aspects of bitcoins coupled with the technicalities associated with bitcoins. Citizens and Industry can find it easier to pay bills, for funds transfer and low transaction costs are quite appealing considering the fees set by traditional banks and financial institutions. The goal of catching up to other countries transacting with Bitcoin quite heavily should be easy to attain with its steady rise in popularity.

Irrespective of the regulatory and security aspects associated, bitcoins have gained tremendous footprint over traditional currency or credit cards across the globe on the back of underpinned advantages it hold :-

- Between buyer and seller, there's no bank or credit-card Company involved, no middleman who can charge fees. The entire Bitcoin banking system is a global peer-to-peer network, running Bitcoin software.
- When one buys something from someone in another country, there's no waiting to convert currencies—and again, no fees.
- All transactions are essentially anonymous, which is super convenient to maintain secrecy.
- There's a whole lot of really complicated math involved in Bitcoin, designed to keep it secure and to prevent Bitcoin inflation.



- ✓ **For example:** The complete record of all Bitcoin transactions—a massive digital ledger called the blockchain—is stored on all Bitcoin users’ computers, rather than being held by a central authority.
- ✓ However, this requires massive, expensive, high-horsepower computers that must slog through gigantic calculations to “mine” new money. The complexity of the math involved is adjusted so that it’s just barely profitable to mine bitcoins.
- The production of bitcoins will stop when there are 21 million bitcoins on earth, which is supposed to happen by the year 2140.
- When we get a Bitcoin address—something like an email address—we also get a complex password known as a private key, which we need to access.
 - ✓ At that point, we can transfer money to other people by sending it to their Bitcoin addresses.
- However, the big picture is that the list of places that accept Bitcoin is fairly limited and scarce.

Bitcoin as an instrument of investment

Since Bitcoin’s inception, its value has gone up by quite a bit—from well under a penny to over USD 1,100 per bitcoin today. However, the value is incredibly volatile. Therefore, to conclude, Bitcoin is fascinating, but it’s not very useful, at least not to most people. Some people love it, for sure, like investors with a taste for risk, tech-savvy early adopters, and technically-minded libertarians. However, we have to keep in mind that there are lots of exciting ways to lose all our Bitcoins. Like if a hard drive crashes without a backup, and we lose our private key. Or if we get a Bitcoin virus, of which there are now many. Or if the Bitcoin exchange goes out of business, which has happened plenty; in fact, 18 of the first 40 exchanges had gone under as of 2013, taking all their clients’ money with them.

Bitcoin wallets are stored in computers or mobile devices; in case those devices get stolen there is a huge possibility that you may not be able to recover your bitcoins. In addition, due to its non-existence by authorities you may not be able to report it as well. Remember, this whole thing is largely unregulated. If we buy something with a credit card and we get ripped off, we can call the credit-card company to give our money back. But if we get ripped off with a Bitcoin transaction, it is impossible to get the money back. A global monitoring body or a regulatory organization should be build up to keep an eye on the ecosystem of bitcoins and its mechanism.

Business, people and industries are attracted by bitcoins’ recent jump in value and look at it as a lucrative investment instrument. However, industry should be aware about the fact that bitcoin is just a formula, not backed by any tangible asset but by sheer demand. There is a high possibility that the world of bitcoin may crash, in case the acceptance of bitcoin is curbed. Therefore, utilizing the crypto-currency for business purposes may become highly risky.

At this juncture, PHD Chamber recommends to the industry that not to trade in bitcoins as risks are apparent and one should not indulge in the transactions which are not regulated by any regulatory body and esteemed financial institutions of the country.

How a Bitcoin transaction works

Bob, an online merchant, decides to begin accepting bitcoins as payment. Alice, a buyer, has bitcoins and wants to purchase merchandise from Bob.

WALLETS AND ADDRESSES



Bob and Alice both have Bitcoin "wallets" on their computers.



Wallets are files that provide access to multiple Bitcoin addresses.



An address is a string of letters and numbers, such as 1HULMaZEPkEPeCh43BeKULybLCWfDpN.



Bob creates a new Bitcoin address for Alice to send her payment to.

CREATING A NEW ADDRESS

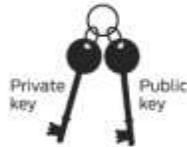


Each address has its own balance of bitcoins.

SUBMITTING A PAYMENT



Alice tells her Bitcoin client that she'd like to transfer the purchase amount to Bob's address.



Public Key Cryptography 101

When Bob creates a new address, what he's really doing is generating a "cryptographic key pair," composed of a private key and a public key. If you sign a message with a private key (which only you know), it can be verified by using the matching public key (which is known to anyone). Bob's new Bitcoin address represents a unique public key, and the corresponding private key is stored in his wallet. The public key allows anyone to verify that a message signed with the private key is valid.

It's tempting to think of addresses as bank accounts, but they work a bit differently. Bitcoin users can create as many addresses as they wish and in fact are encouraged to create a new one for every new transaction to increase privacy. So long as no one knows which addresses are Alice's, her anonymity is protected.

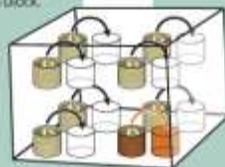
Gary, Garth, and Glenn are Bitcoin miners.



VERIFYING THE TRANSACTION

Their computers bundle the transactions of the past 10 minutes into a new "transaction block."

The miners' computers are set up to calculate cryptographic hash functions.



Private key

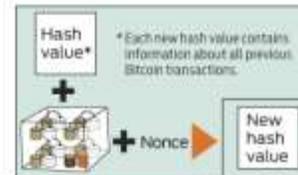


Alice's wallet holds the private key for each of her addresses. The Bitcoin client signs her transaction request with the private key of the address she's transferring bitcoins from.

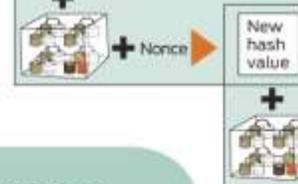
Public key



Anyone on the network can now use the public key to verify that the transaction request is actually coming from the legitimate account owner.



The mining computers calculate new hash values based on a combination of the previous hash value, the new transaction block, and a nonce.



Cryptographic Hashes

Cryptographic hash functions transform a collection of data into an alphanumeric string with a fixed length, called a hash value. Even tiny changes in the original data drastically change the resulting hash value. And it's essentially impossible to predict which initial data set will create a specific hash value.

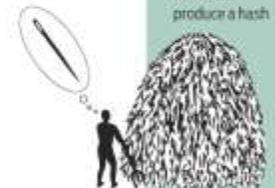
The root of all evil	6d0a 1899 086a... (56 more characters)
The root of all evil	485c 6be4 6d0e...
The root of all evil	b80b 7e9 8392...

The root of all evil ??? → 0000 0000 0000 ...

Creating hashes is computationally trivial, but the Bitcoin system requires that the new hash value have a particular form—specifically, it must start with a certain number of zeros.

Nonces

To create different hash values from the same data, Bitcoin uses "nonces." A nonce is just a random number that's added to data prior to hashing. Changing the nonce results in a wildly different hash value.



The miners have no way to predict which nonce will produce a hash

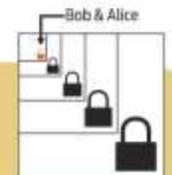
value with the required number of leading zeros. So they're forced to generate many hashes with different nonces until they happen upon one that works.

Each block includes a "coinbase" transaction that pays out 50 bitcoins to the winning miner—in this case, Gary. A new address is created in Gary's wallet with a balance of newly minted bitcoins.



TRANSACTION VERIFIED

As time goes on, Alice's transfer to Bob gets buried beneath other, more recent transactions. For anyone to modify the details, he would have to redo the work that Gary did—because any changes require a completely different winning nonce—and then redo the work of all the subsequent miners. Such a feat is nearly impossible.





SURVEY ON BITCOINS: AN UNEXPLORED TERRITORY OF TRANSACTIONS AND PAYMENTS

Guide to completing questionnaire:

- It is important, for the survey to be meaningful. Hence we request that every question is answered.
- Please give the compiler's contact details as it will help the consulting organization to contact him/her in the event of any query.
- We appreciate your time and effort to complete this questionnaire.

The responses provided would be kept strictly confidential and analysis will be done only in the aggregate. The information is being used only for research purpose and nowhere name of the company/respondent will be revealed. Standard Confidentiality clause will be applicable.

General Information

1. Name of the Firm		
2. State	3. City	
4. Industry		
<p>Industry Codes: 01=Garments; 02=Textiles; 03=Drugs & Pharmaceutical; 04=Electronics (including Consumer Durables); 05=Electrical Appliances (including white goods); 06=Machine Tools (including Machinery & Parts); 07= Auto Components; 08=Leather & Leather Products; 09=Sugar; 10=Food Processing; 11=Plastic & Plastic Products; 12=Rubber & Rubber Products; 13=Paper & Paper Products; 14=Structural Metal & Metal Products; 15=Paints & Varnishes; 16=Cosmetics & Toiletries; 17=Other Chemicals; 18=Mining; 19=Hotels; 20=Marine Food Processing; 21= Agro Processing; 22=Others (Please Specify)</p>		
5. What is the legal status of your firm?		
<p>Codes: 01=Publicly Listed Company; 02= Private Equity (not listed), Limited Liability Company; 03= Partnership (unlimited liability); 04= Sole Proprietorship (Individual); 05= others (Please Specify)</p>		
6. What was the annual turnover of your firm in the past three years?		
2013-14 (INR Crore)	2014-15 (INR Crore)	2015-16 (INR Crore)

7. Have you heard about the payment and transaction mechanism called Bitcoins?

(i) Yes	(ii) No
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If No, kindly discontinue with the survey as the following questions requires information about Bitcoins.
If Yes, kindly continue with the survey.

8. Have you ever made a transaction or payment using Bitcoins?

(i) Yes	(ii) No
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9. Have you faced any technical hassles or difficulty while transacting with Bitcoins?

(i) Very easy	(ii) Little difficult	(iii) Very difficult	(iv) Highly Complex
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10. Compared to online banking payment and transaction services, how would you rate bitcoin services?

(i) Easy	(ii) Hard	(iii) Similar
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11. Degree of transaction fees compared to Banking system?

(i) Very low	(ii) Low	(iii) Similar	(iv) High	(v) Very high
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12. How do you buy bitcoins online?

(i) Debit Card	(ii) Net Banking	(iii) Credit Card	(iv) PayPal	(v) Bitcoin teller machines
Other, if any				

13. Your opinion about the fixed cap of 21 million on bitcoins across the globe?

(i) Should be increased	(ii) Should be decreased	(iii) Adequate supply
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14. What kind of Bitcoin wallet you use?

(i) Bitcoin Classic	(ii) Bitcoin Core	(iii) Bitcoin XT	(iv) BitCore
(v) Other, if any			

15. What kind of problems you face while transacting with Bitcoins?

(i) Fraud and Chargeback	(ii) Error in Cross-border transactions	(iii) Transaction timeout	(iv) Unacceptability from receiver's end
(v) Other, if any			

16. Presently, there is no regulating authority for Bitcoins. Do you think Bitcoins mechanism should be regulated by an authority?

(i) Yes	(ii) No
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17. To promote digitization, do you think the government should promote the use of Bitcoins in India?

(iii) Yes	(iv) No
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18. Benefits you find while transacting or making payments via Bitcoin, both monetary and non-monetary?

19. Please provide your valuable suggestions and recommendations related to Bitcoins and their usage in India?

Filled by:

Contact details:



Study/Project Team

Dr. S P Sharma
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Mr. Rohit Singh
Research Associate

Disclaimer

“Industry Perspective on Bitcoins” is prepared by PHD Chamber of Commerce and Industry to provide a holistic overview on Bitcoins and its working and regulatory mechanism.

It may be noted that this book is for guidance and information purposes only. Though due care has been taken to ensure accuracy of information to the best of the PHD Chamber’s knowledge and belief, it is strongly recommended that readers should seek specific professional advice before taking any decisions.

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ISBN No. 978 93 84145 42 2

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PHD Research Bureau; the research arm of the PHD Chamber of Commerce and Industry was constituted in 2010 with the objective to review the economic situation and policy developments at sub-national, national and international levels and comment on them in order to update the members from time to time, to present suitable memoranda to the government as and when required, to prepare State Profiles and to conduct thematic research studies on various socio-economic and business developments.

The Research Bureau has been instrumental in forecasting various lead economic indicators national and sub-national. Many of its research reports have been widely covered by media and leading business newspapers.

Research Activities	Comments on Economic Developments	Newsletters	Consultancy
<ul style="list-style-type: none"> • Research Studies 	<ul style="list-style-type: none"> • Macro Economy 	<ul style="list-style-type: none"> • Economic Affairs Newsletter (EAC) 	<ul style="list-style-type: none"> • Trade & Investment Facilitation Services (TIFS)
<ul style="list-style-type: none"> • State Profiles 	<ul style="list-style-type: none"> • States Development 	<ul style="list-style-type: none"> • Economic & Business Outlook (EBO) 	<ul style="list-style-type: none"> • Business Research Consultancy
<ul style="list-style-type: none"> • Impact Assessments 	<ul style="list-style-type: none"> • Infrastructure 	<ul style="list-style-type: none"> • Global Economic Monitor (GEM) 	
<ul style="list-style-type: none"> • Thematic Research Reports 	<ul style="list-style-type: none"> • Foreign exchange market 	<ul style="list-style-type: none"> • Trade & Investment Facilitation Services (TIFS) 	
<ul style="list-style-type: none"> • Releases on Economic Developments 	<ul style="list-style-type: none"> • Global Economy & International Trade 	<ul style="list-style-type: none"> • State Development Monitor (SDM) • Forex and FEMA Committee Newsletter 	



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Ms. Sunita Gosain	Secretarial Assistant	Secretarial & Administrative processes



Studies Undertaken by PHD Research Bureau

A: Thematic research reports

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13. India- Africa Promise Diverse Opportunities: Suggestions Report (November 2013)
14. Annual survey of Indian Direct Selling Industry-2012-13 (December 2013)
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25. The Indian Direct Selling Industry Annual Survey 2013-14 (November 2014)
26. Participated in a survey to audit SEZs in India with CAG Office of India (November 2014)
27. Role of MSMEs in Make in India with reference to Ease of Doing Business in Ghaziabad (Nov 2014)
28. Exploring Prospects for Make in India and Made in India: A Study (January 2015)
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B: State profiles

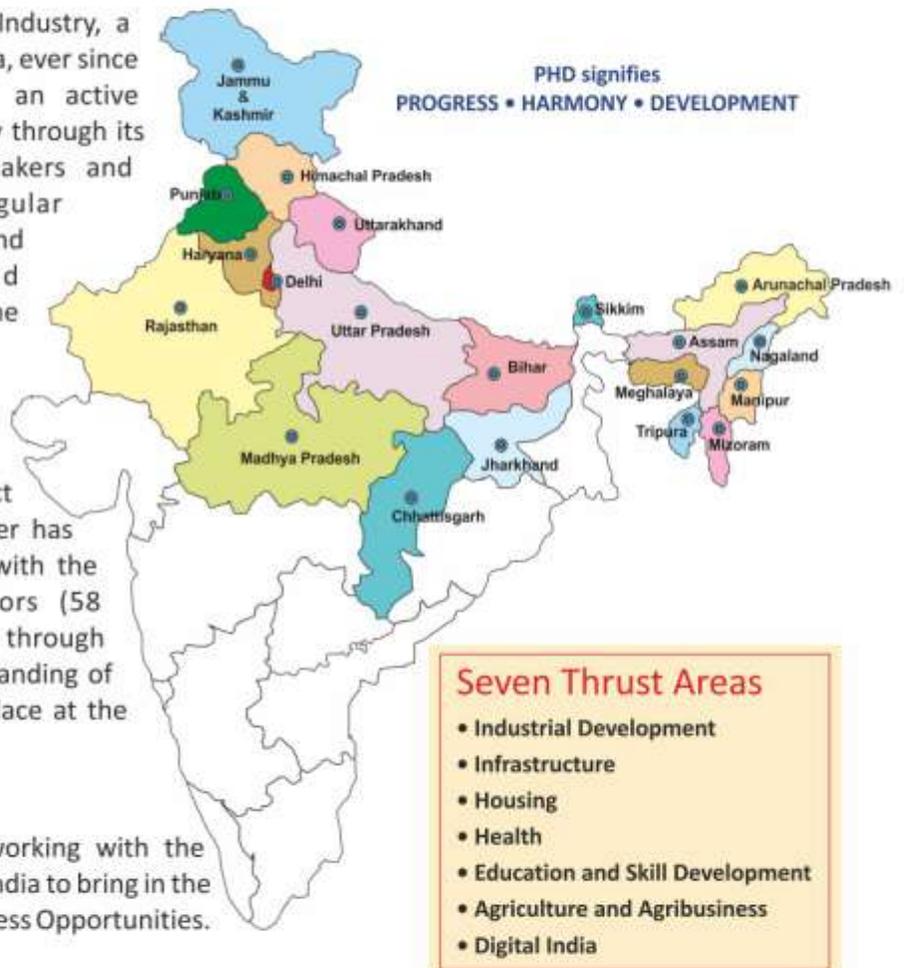
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58. Punjab: The State Profile (November 2011)
59. J&K: The State Profile (December 2011)
60. Uttar Pradesh: The State Profile (December 2011)
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69. Suggestions for Progressive Uttar Pradesh (August 2015)
70. State profile of Telangana- The dynamic state of India (April 2016)
71. Smart Infrastructure Summit 2016- Transforming Uttar Pradesh (August 2016)
72. Rising Jharkhand: An Emerging Investment Hub (February 2017)



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PHD Chamber of Commerce & Industry, a leading Industry Chamber of India, ever since its inception in 1905, has been an active participant in the India Growth Story through its Advocacy Role for the Policy Makers and Regulators of the Country. Regular interactions, Seminars, Conference and Conclaves allow healthy and constructive discussions between the Government, Industry and International Agencies bringing out the Vitals for Growth. As a true representative of the Industry with a large membership base of 48000 direct and indirect members, PHD Chamber has forged ahead leveraging its legacy with the Industry knowledge across sectors (58 Industry verticals being covered through Expert Committees), a deep understanding of the Economy at large and the populace at the micro level.

At a Global level we have been working with the Embassies and High Commissions in India to bring in the International Best Practices and Business Opportunities.



"Lead the Change - Make the Difference"

PHD CHAMBER OF COMMERCE AND INDUSTRY

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